

NSARB-2023-001-APP-004

EXHIBIT 4

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REPORT ON THE OUTCOMES OF CONSULTATION

AQ#1205x, AQ#1432, AQ#1433

Submission to the Nova Scotia Aquaculture Review Board

Nova Scotia Department of Fisheries and Aquaculture

TABLE OF CONTENTS – REPORT ON THE OUTCOMES OF CONSULTATION
AQ#1205x, AQ#1432, AQ#1433

DOCUMENT		PAGE #
1.0	DESCRIPTION OF APPLICATIONS	3
2.0	CONSULTATION WITH MUNICIPAL, PROVINCIAL AND FEDERAL AGENCIES	10
3.0	SUMMARY OF CONSULTATIONS WITH THE MI'KMAQ OF NOVA SCOTIA	14

LIST OF APPENDICES

APPENDIX		PAGE #
Appendix A	Network Memo and Network Agency Review of an Aquaculture Application	21
Appendix B	Fisheries and Oceans Canada	30
Appendix C	Canadian Food Inspection Agency	337
Appendix D	Transport Canada	348
Appendix E	Environment and Climate Change Canada – Canadian Shellfish Sanitation Program	437
Appendix F	Environment and Climate Change Canada – Canadian Wildlife Service	448
Appendix G	NS Department of Environment (Now Department of Environment and Climate Change)	476
Appendix H	NS Department of Agriculture	488
Appendix I	NS Department of Municipal Affairs (Now Department of Municipal Affairs and Housing)	499
Appendix J	NS Department of Communities, Culture and Heritage (Now Department of Communities, Culture, Tourism and Heritage)	514
Appendix K	NS Department of Lands and Forestry (Now Department of Natural Resources and Renewables)	624
Appendix L	NS Department of Fisheries and Aquaculture – Inland Fisheries	704
Appendix M	NS Office of Aboriginal Affairs (Now Office of L'nu Affairs)	715

1.0 DESCRIPTION OF APPLICATIONS

In 2016, the province identified that a portion of the infrastructure present on AQ#1205 was outside the bounds of the issued lease space. This is in contravention to section 55(2)(b) of the *Aquaculture Licence and Lease Regulations*. Nova Scotia Environment (now Nova Scotia Environment and Climate Change) provided two options to Kelly Cove Salmon Ltd. (KCS) to bring their operation into compliance regarding the said Regulation. On March 6, 2019, KCS submitted an application to the Nova Scotia Department of Fisheries and Aquaculture (DFA) for an adjudicative boundary amendment for AQ#1205, known as Coffin Island. AQ#1205 is located in Liverpool Bay (Figure 1a), in Queens County, and is currently licenced to culture Atlantic salmon (*Salmo salar*) and rainbow trout (*Oncorhynchus mykiss*). The proposed boundary amendment application is for the cultivation of Atlantic salmon only. The current lease is 3.99 hectares with fourteen (14) cages in a 2 x 7 configuration. The proposed amendment to site AQ#1205 will increase the lease to 40.70 hectares and consist of twenty (20) cages, in a 2 x 10 configuration (referred to as AQ#1205x) (Figure 1b). The proposed boundary amendment will expand the boundaries of the issued lease space encompassing all aquaculture equipment and aquacultural produce that is currently present on the site as well as the additional proposed equipment.

On March 6, 2019, KCS also submitted applications to the DFA for two new marine finfish licences and leases (Reference Files AQ#1432 and AQ#1433), known as Brooklyn and Mersey Point, respectively, in Liverpool Bay, Queens County (Figure 2a and Figure 3a, respectively). Each of the proposed sites are 40.70 hectares (Figure 2b and Figure 3b, respectively), each with twenty (20) cages in a 2 x 10 configuration. Each proposal is for the culture of Atlantic salmon.

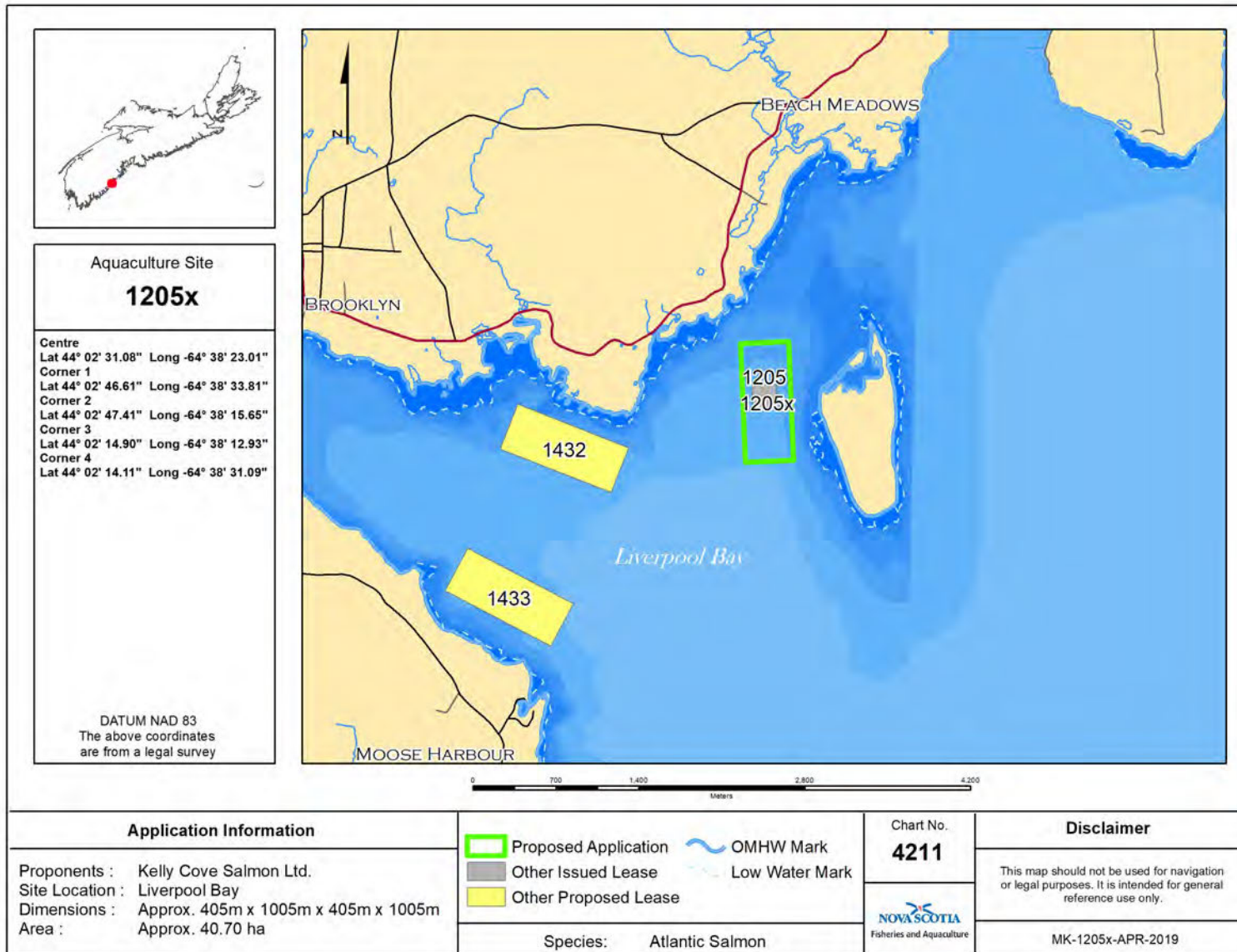


Figure 1a. Proposed site AQ#1205x. Please refer to DFA’s Site Mapping Tool at <https://novascotia.ca/fish/aquaculture/site-mapping-tool/> for an interactive map showing the proposed boundary amendment.

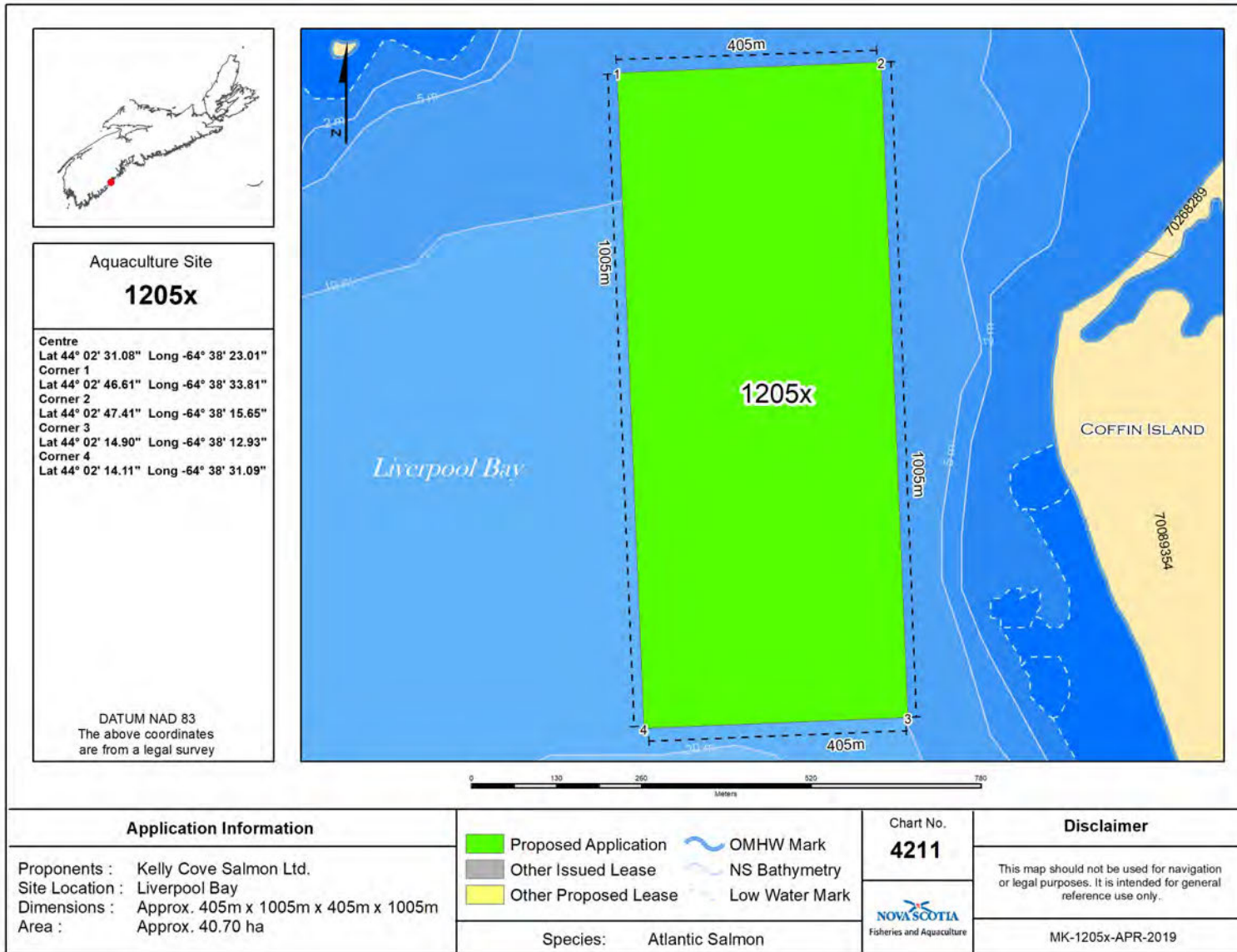


Figure 1b. Proposed site AQ#1205x. Please refer to DFA's Site Mapping Tool at <https://novascotia.ca/fish/aquaculture/site-mapping-tool/> for an interactive map showing the proposed boundary amendment.

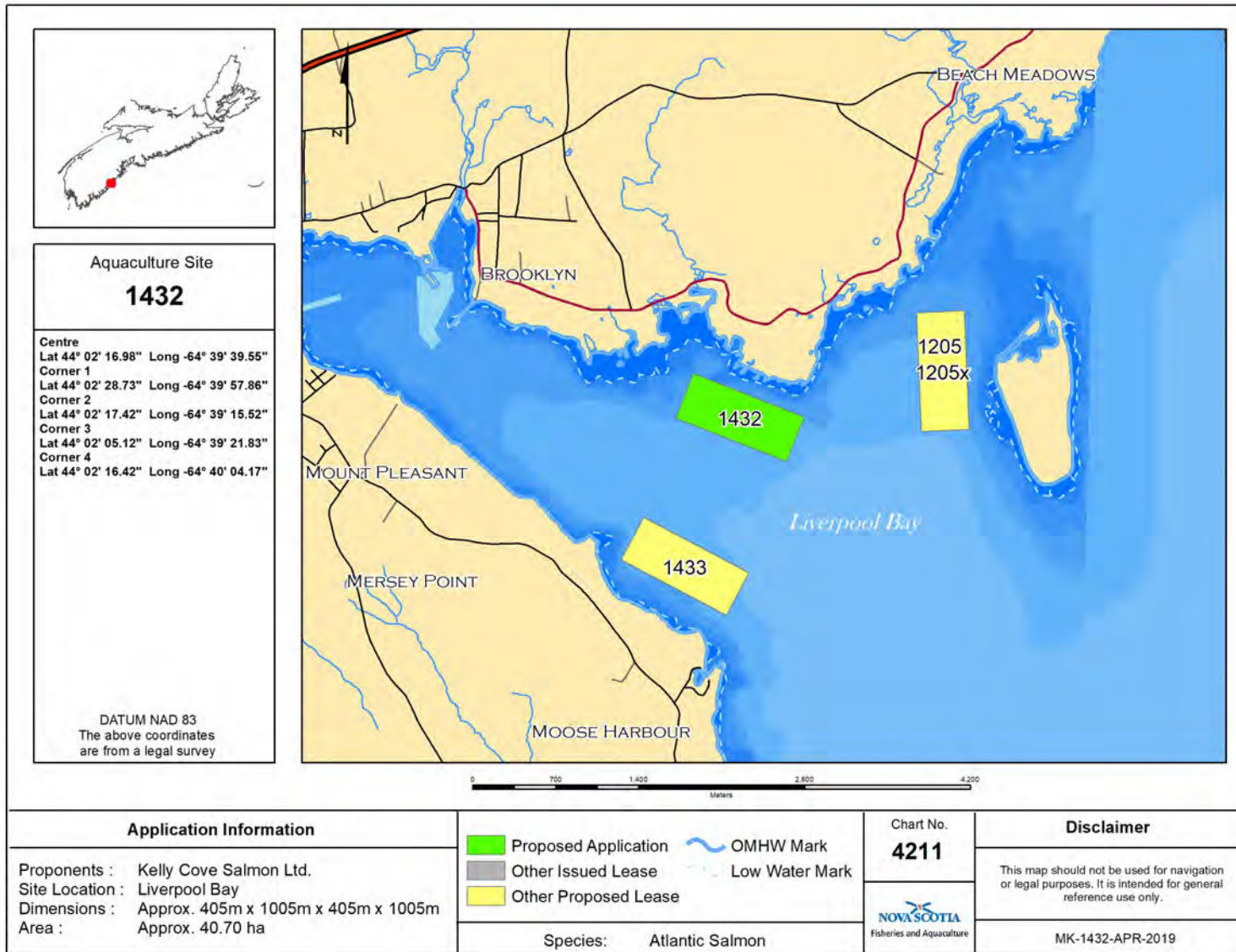


Figure 2a. Proposed new marine finfish site AQ#1432. Please refer to DFA’s Site Mapping Tool at <https://novascotia.ca/fish/aquaculture/site-mapping-tool/> for an interactive map showing the proposed marine site.

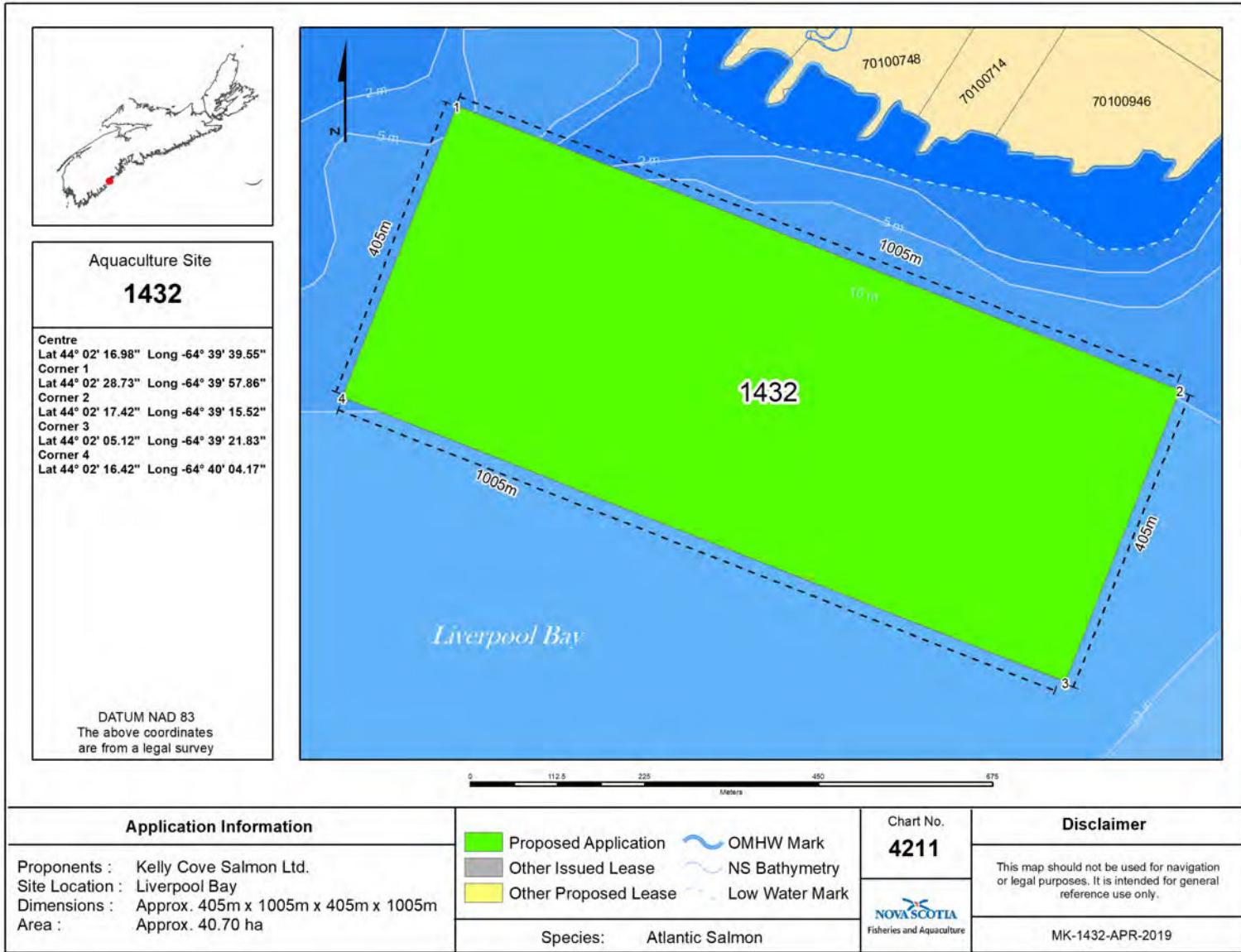


Figure 2b. Proposed new marine finfish site AQ#1432. Please refer to DFA’s Site Mapping Tool at <https://novascotia.ca/fish/aquaculture/site-mapping-tool/> for an interactive map showing the proposed marine site.

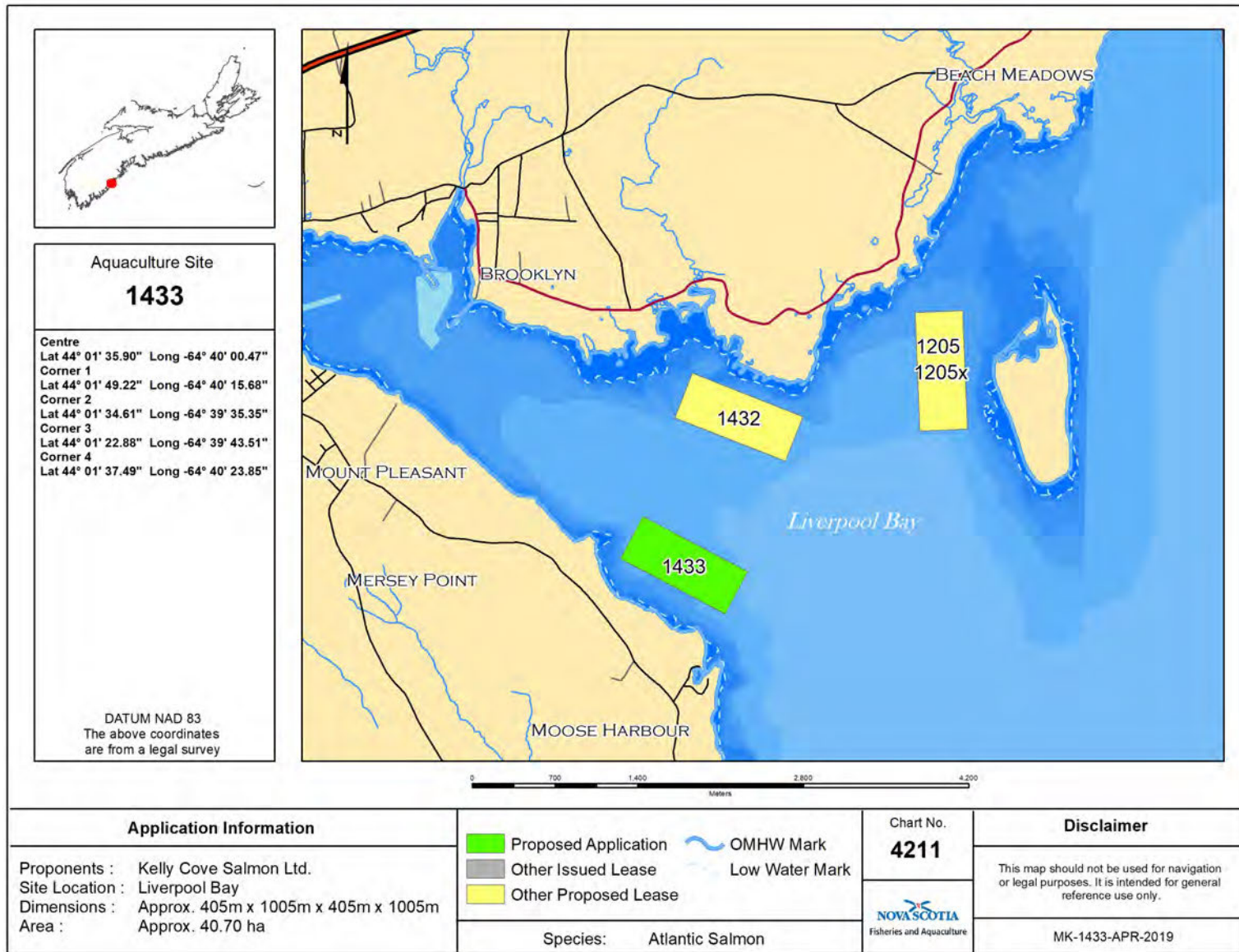


Figure 3a. Proposed new marine finfish site AQ#1433. Please refer to DFA’s Site Mapping Tool at <https://novascotia.ca/fish/aquaculture/site-mapping-tool/> for an interactive map showing the proposed marine site.

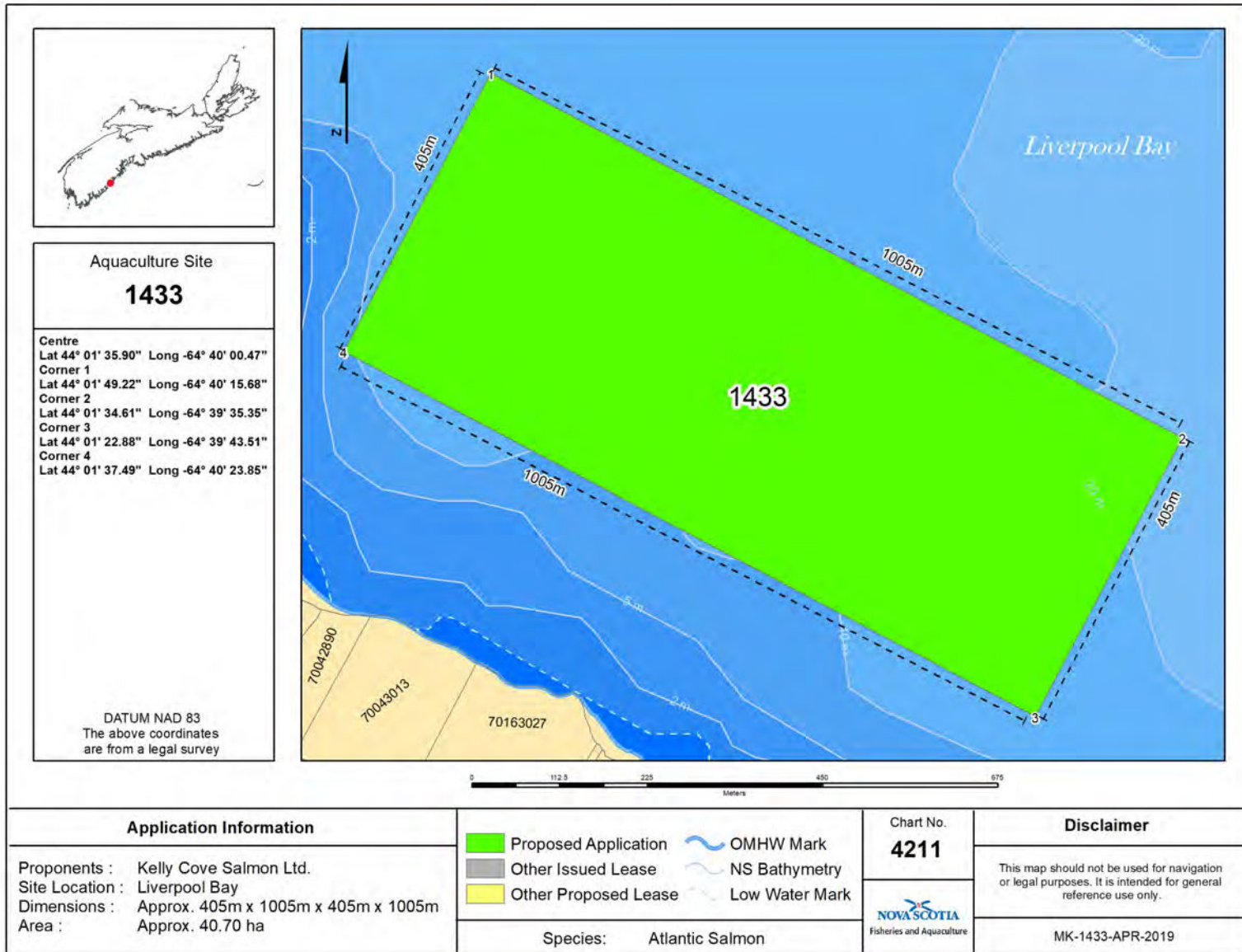


Figure 3b. Proposed new marine finfish site AQ#1433. Please refer to DFA’s Site Mapping Tool at <https://novascotia.ca/fish/aquaculture/site-mapping-tool/> for an interactive map showing the proposed marine site.

2.0 CONSULTATION WITH MUNICIPAL, PROVINCIAL AND FEDERAL AGENCIES

DFA requested review of the applications by Municipal, Provincial and Federal agencies listed in Table 1 through a network memo (Appendix A).

These agencies provided advice to DFA on the proposed applications based on their respective mandates. All feedback from the network review were shared with the applicant for their consideration. DFA coordinated with the applicant and the network agencies to respond to questions or comments regarding the applications.

Table 1: List of Appendices

Network Memo and Network Agency Review of an Aquaculture Application	Appendix A
Fisheries and Oceans Canada	Appendix B
Canadian Food Inspection Agency	Appendix C
Transport Canada	Appendix D
Environment and Climate Change Canada – Canadian Shellfish Sanitation Program	Appendix E
Environment and Climate Change Canada – Canadian Wildlife Service	Appendix F
NS Department of Environment (Now Department of Environment and Climate Change)	Appendix G
NS Department of Agriculture	Appendix H
NS Department of Municipal Affairs (Now Department of Municipal Affairs and Housing)	Appendix I
NS Department of Communities, Culture and Heritage (Now Department of Communities, Culture, Tourism and Heritage)	Appendix J
NS Department of Lands and Forestry (Now Department of Natural Resources and Renewables)	Appendix K
NS Department of Fisheries and Aquaculture – Inland Fisheries	Appendix L
NS Office of Aboriginal Affairs (Now Office of L’nu Affairs)	Appendix M

Summary of Network Consultations

Below are summaries of the individual network agency consultations undertaken by DFA for the adjudicative boundary amendment application for lease AQ#1205x and adjudicative applications for leases AQ#1432 and AQ#1433. Please see the appendices outlined in Table 1 to review the associated documents related to each of the following network agency summaries:

Fisheries and Oceans Canada (DFO) reviewed the applications according to their legislative mandate, which includes the *Fisheries Act*, *Species at Risk Act* (SARA), *Oceans Act* and applicable regulations. Questions were raised in discussions by DFO requiring clarification from the applicant, which were provided by the applicant (see Appendix B).

For each application, DFO completed its review and submitted a Letter of Advice (LOA) and one Canadian Science Advisory Secretariat (CSAS) Science Response. Each LOA provided a summary of the results of DFO's risk assessment to inform of risks posed to fish and fish habitat and identify where additional avoidance and mitigation measures could be applied.

The applications were reviewed by various DFO sectors/offices to assess the following: the deposit of deleterious substances; the death of fish by means other than fishing; the harmful alteration, disruption or destruction of fish habitat; the killing, harming of SARA-listed species and the destruction of their critical habitat; and the introduction of aquatic species into regions or bodies of water frequented by fish where they are not indigenous.

DFO conducted a risk assessment for each application using pathways of effects to establish cause-and-effect relationships by linking activities to stressors and stressors to effects on fish and fish habitat. These potential stressors included physical alteration of habitat structure, alteration in light, noise, deposit of nutrients and organic material, release of aquatic invasive species, deposit of chemicals, release of farmed fish, and the release of pathogens.

Each assessment by DFO was supported by a modelling exercise that described benthic and pelagic Predicted Exposure Zones (PEZs) associated with the range of aquaculture activities, and the predicted impacts on susceptible fish and fish habitat, including SARA listed species, susceptible fishery species, and the habitats that support them. DFO considered the proponent's avoidance and mitigation measures, and the regulatory requirements of DFO and other federal and provincial regulators while using the precautionary approach in determining the residual risk to fish and fish habitat.

DFO also assessed potential overlaps with fisheries that occur in the general vicinity and could potentially be displaced. These include American lobster, groundfish, sea scallop, Atlantic mackerel and Atlantic herring. DFO concluded that the lease area for proposed sites AQ#1205x, AQ#1432 and AQ#1433, however, are small relative to the fishing grounds for each of these fished species.

DFO recommended the implementation of the applicant's Sea Lice Management and Treatment Plan, and that the applicant prioritize preventing Atlantic salmon escapees on all sites if the site(s) are approved by the NSARB. If the application(s) are approved, DFA will continue to work with the

applicant to ensure the advice and recommendations provided by DFO are appropriately incorporated into the applicant's Farm Management Plan (FMP) for each licence/lease.

Canadian Food Inspection Agency (CFIA) reviewed the applications and did not raise any questions or concerns with the proposed boundary amendment or proposed two new marine finfish sites (see Appendix C).

Transport Canada (TC) reviewed the applications and did not raise any questions or concerns with the proposed boundary amendment or proposed two new marine finfish sites. Transport Canada will engage with the Canadian Coast Guard (CCG) Aids to Navigation (AtoN) group to ensure under the Site Marking Plan for each site, yellow buoys are sufficient (see Appendix D). This request will be addressed under Transport Canada's *Canadian Navigable Waters Act* (CNWA) through the Navigation Protection Program (NPP) approval process, upon a decision from the board.

Environment and Climate Change Canada (ECCC) – Canadian Shellfish Sanitation Program (CSSP) reviewed the applications and did not raise any questions or concerns with the proposed boundary amendment or proposed two new marine finfish sites (see Appendix E).

Environment and Climate Change Canada (ECCC) - Canadian Wildlife Services Division (CWS) reviewed the applications and had comments requiring clarification. The additional information requested by CWS was provided by the applicant and DFA (see Appendix F). CWS recommends that the proposed new lease boundary (AQ#1205x) not be situated within 300 metres from Coffin Island, which is used for nesting by colonial birds and roseate terns. Additionally, CWS recommends that the proposed two new aquaculture leases (AQ#1432 and AQ#1433) should not be situated within areas where there are concentrations of wintering Harlequin Ducks, and an adequate buffer should be implemented between Harlequin Duck wintering areas and proposed aquaculture sites.

If the application(s) are approved by the NSARB, DFA will work with the applicant to ensure that the advice, mitigations, and recommendations provided by CWS are appropriately incorporated into the applicant's FMP for each licence/lease.

Nova Scotia Department of Environment (now Environment and Climate Change (NSECC)) reviewed the applications and recommends that the applicant use heavy material inflatable floats and buoys instead of Styrofoam buoys for corner markers. NSECC also recommends that corner blocks for site markers be placed by a qualified third party with GPS technology, which will indicate that infrastructure is kept within the proposed boundaries (see Appendix G). If the application(s) are approved by the NSARB, DFA will work with the applicant to explore alternative buoy types, as per the recommendation by NSECC. Also, DFA will work with KCS to ensure they have qualified personnel installing corner markers in alignment with each Site Marking Plan.

Nova Scotia Department of Agriculture reviewed the applications and did not raise any questions or concerns with the proposed boundary amendment or proposed two new marine finfish sites (see Appendix H).

Nova Scotia Department of Municipal Affairs (now Municipal Affairs and Housing) The memo serves as a notification of the proposed developments to Municipal Affairs only and no response was required (see Appendix I).

Nova Scotia Department of Communities, Culture, and Heritage (now Communities Culture, Tourism and Heritage (CCTH)) reviewed the boundary amendment application and initially did not have any archaeological concerns with the proposed boundary amendment. Following the review of the proposed two new marine applications, the department indicated that although there are no recorded archaeology sites in the area of the proposed aquaculture development, the larger vicinity has a number of recorded sites. There is concern for the impact of submerged archaeological resources when large anchors are placed on the sea floor. The concern is lessened if the anchors remain stationary and are not dragged (see Appendix J).

After further consideration and consultation, an Archaeological Resource Impact Assessment (ARIA) of the proposed expansion areas was completed by the applicant on their own volition. Following the completion of the ARIA Phase I, it was determined that an ARIA Phase II of the proposed lease areas was required for AQ#1205x and AQ#1432 only. CCTH reviewed the final report for the Phase II and found the results to be acceptable. CCTH recommended the assessment area be cleared of any requirement for further archaeological investigation and that the proposed development may proceed as planned (see Appendix J). CCTH reviewed the ARIA Phase I and Phase II reports and provided their feedback in subsequent letters, which were shared by the applicant with DFA (see Appendix J). If the application(s) are approved by the NSARB, DFA will work with the applicant to ensure that the advice and recommendations provided by CCTH are incorporated into the applicant's FMP for each licence/lease.

Nova Scotia Department of Lands and Forestry (now Natural Resources and Renewables (NRR)) reviewed the applications and recommended a study be conducted on the number of bird interactions with the existing site prior to the proposed expansion of operations in Liverpool Bay. The applicant confirmed that no studies had been conducted but that they do monitor wildlife interactions and no interactions with birds have been recorded to date at AQ#1205. In addition, the applicant provided their updated Wildlife Interaction Plan (WIP), which incorporates additional control and monitoring measures related to interactions with other wildlife, including birds (see Appendix K). If the application(s) are approved by the NSARB, DFA will work with the applicant to ensure wildlife monitoring, interactions and mitigations are appropriately incorporated into the applicant's FMP for the licence/lease (see Appendix K).

Nova Scotia Department of Fisheries and Aquaculture - Inland Fisheries Division reviewed the applications and did not raise any questions or concerns with the proposed boundary amendment or proposed two new marine finfish sites (see Appendix L).

Nova Scotia Office of Aboriginal Affairs (now Office of L'nu Affairs (OLA)) reviewed the network memo containing information relating to the applications and provided advice on requirements for further consultation with the First Nations communities of Nova Scotia that might be impacted or could provide feedback on the proposed aquaculture lease development (see Appendix M).

3.0 SUMMARY OF CONSULTATIONS WITH THE MI'KMAQ OF NOVA SCOTIA

Summary of Consultations with the Mi'kmaq of Nova Scotia

Level of Consultation and the First Nations Communities Offered Consultation

The applications were sent to the Nova Scotia Office of L'nu Affairs (OLA) to screen the applications for Aboriginal consultation purposes. OLA found the applications to potentially involve impacts to Mi'kmaw Aboriginal and Treaty rights at the moderate end of the Haida spectrum.

The criteria used to assess the potential for intrusion on asserted or established Aboriginal or Treaty rights is further described in the initial offer to consult letter. These criteria included:

- The scope and scale of physical works required for the project;
- The proximity to Mi'kmaw communities;
- Regulatory requirements associated with the project (which estimate potential environmental impacts to waterways); and
- The potential for the existence of – and impacts to – heritage resources of Mi'kmaw origin within the project area.

On balance, DFA offered to consult the Mi'kmaq of Nova Scotia at a moderate level and reached out to Chiefs and Councils for reciprocity in the form of community-level and collectively held knowledge of potential adverse impacts to Aboriginal rights practiced within the project area which could be used to inform the results of our screening and open the consultation dialogue.

Consultation was initiated with the following groups:

The 10 Chiefs and Councils of the Assembly of Nova Scotia Mi'kmaw Chiefs, including Membertou First Nation (under the August 31, 2020, Mi'kmaq-Nova Scotia-Canada Consultation Terms of Reference).

Issues Raised by the Mi'kmaq of Nova Scotia During Consultation

The following issues were raised by Acadia First Nations and/or KMKNO, the executive body that leads consultation efforts on behalf of the Assembly of Nova Scotia Mi'kmaw Chiefs:

1. Aquaculture facility waste
2. Parasites and sea lice, antibiotics
3. Oxygen
4. Protection of wild stocks from sea lice
5. Fish Escape
6. American eel
7. Impacts on local Food, Social and Ceremonial (FSC) fisheries
8. Underwater Archaeological Resources
9. Tourism

DFA Assessment

1. Aquaculture facility waste

The DFA assessed this issue and considered this to be a general concern regarding the aquaculture process where a connection between the contemplated decision and a potential negative impact to an established or asserted Aboriginal or Treaty right was not clear. The DFA responded to the issue raised and offered a meeting with representatives of the KMKNO and concerned Mi'kmaq harvesters to learn more about the potential interaction between the practice of Aboriginal and treaty rights and aquaculture in Nova Scotia. The issue was discussed during Consultation meetings held on December 9, 2020 (Consultation Meeting #1) and March 2, 2022 (Consultation Meeting #3).

The DFA determined that this issue raised was general in nature and not specific to the proposed activities identified by the applicant. In addition, the Mi'kmaq of Nova Scotia did not clearly indicate how this issue was related to asserted and established aboriginal rights. As such, no accommodation or mitigation measures are recommended to the Aquaculture Review Board for this issue raised.

2. Parasites and sea lice, antibiotics

The DFA assessed this issue and considered this to be a general concern regarding the aquaculture process where a connection between the contemplated decision and a potential negative impact to an established or asserted Aboriginal or Treaty right was not clear. The DFA responded to the issue raised and offered a meeting with representatives of the KMKNO and concerned Mi'kmaq harvesters to learn more about the potential interaction between the practice of Aboriginal and treaty rights and aquaculture in Nova Scotia. The issue was discussed during Consultation meetings held on December 9, 2020 (Consultation Meeting #1) and March 1, 2022 (Consultation Meeting #2).

The DFA determined that this issue raised was general in nature and not specific to the proposed activities identified by the applicant. In addition, the Mi'kmaq of Nova Scotia did not clearly indicate how this issue was related to asserted and established aboriginal rights. As such, no accommodation or mitigation measures are recommended to the Aquaculture Review Board for this issue raised.

3. Oxygen

The DFA assessed this issue and considered this to be a general concern regarding the aquaculture process where a connection between the contemplated decision and a potential negative impact to an established or asserted Aboriginal or Treaty right was not clear. The DFA responded to the issue raised and offered a meeting with representatives of the KMKNO and concerned Mi'kmaq harvesters to learn more about the potential interaction between the practice of Aboriginal and treaty rights and aquaculture in Nova Scotia. The issue was discussed during Consultation meetings held on December 9, 2020 (Consultation Meeting #1).

The DFA determined that this issue raised was general in nature and not specific to the proposed activities identified by the applicant. In addition, the Mi'kmaq of Nova Scotia did not clearly indicate

how this issue was related to asserted and established aboriginal rights. As such, no accommodation or mitigation measures are recommended to the Aquaculture Review Board for this issue raised.

4. Protection of wild stocks from sea lice

The DFA assessed this issue and considered this to potentially threaten established and asserted Mi'kmaw Aboriginal and treaty rights. The DFA responded to the issue raised and offered a meeting with representatives of the KMKNO and concerned Mi'kmaq harvesters for further Consultation. The issue was discussed during Consultation meetings held on December 9, 2020 (Consultation Meeting #1), March 1, 2022 (Consultation Meeting #2) and June 1, 2022 (Consultation Meeting #4).

The DFA determined that, due to a lack of specificity, this issue raised was general in nature and not specific to the proposed activities identified by the applicant. As such, no accommodation or mitigation measures are recommended to the Aquaculture Review Board for this issue raised.

5. Fish escape

The DFA assessed this issue and considered this to be a general concern regarding the aquaculture process where a connection between the contemplated decision and a potential negative impact to an established or asserted Aboriginal or Treaty right was not clear. The DFA responded to the issue raised and offered a meeting with representatives of the KMKNO and concerned Mi'kmaq harvesters to learn more about the potential interaction between the practice of Aboriginal and treaty rights and aquaculture in Nova Scotia. The issue was discussed during Consultation meetings held on December 9, 2020 (Consultation Meeting #1).

The DFA determined that this issue raised was general in nature and not specific to the proposed activities identified by the applicant. In addition, the Mi'kmaq of Nova Scotia did not clearly indicate how this issue was related to asserted and established aboriginal rights. As such, no accommodation or mitigation measures are recommended to the Aquaculture Review Board for this issue raised.

6. American eel

The DFA assessed this issue and considered this to potentially threaten established and asserted Mi'kmaw Aboriginal and treaty rights. The DFA responded to the issue raised and offered a meeting with representatives of the KMKNO and concerned Mi'kmaq harvesters for further Consultation. The issue was discussed during Consultation meetings held on December 9, 2020 (Consultation Meeting #1).

The DFA determined that, due to a lack of specificity, this issue raised was general in nature and not specific to the proposed activities identified by the applicant. As such, no accommodation or mitigation measures are recommended to the Aquaculture Review Board for this issue raised.

7. Impacts on local FSC fisheries

This issue was first raised during the Consultation meeting held on December 9, 2020 (Consultation Meeting #1). The DFA responded to the issue raised during the Consultation meeting and requested that the Mi'kmaq of Nova Scotia further explain specific concerns about the potential adverse

impact on local FSC fisheries from the Mi'kmaq during the consultation process. The issue was discussed again during Consultation meetings held on March 2, 2022 (Consultation Meeting #3) and June 1, 2022 (Consultation Meeting #4).

The DFA determined that, due to a lack of specificity, this issue raised was general in nature and not specific to the proposed activities identified by the applicant. As such, no accommodation or mitigation measures are recommended to the Aquaculture Review Board for this issue raised.

8. Impacts to submerged Mi'kmaw Archaeological Resources

This issue was first raised during the Consultation meeting held on March 2, 2022 (Consultation Meeting #3). During the Consultation meeting, the DFA noted that no significant concerns were raised by Communities, Culture, Tourism and Heritage ("CCTH") during the review process but that CCTH advised that if any heritage resources were discovered that the operator should contact the Special Places Coordinator. The KMKNO Archaeology Research Division (ARD) asserted that the project area is high risk and recommended an Archaeological Resource Impact Assessment (ARIA) be completed.

During the Consultation meeting held on June 1, 2022 (Consultation Meeting #4), CCTH informed the KMKNO and Acadia First Nation that no official assessment had been undertaken to date, adding that the background information presented was helpful. CCTH stated that their examination of the application in these areas yielded information on shipwrecks and pre-contact site on Coffin Island - supporting the Mi'kmaw position that limited current knowledge does not preclude the existence of additional sites - and adding that CCTH understands the Mi'kmaw connection to the Mersey system. CCTH noted that they were still considering the project area as having a high energy subsurface environment and sandy floors. The DFA agreed to consider the request by KMKNO ARD to complete an ARIA for the project area.

The proponent, on its own volition, decided to retain Boreas Heritage Consulting Inc. (Boreas Heritage) to conduct a Phase I ARIA (desktop exercise) at the proposed project areas. The Phase I ARIA was conducted under Heritage Research Permit A2022NS130. The Phase I ARIA report was approved by CCTH on December 13, 2022, and the KMKNO ARD was provided a copy of the report. Based on the results of the desktop exercise, Boreas Heritage offered the following recommendations:

- 1. It is recommended that the two (2) areas of high archaeological potential (HPA-01 & HPA-02), as described in this report, be avoided during any proposed development and/or ground disturbance activities associated with the proposed Project, to prevent accidental impacts to areas ascribed high archaeological potential.*
- 2. If areas of high archaeological potential, or parts thereof, cannot be avoided during development activities related to the proposed Project, it is recommended these areas be subjected to subsurface archaeological sampling probes in order to confirm the presence or absence of archaeological resources.*
- 3. If any changes or deviations from the original plans relating to the proposed Project, as provided to Boreas Heritage for this Survey, are necessary, and are found to impact areas outside the Assessment Area described in this report, then additional archaeological resource impact*

assessment(s) may be warranted for these amended portions of the proposed Project.

4. It is recommended that the remainder of the Assessment Area, as described in the report, be cleared of any requirement for further archaeological investigation and that development within these areas may proceed as planned.

5. In the event archaeological resources and/or human remains are encountered, from disturbed or undisturbed contexts, during construction or disturbance activities associated with the proposed Project, works must immediately cease until contact is made with, and direction(s) on how to proceed has been received from the Coordinator of Special Places, Nova Scotia Department of Communities, Culture, Tourism and Heritage.

The proponent, on its own volition, decided to proceed with the recommendations within the Phase I ARIA report and retained Boreas Heritage to conduct a Phase II ARIA (core sampling) at the previously recommended assessment areas. The Phase II ARIA was conducted under Heritage Research Permit A2023NS016. The Phase II ARIA report was approved by CCTH on March 22, 2023, and the KMKNO ARD was provided a copy of the report. Based on the results of the core sampling, Boreas Heritage offered the following recommendations:

1. It is recommended the Assessment Area (HPA-01 & HPA-02), as described in the report, be cleared of any requirement for further archaeological investigation and that development within these areas may proceed as planned.

2. If any changes or deviations from the original plans relating to the proposed Project, as provided to Boreas Heritage for this Survey, are necessary, and are found to impact areas outside the Assessment Area described in this report, then additional archaeological resource impact assessment(s) may be warranted for these amended portions of the proposed Project.

3. In the event archaeological resources and/or human remains are encountered, from disturbed or undisturbed contexts, during construction or disturbance activities associated with the proposed Project, works must immediately cease until contact is made with, and direction(s) on how to proceed has been received from the Coordinator of Special Places, Nova Scotia Department of Communities, Culture, Tourism and Heritage.

Having reviewed all pertinent information, the DFA concluded that the issue raised regarding impacts to submerged Mi'kmaw archaeological resources was speculative in nature. Nonetheless, in terms of accommodation or mitigation measures in connection with this issue, consistent with advice provided by CCTH, which is responsible, under authority of the *Special Places Protection Act*, for the protection of archaeological sites in Nova Scotia, a recommendation is made to the Aquaculture Review Board that the site operators be required to contact CCTH's Coordinator of Special Places in the event that any artifacts are encountered by the operators at the site.

9. Tourism

This issue was first raised in the Consultation meeting held on March 2, 2022 (Consultation Meeting #3). The DFA responded to the issue during the Consultation meeting. The DFA determined that this issue raised was general in nature and not specific to the proposed activities identified by the applicant. In addition, the Mi'kmaq of Nova Scotia did not clearly indicate how this issue was related to asserted and established aboriginal rights. As such, no accommodation or mitigation measures will be recommended to the Aquaculture Review Board for this issue raised.

Accommodation

The DFA decided to proceed with processing this application. Following Consultation with the Mi'kmaw of Nova Scotia, the DFA provides the following recommendations to the Aquaculture Review Board:

1. Site operators be required to contact CCTH's Coordinator of Special Places in the event that any artifacts are encountered by the operators at the site.

The 10 Chiefs and Councils of the Assembly of Nova Scotia Mi'kmaw Chiefs, KMKNO and Membertou First Nation have been informed of this decision.

APPENDIX A – NETWORK MEMO AND NETWORK AGENCY REVIEW OF AN
AQUACULTURE APPLICATION

MEMORANDUM

To: Aquaculture Network Agencies

From: Lynn Winfield, Licensing Coordinator, Aquaculture Division
Nova Scotia Department of Fisheries and Aquaculture

CC: Matthew King, GIS Analyst
Nathaniel Feindel, Manager of Aquaculture Development
Joe Hanrahan, Coastal Resource Coordinator

Date: June 27, 2019

RE: Boundary Amendment Application No. 1205 (Coffin Island), Queens County
Aquaculture Network Review

Attention network agencies, Kelly Cove Salmon Ltd. has submitted a boundary amendment application for AQ#1205. The site is located in Liverpool Bay (Coffin Island), Queens County.

Please find attached information relating to the following aquaculture Marine Finfish application:

Application No.:	1205
Proponent:	Kelly Cove Salmon Ltd.
Application Type:	Boundary Amendment
Location:	Liverpool Bay (Coffin Island), Queens County

To facilitate the screening process, NSDFA offers the following points of information:

1. AQ#1205 was first issued on March 27, 2000 for a ten year term (April 1, 2000 to April 1, 2010). Kelly Cove Salmon Ltd. was assigned AQ#1205 on May 17, 2012.
2. Following the review of the application by our Network Partners, this application will be provided to the Aquaculture Review Board for final decision;
3. The applicant is making application to Transport Canada for an authorization under the Navigation Protection Act for the placement of marine cages.

We request that you review and submit all components that pertain to this application by August 27, 2019

Note: We require a written (mail/email) response from each of our review agencies in order to process this application. You may contact me at by phone at 902-875-7440 or email Lynn.Winfield@novascotia.ca if you have any questions.

Sincerely,



Lynn Winfield,
Licensing Coordinator

MEMORANDUM

To: Aquaculture Network Agencies

From: Lynn Winfield, Licensing Coordinator, Aquaculture Division
Nova Scotia Department of Fisheries and Aquaculture

CC: Matthew King, GIS Analyst
Nathaniel Feindel, Manager of Aquaculture Development
Joe Hanrahan, Coastal Resource Coordinator

Date: June 27, 2019

RE: New Aquaculture Application No. 1432 (Brooklyn), Queens County
Aquaculture Network Review

Attention network agencies, Kelly Cove Salmon Ltd. has submitted a new aquaculture application (AQ#1432) for the Marine Finfish cage cultivation of Atlantic salmon. The proposed site is located in Liverpool Bay, Queens County.

Please find attached information relating to the following aquaculture application:

Application No.: AQ#1432
Applicant: Kelly Cove Salmon Ltd.
Application Type: New Marine Aquaculture Site
Species: Atlantic salmon
Cultivation Type: Marine cage cultivation
Location: Liverpool Bay, Queens County

To facilitate the screening process, NSDFA offers the following points of information:

1. Following the review of the application by our Network Partners, this application will be provided to the Aquaculture Review Board for final decision;
2. The applicant is making application to Transport Canada for an authorization under the Navigation Protection Act for the placement of marine cages.

We request that you review and submit all components that pertain to this application by August 27, 2019

Note: We require a written (mail/email) response from each of our review agencies in order to process this application. You may contact me at by phone at 902-875-7440 or email Lynn.Winfield@novascotia.ca if you have any questions.

Sincerely,



Lynn Winfield,
Licensing Coordinator

MEMORANDUM

To: Aquaculture Network Agencies

From: Lynn Winfield, Licensing Coordinator, Aquaculture Division
Nova Scotia Department of Fisheries and Aquaculture

CC: Matthew King, GIS Analyst
Nathaniel Feindel, Manager of Aquaculture Development
Joe Hanrahan, Coastal Resource Coordinator

Date: June 27, 2019

RE: New Aquaculture Application No. 1433 (Mersey Point), Queens County
Aquaculture Network Review

Attention network agencies, Kelly Cove Salmon Ltd. has submitted a new aquaculture application #1433 for the marine finfish cage cultivation of Atlantic Salmon. The site is located in Liverpool Bay (Mersey Point), Queens County.

Please find attached information relating to the following aquaculture Marine Finfish application:

Application No.:	1433
Proponent:	Kelly Cove Salmon Ltd.
Application Type:	New Marine Aquaculture Site
Species:	Atlantic salmon
Cultivation Type:	Marine cage cultivation
Location:	Liverpool Bay, Queens County

To facilitate the screening process, NSDFA offers the following points of information:

1. Following the review of the application by our Network Partners, this application will be provided to the Aquaculture Review Board for final decision;
2. The applicant is making application to Transport Canada for an authorization under the Navigation Protection Act for the placement of marine cages.

We request that you review and submit all components that pertain to this application by August 27, 2019

Note: We require a written (mail/email) response from each of our review agencies in order to process this application. You may contact me at by phone at 902-875-7440 or email Lynn.Winfield@novascotia.ca if you have any questions.

Sincerely,



Lynn Winfield,
Licensing Coordinator

Network Agency Review of an Aquaculture Application

Agency	
Division (if applicable)	
Date	
File No.	
Type of application	
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Public Notice and Disclosure

As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

Privacy Statement

The network review information collected as part of an aquaculture application will only be used or disclosed by Fisheries and Aquaculture for the purpose of deciding on the application.

All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

APPENDIX B – FISHERIES AND OCEANS CANADA

From: Feindel, Jessica A [<mailto:Jessica.Feindel@novascotia.ca>]
Sent: July-13-16 1:44 PM
To: Parker, Edward V
Subject: FW: Liverpool #1205 - Baseline sampling station proposal
Importance: High

Hi Ed,

This proposal (along with one I will send in a second email) should be reviewed by the AESMC. Are you still the appropriate DFO committee member?

Hope you are well,
Jessica



Baseline Sampling
Station Proposal_Liv

Proposed Baseline Sampling Stations

**Site #1205
Liverpool**

Liverpool Bay
Queens County
Nova Scotia

July 8, 2016



Prepared for:
Kelly Cove Salmon Ltd.
P.O. Box 1546
Sheburne, NS
B0T 1W0

Prepared by:
Sweeney International Marine Corp.
NRC-IMB Research Facilities
1411 Oxford Street
Suite 367-368
Halifax, NS
B3H 3Z1
Tel: (902) 492-7865
(902) 492-0359
Fax: (902) 492-7734
www.simcorp.ca



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(902) 492-0359
Fax: (902) 492-7734
www.simcorp.ca

July 8, 2016

SIMCorp File #SW2016-062

Mr. Jeff Nickerson
Kelly Cove Salmon Ltd.
P.O. Box 1546
Shelburne, NS
B0T 1W0

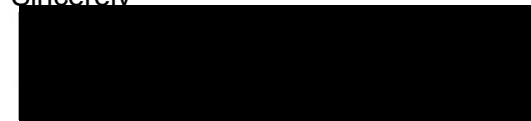
Dear Mr. Nickerson,

Reference: **Liverpool (#1205) Proposed Baseline Sampling Stations**

Please find enclosed the above noted report for the proposed baseline sampling stations for the boundary amendment of site #1205 at Liverpool Bay, N.S.

If you have any questions or comments on the above noted report please do not hesitate to contact me at 902-492-0359.

Sincerely



Leah Lewis-McCrea, M.Sc.
Nova Scotia Division Manager
Sweeney International Management Corp.
llewis@simcorp.ca

cc: Jessica Feindel (NSDFA)
Mike Szemerda (KCS)
Bob Sweeney (SIMCorp)

TABLE OF CONTENTS

1.0 INTRODUCTION.....	2
2.0 PROPOSED LEASE BOUNDARIES	2
3.0 BASELINE SAMPLING LOCATIONS.....	3

LIST OF TABLES

Table 1 – Current boundary and center coordinates of Liverpool (#1205).....	2
Table 2 – Proposed boundary and center coordinates of Liverpool (#1205).....	3
Table 3 – Proposed reference station coordinates for the proposed boundaries at Liverpool (#1205).....	4
Table 4 – Proposed reference station coordinates for the proposed boundaries at Liverpool (#1205).....	5

LIST OF FIGURES

Figure 1 – Current Liverpool (#1205) location in Liverpool Bay	2
Figure 2 – Proposed boundary location for Liverpool (#1205)	3
Figure 3 – Reference station coordinates for current lease boundaries at Liverpool (#1205).....	4
Figure 4 – Proposed reference station coordinates for proposed lease boundaries at Liverpool (#1205)	5
Figure 5 – ADCP deployment coordinates current lease boundaries at Liverpool (#1205).....	6



1.0 INTRODUCTION

The following baseline sampling station proposal has been prepared by SIMCorp for Kelly Cove Salmon Ltd. to communicate proposed boundary coordinates and baseline sampling stations as required for the boundary amendment application at Liverpool (#1205).

2.0 PROPOSED LEASE BOUNDARIES

Marine aquaculture site #1205 is located east of Liverpool, NS on the western side of Coffin Island in Queens County (Figure 1). This area can be seen on CHS chart #4211. The current lease has dimensions of approximately 200 X 200 m with an area of approximately 4 ha (Table 1). The proposed boundary amendment, extends the lease boundaries to accommodate all below surface gear. The dimensions of the proposed lease has dimensions of approximately 480 x 990 m with an area of approximately 47.5 ha (Figure 2; Table 2).

Figure 1 – Current Liverpool (#1205) location in Liverpool Bay

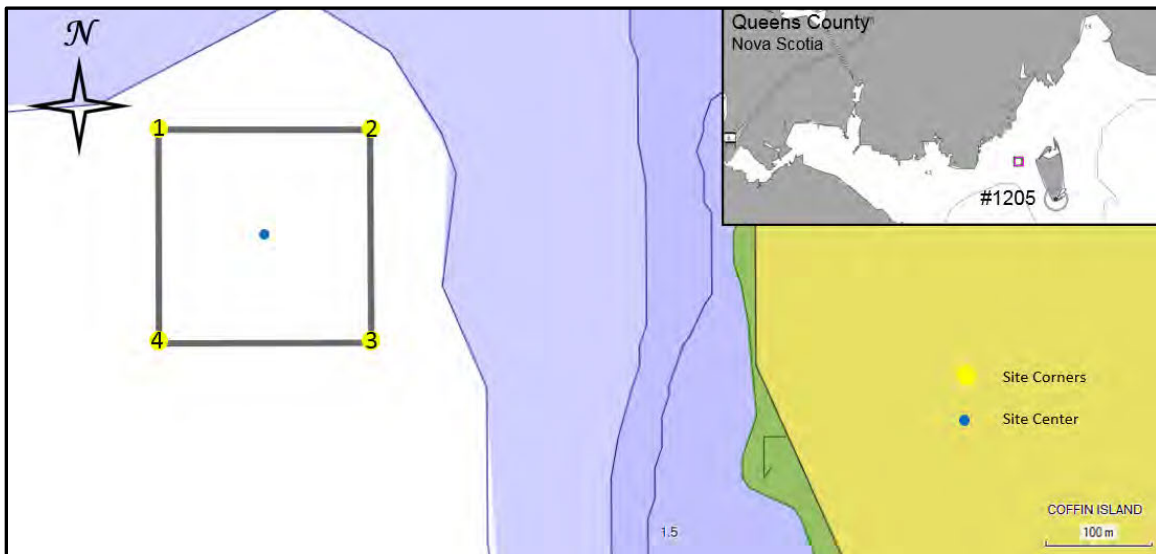


Table 1 – Current boundary and center coordinates of Liverpool (#1205)

SITE COORDINATES (NAD 83)		
Corner	Latitude	Longitude
1	44° 02' 35.45"	64° 38' 28.97"
2	44° 02' 35.45"	64° 38' 19.97"
3	44° 02' 28.97"	64° 38' 28.92"
4	44° 02' 28.97"	64° 38' 19.97"
Site Centre	44° 02' 32.24"	64° 38' 24.42"

Figure 2 – Proposed boundary location for Liverpool (#1205)



Table 2 – Proposed boundary and center coordinates of Liverpool (#1205)

SITE COORDINATES (NAD 83)		
Corner	Latitude	Longitude
1	44° 02' 45.12"	65° 38' 35.28"
2	44° 02' 45.54"	64° 38' 13.50"
3	44° 02' 13.62"	64° 38' 10.02"
4	44° 02' 13.08"	64° 38' 31.98"
Site Centre	44° 02' 29.40"	64° 38' 22.68"

All methods employed to conduct the seafloor sediment condition analyses will be adopted, in consultation with Nova Scotia’s Department of Fisheries and Aquaculture (NSDFA) officials, from Appendix B of the Nova Scotia Department of Fisheries and Aquaculture draft *Standard Operating Procedures for the Environmental Monitoring of Marine Aquaculture in Nova Scotia* dated June 2016.

3.0 BASELINE SAMPLING LOCATIONS

A total of four (4) stations will be investigated for the purpose of the baseline survey (Figure 3). Coordinates, the site is stocked, therefore only the four corners of the proposed boundaries will be sampled. The sampling station coordinates are present in Table 2; omitting sampling at the approximate site center because gear is present



onsite. Sediment samples will be collected at each of the baseline stations with a Standard Ponar grab. The top 2 cm of the grab samples will be analyzed for redox, sulphide, porosity, percent organic matter, and grain size.

The reference stations (LVP-04 and LVP-06) for the current lease boundaries are approximately 223 m and 209 m from the boundaries (Figure 4; Table 3). Extending the lease boundaries to incorporate all aquaculture site specific gear, above and below the waterline, will cause reference stations LVP-04 and LVP-06 to fall within the new lease boundary. The recommended locations of the reference stations to accommodate the proposed boundaries are illustrated in Figure 5 and Table 5. LVP-A and LVP-B are approximately 203 m and 199 m from the proposed lease, respectively.

Figure 3 – Reference station coordinates for current lease boundaries at Liverpool (#1205)



Table 3 – Proposed reference station coordinates for the proposed boundaries at Liverpool (#1205)

CURRENT REFERENCE STATION COORDINATES (NAD 83)		
Reference Station	Latitude	Longitude
LVP-04	44° 02' 21.78"	64° 38' 24.0"
LVP-06	44° 02' 42.18"	64° 38' 20.4"



Figure 4 – Proposed reference station coordinates for proposed lease boundaries at Liverpool (#1205)

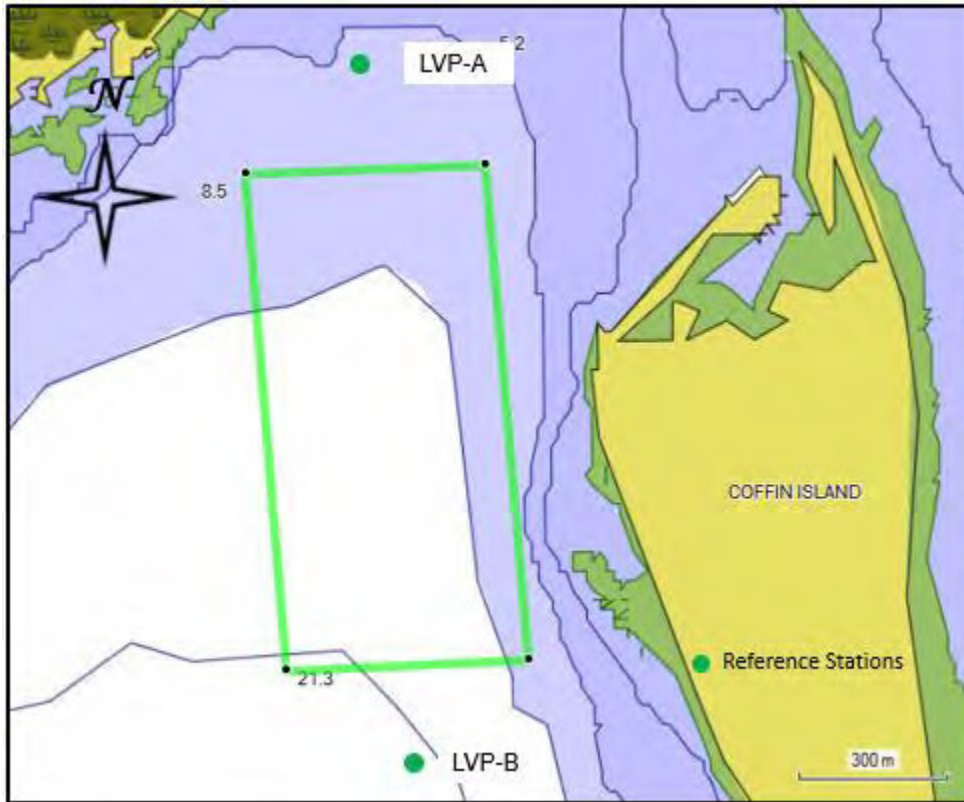


Table 4 – Proposed reference station coordinates for the proposed boundaries at Liverpool (#1205)

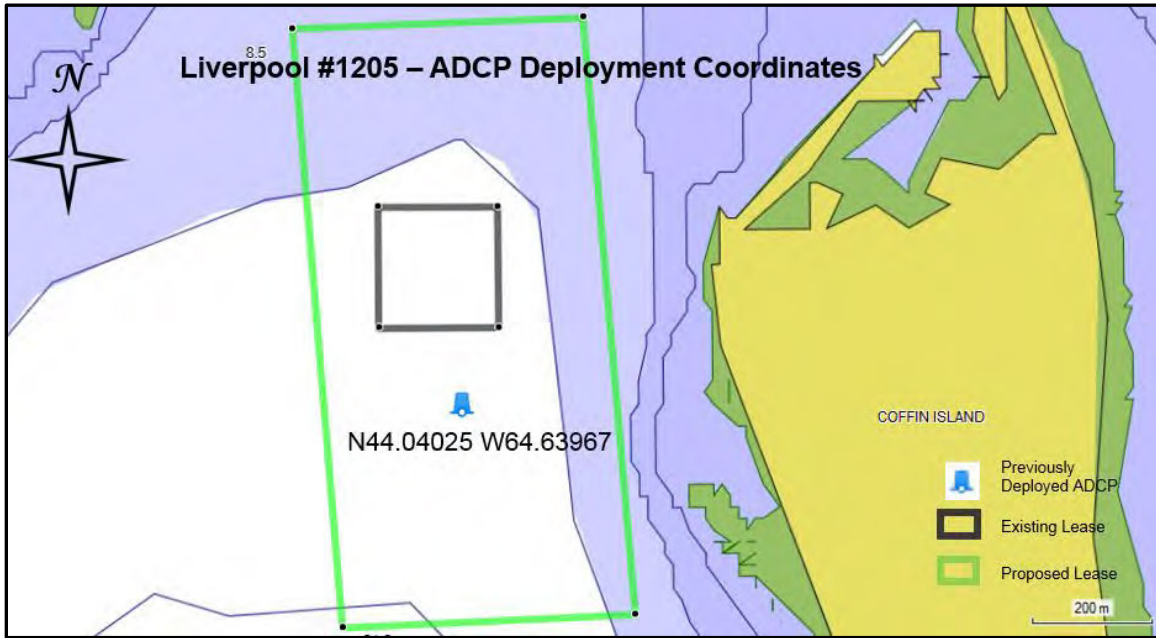
PROPOSED REFERENCE STATION COORDINATES (NAD 83)		
Reference Station	Latitude	Longitude
LVP-A	44° 02' 51.84"	64° 38' 25.02"
LVP-B	44° 02' 06.90"	64° 38' 20.52"

Video monitoring will be conducted at all baseline stations to summarize observations such as depth, time, coordinates, sediment type, consistency, odour, flora, fauna, etc.

A 600-kHz Acoustic Doppler Current Profiler (ADCP) was deployed 125 m south of the current Liverpool lease area (N44.04025 W64.63967) between October 23 and December 13, 2012 (Figure 6). The data obtained on the localized current speed and direction throughout the water column will be utilized for the purpose of a boundary amendment at this site, as an ADCP cannot be deployed at the center of the proposed site due to the presence of gear.



Figure 5 – ADCP deployment coordinates current lease boundaries at Liverpool (#1205)



Sweeney International Marine Corp.

46 Milltown Blvd.
St. Stephen, NB
E3L 1G3

NRC-IMB Research Facilities
1411 Oxford Street
Suite 367-368
Halifax, NS
B3H 3Z1



From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: July 13, 2016 3:03 PM
To: Feindel, Jessica A <Jessica.Feindel@novascotia.ca>
Cc: Rose-Quinn, Tammy <Tammy.Rose-Quinn@dfo-mpo.gc.ca>
Subject: RE: Liverpool #1205 - Baseline sampling station proposal

Thank you Jessica. I will share with Tammy Rose-Quinn (Acting Director, AMO) to determine our appropriate level of response/review and from whom your department should receive it.

Edward Parker

A/Senior Advisor, Aquaculture Management Office, Maritimes Region
Fisheries and Oceans Canada | Government of Canada
Edward.Parker@dfo-mpo.gc.ca | Tel: (902) 402-0298

A/Conseillier Principale, Bureau de la Gestion de l'Aquaculture, Région des Maritimes
Pêches et Océans Canada | Gouvernement du Canada
Edward.Parker@dfo-mpo.gc.ca | Tél: (902) 402-0298

If you have received this communication by mistake, please notify the sender immediately and delete the communication without printing, copying or forwarding it. Thank you.

Si vous avez reçu cette communication par erreur, veuillez en aviser l'expéditeur immédiatement et la supprimer sans l'imprimer, la copier, ou la faire suivre. Merci.

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: July 21, 2016 4:03 PM
To: Feindel, Jessica A <Jessica.Feindel@novascotia.ca>
Cc: Rose-Quinn, Tammy <Tammy.Rose-Quinn@dfo-mpo.gc.ca>
Subject: RE: Liverpool #1205 - Baseline sampling station proposal
Importance: High

Hi Jessica,

Thank you for your request received by DFO on July 13, 2016 to review the proposed baseline sampling station locations for Site 1205, Liverpool. It is important to note that our review was limited to your specific request to review the proposed baseline sampling station locations. Our review did not include that of any other information or application related to any other existing or proposed operational aspect of the site.

In accordance to section 9(1) of the *Aquaculture Activities Regulations (AAR)*, if the owner or operator has plans to or has already submitted an application that is likely to increase the predicted contours of the footprint of the biochemical oxygen demanding matter deposited by the facility, the owner or the operator must conduct the studies necessary to obtain the information referred to in paragraphs 8(1)(a) to (d) of the AAR and submit the information to the Minister within 30 days after the day on which the application is or was made. With respect to this matter, DFO has not received additional information from the owner or operator or the province. Should the province receive such information, DFO would welcome the opportunity to review it.

In accordance to section 7(2) of the AAR, the owner or operator must take reasonable measures to minimize the deposit of fish feces and unconsumed feed, having regard to (i) the cost and effectiveness of the available measures; (ii) the degree and nature of the detriment that may result from the deposit; and (iii) the physical characteristics of the site and the type of aquaculture that is engaged in.

It is DFO's expectation that the owner or operator will comply with the AAR and *Species at Risk Act* (SARA). DFO is not aware of any compliance concerns related to the AAR or SARA that the province should be made aware of at this time.

Regards,
Edward Parker

A/Senior Advisor, Aquaculture Management Office, Maritimes Region
Fisheries and Oceans Canada | Government of Canada
Edward.Parker@dfo-mpo.gc.ca | Tel: (902) 402-0298

A/Conseillier Principale, Bureau de la Gestion de l'Aquaculture, Région des Maritimes
Pêches et Océans Canada | Gouvernement du Canada
Edward.Parker@dfo-mpo.gc.ca | Tél: (902) 402-0298

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From: Richardson, Kate A <Kate.Richardson@novascotia.ca>
Sent: March 12, 2019 10:29 AM
To: 'Laking, Erin' <Erin.Laking@dfo-mpo.gc.ca>
Cc: 'Rose-Quinn, Tammy' <Tammy.Rose-Quinn@dfo-mpo.gc.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Reid, Gregor Kyle <Gregor.Reid@novascotia.ca>; Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: 1205 Boundary Amendment Baseline

Hello Erin,

Please find attached the baseline report for lease 1205 (Coffin Island) Boundary Amendment.

I am just wondering how you would like the video to be sent for your review. We can send the video on an external hard drive or USB stick if that is acceptable.

If you need any additional information please do not hesitate to contact me.

Kind Regards,

Kate Richardson
EMP Supervisor
N.S. Department of Fisheries and Aquaculture
W:(902)875-7436

C: (902)875-7549

NOTE: PLEASE REFER TO THE APPLICATION PACKAGE, SECTION 2.0, APPLICANT'S DEVELOPMENT WHICH INCLUDES THE BASELINE REPORT.

From: Richardson, Kate A <Kate.Richardson@novascotia.ca>
Sent: March 12, 2019 10:31 AM
To: 'Laking, Erin' <Erin.Laking@dfo-mpo.gc.ca>
Cc: 'Rose-Quinn, Tammy' <Tammy.Rose-Quinn@dfo-mpo.gc.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Reid, Gregor Kyle <Gregor.Reid@novascotia.ca>; Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: 1432 Brooklyn Baseline Information

Hello Erin,

Please find attached the baseline report for 1432 (Brooklyn), which is one of the two proposed leases in Liverpool Bay.

I am just wondering how you would like the video to be sent for your review. We can send the video on an external hard drive or USB stick if that is acceptable.

If you need any additional information please do not hesitate to contact me.

Kind Regards,

Kate Richardson
EMP Supervisor
N.S. Department of Fisheries and Aquaculture
W:(902)875-7436
C: (902)875-7549

NOTE: PLEASE REFER TO THE APPLICATION PACKAGE, SECTION 2.0, APPLICANT'S DEVELOPMENT WHICH INCLUDES THE BASELINE REPORT.

From: Richardson, Kate A <Kate.Richardson@novascotia.ca>
Sent: March 12, 2019 10:33 AM
To: 'Laking, Erin' <Erin.Laking@dfo-mpo.gc.ca>
Cc: 'Rose-Quinn, Tammy' <Tammy.Rose-Quinn@dfo-mpo.gc.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Reid, Gregor Kyle <Gregor.Reid@novascotia.ca>; Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: 1433- Mersey Point Baseline Information

Hello Erin,

Please find attached the baseline report for 1433 (Mersey Point), which is one of the two proposed leases in Liverpool Bay.

I am just wondering how you would like the video to be sent for your review. We can send the video on an external hard drive or USB stick if that is acceptable.

If you need any additional information please do not hesitate to contact me.

Kind Regards,

Kate Richardson

EMP Supervisor

N.S. Department of Fisheries and Aquaculture

W:(902)875-7436

C: (902)875-7549

NOTE: PLEASE REFER TO THE APPLICATION PACKAGE, SECTION 2.0, APPLICANT'S DEVELOPMENT WHICH INCLUDES THE BASELINE REPORT.

From: Rose-Quinn, Tammy <Tammy.Rose-Quinn@dfo-mpo.gc.ca>

Sent: March 12, 2019 10:59 AM

To: Richardson, Kate A <Kate.Richardson@novascotia.ca>; Laking, Erin <Erin.Laking@dfo-mpo.gc.ca>

Cc: Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Reid, Gregor Kyle <Gregor.Reid@novascotia.ca>; Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>

Subject: RE: 1205 Boundary Amendment Baseline

Hi Kate,

For all applications, a USB is fine!

Thanks,

PS: In future, inquiries such as these can be sent directly to me.

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: Thursday, June 27, 2019 10:07 AM
To: Rose-Quinn, Tammy <Tammy.Rose-Quinn@dfo-mpo.gc.ca>
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: Kelly Cove Salmon - Boundary Amendment - AQ1205

Attn: Network Review Agencies,

Attached please find the Boundary Amendment application and information for Kelly Cove Salmon AQ#1205 in Liverpool Bay, Queens County.

Please respond with your feedback by August 27, 2019.

Thanks,



E. Lynn Winfield

**Licensing Coordinator,
 Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
 Shelburne, NS B0T 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429
 Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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2019.06.27 Network AQ1432 Network 1432 NPP Froms AQ#1433 Network Mersey Point NPP
 Memo and Attachments Memo & Attachments Brooklyn.pdf Memo & Attachments Forms.pdf

***Please refer to Application Package, Section 2.0 - Applicant's Aquaculture Development Plan, for documents sent to and reviewed by Fisheries and Oceans Canada.**

NOTE: THIS EMAIL WAS DUPLICATED FOR AQ#1432 AND AQ#1433 AND SENT TO THE SAME RECIPIENTS.

From: Rose-Quinn, Tammy <Tammy.Rose-Quinn@dfo-mpo.gc.ca>
Sent: July 2, 2019 1:01 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment - AQ1205

Hi Lynn,

What size is the site 1205 expanding from and to?

Thanks,

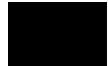
Tammy

From: Winfield, Lynn
Sent: July 2, 2019 2:09 PM
To: Rose-Quinn, Tammy <Tammy.Rose-Quinn@dfo-mpo.gc.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment - AQ1205

Hi Tammy,

AQ#1205 is currently 4HA and the new site would be 40.70HA

Thanks,



E. Lynn Winfield
Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture

From: Rose-Quinn, Tammy <Tammy.Rose-Quinn@dfo-mpo.gc.ca>
Sent: July 26, 2019 1:58 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: AQ#1432 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Brooklyn),
Queens County

Hi Lynn,

Did you remove the baseline from the applications that you forwarded regarding 1432, 1433 and 1205? I am just wondering cause as it seems you are not seeking advice on the whole application? Am I correct?

Tammy

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: July 29, 2019 11:01 AM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>; Richardson, Kate A <Kate.Richardson@novascotia.ca>
Subject: Baseline info for Liverpool Bay - AQ1205, AQ1432 and AQ1433
 This message originated from outside your organization.

Good Morning Jennifer,

Tammy at DFO has inquired about the baseline information for the Liverpool Bay sites, can you please advise if you have already forwarded the Baseline info to Tammy?

Thanks,



E. Lynn Winfield
Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture



1575 Lake Road
 Shelburne, NS B0T 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429
 Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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From: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Sent: July 29, 2019 11:43 AM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>; Richardson, Kate A <Kate.Richardson@novascotia.ca>
Subject: RE: Baseline info for Liverpool Bay - AQ1205, AQ1432 and AQ1433

I have not officially gave Tammy anything. I thought you guys provide DFO with what they need?
 I did give her the full submission as per Jeff's request shortly after we submitted it to DFA so yes she should have it but maybe she wants to follow proper steps...

Jen

From: Winfield, Lynn
Sent: July 29, 2019 8:57 AM
To: Rose-Quinn, Tammy <Tammy.Rose-Quinn@dfo-mpo.gc.ca>
Subject: RE: AQ#1432 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Brooklyn),
Queens County

Morning Tammy,

I thought that Kate and Jennifer (KCS) had provided you with the baseline info. Did you not receive it?

Thanks,



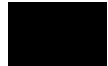
E. Lynn Winfield
Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture

From: Winfield, Lynn
Sent: August 30, 2019 12:08 PM
To: Rose-Quinn, Tammy <Tammy.Rose-Quinn@dfo-mpo.gc.ca>; Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Subject: FW: AQ#1432 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Brooklyn),
Queens County

Good Afternoon

Please be reminded that our office has not received comments from your Department for the proposed aquaculture site in Liverpool Bay (Brooklyn) AQ1432. Your comments are due on or before **September 6, 2019**.

Thanks,



E. Lynn Winfield
Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture



1432 NPP Froms
Brooklyn.pdf



AQ1432 Network
Memo & Attachmen

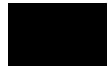
NOTE: REFER TO THE NETWORK MEMO AND ORIGINAL REQUEST SENT ON JUNE 27, 2019.

From: Winfield, Lynn
Sent: August 30, 2019 12:30 PM
To: Rose-Quinn, Tammy <Tammy.Rose-Quinn@dfo-mpo.gc.ca>; Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Subject: FW: AQ#1433 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Mersey Point), Queens County

Good Afternoon

Please be reminded that our office has not received comments from your Department for the proposed aquaculture site in Liverpool Bay (Mersey Point) AQ1433. Your comments are due on or before **September 6, 2019**.

Thanks,



E. Lynn Winfield
Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture



AQ#1433 Network Memo & Attachmen



Mersey Point NPP Forms.pdf

NOTE: REFER TO THE NETWORK MEMO AND ORIGINAL REQUEST SENT ON JUNE 27, 2019.

From: Winfield, Lynn
Sent: August 30, 2019 3:04 PM
To: Houlihan, Daniel W <Daniel.Houlihan@dfo-mpo.gc.ca>
Subject: FW: AQ#1432 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Brooklyn), Queens County

Hi Daniel,

I forgot to include you on this email.

Thanks,



E. Lynn Winfield
Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture

NOTE: REFER TO THE NETWORK MEMO AND ORIGINAL REQUEST SENT ON JUNE 27, 2019.

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: September 11, 2019 4:43 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>; Hanrahan, Joe <Joe.Hanrahan@novascotia.ca>; Page, Fred H <Fred.Page@dfo-mpo.gc.ca>; Scouten, Sarah J <Sarah.Scouten@dfo-mpo.gc.ca>; Laking, Erin <Erin.Laking@dfo-mpo.gc.ca>; Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Subject: RE: AQ#1432 and AQ#1433 - Liverpool Bay

Hi Lynn,

DFO Scientists are deploying current meters next week at the two proposed lease areas in Liverpool. Can you please tell us whether or not there has historically been aquaculture gear at those sites? Or are you otherwise aware of any remnants of past aquaculture activities that could be on the seabed that could pose a hazard or logistical concern?

Thanks!

Ed

Edward Parker

Telephone | Téléphone 902-402-0298

Facsimile | Télécopieur 902-426-1489

Edward.Parker@dfo-mpo.gc.ca

Fisheries and Oceans Canada | Pêches et Océans Canada

PO Box 1006, P500, Dartmouth, NS B2Y 4A2

CP 1006, P500, Dartmouth, N-É B2Y 4A2

Government of Canada | Gouvernement du Canada

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From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: Friday, September 13, 2019 11:55 AM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Hanrahan, Joe <Joe.Hanrahan@novascotia.ca>; Page, Fred H <Fred.Page@dfo-mpo.gc.ca>; Scouten, Sarah J <Sarah.Scouten@dfo-mpo.gc.ca>; Laking, Erin <Erin.Laking@dfo-mpo.gc.ca>; Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Subject: RE: AQ#1432 and AQ#1433 - Liverpool Bay

Good Morning Ed,

There are no former leases in Liverpool Bay, prior to the issuance of AQ1205.

Thanks,



E. Lynn Winfield

**Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture**

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: January 29, 2020 5:44 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment - AQ1205

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

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Hi Lynn,

I have the following request for additional information:

Area of the seabed impacted by each 2000 kg shovel anchor, as well as a description of plans, if any, to uninstall and reinstall anchors and weights (or any equipment physically attached to the benthic substrate) in different locations.

Will there be any use of acoustic predator deterrents?

Will there be introduced artificial light?

Thanks,

Ed

Edward Parker

Senior Advisor, Aquaculture Management

Telephone | Téléphone 902-402-0298

Facsimile | Télécopieur 902-426-7967

Edward.Parker@dfo-mpo.gc.ca

Fisheries and Oceans Canada | Pêches et Océans Canada

PO Box 1006, P500, Dartmouth, NS B2Y 4A2

CP 1006, P500, Dartmouth, N-É B2Y 4A2

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From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: June 12, 2020 10:33 AM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment - AQ1205

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

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Hi Lynn,

The Brooklyn wharf is managed by the Harbour Authority of Brooklyn. Jim Fralic is the President of the Harbour Authority and can be reached at 1-902-354-5682. We recommend this information be shared with Kelly Cove Salmon Ltd. if they intend to use the Brooklyn wharf facilities.

Thanks,
Ed

Edward Parker
Regional Senior Aquaculture Management Officer
Telephone | Téléphone 902-402-0298
Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca
Fisheries and Oceans Canada | Pêches et Océans Canada
PO Box 1006, P600, Dartmouth, NS B2Y 4A2
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From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: August 24, 2020 4:35 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: MacDougall, Robert <Robert.MacDougall@dfo-mpo.gc.ca>; Feindel, Jessica A <Jessica.Feindel@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: QUESTION: Liverpool aquaculture proposals

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

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Hi Lynn,

After reviewing the current meter data for sites 1205, 1432, 1433 proposed for Liverpool, we have the following questions:

Are the depths in the provided current meter data files measured from the seabed or from the transducer face?

What is the distance between the seabed and the transducer face? The excel sheets have the bin size and the 1st bin range (which we understand is the distance from the transducer face to the first bin). The requested information is to calculate the distance from the seabed to the first bin.

Thanks,
Ed

Edward Parker
Regional Senior Aquaculture Management Officer
Telephone | Téléphone 902-402-0298
Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca
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Si vous avez reçu cette communication par erreur, veuillez en aviser l'expéditeur immédiatement et la supprimer sans l'imprimer, la copier, ou la faire suivre. Merci.

From: Watts, Melinda
Sent: August 26, 2020 10:07 AM
To: Jeff Nickerson <jnickerson@cookeaqua.com>; Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Cc: Feindel, Jessica A <Jessica.Feindel@novascotia.ca>; Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Subject: FW: QUESTION: Liverpool aquaculture proposals

Hi Jeff and Jennifer,

Please see the questions below. Internally we are looking at our database to see if there is other current meter data that can be included for this proposal.

Please forward on to Michael as I apparently do not have his contact information.

Thank you,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

NOTE: REFER TO THE QUESTIONS REQUESTED FROM DFO DATED AUGUST 24, 2020.

From: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Sent: August 26, 2020 3:38 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Cc: Jeff Nickerson <jnickerson@cookeaqua.com>; Shaun Allain <sallain@simcorp.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>
Subject: FW: QUESTION: Liverpool aquaculture proposals

Hi Melinda,
Please see below note from SimCorp on this,
Let me know if more info is needed,

Thanks Jen

From: Marshall Elsemore <melsemore@simcorp.ca>
Sent: August 26, 2020 2:56 PM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Cc: 'Shaun Allain' <sallain@simcorp.ca>
Subject: RE: QUESTION: Liverpool aquaculture proposals
This message originated from outside your organization.
Hi Jenn,

The depths on the excel files would be the approximate depth from the transducer head. The distance from the transducer head to the seabed would have been roughly 1-1.5 meters.

Hopefully that is everything you needed. I don't have the files in front of me as I'm in Newfoundland for work but we typically have the meters positioned as close to the ocean floor as possible and that height is as low as we've been able to get it.

If you needed more information from me, don't hesitate to ask!

Regards,
Marshall

From: Watts, Melinda
Sent: August 26, 2020 4:05 PM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Cc: Jeff Nickerson <jnickerson@cookeaqua.com>; Shaun Allain <sallain@simcorp.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>
Subject: RE: QUESTION: Liverpool aquaculture proposals

Thank you Jen.

We will review our database for other potential current meter data and send along with this information to DFO shortly. I will confirm with you when that happens and if any further information is requested.

Cheers,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: Wednesday, August 26, 2020 4:43 PM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: FW: QUESTION: Liverpool aquaculture proposals

Hi Ed,

Please see the response from KCS via SImCorp on the questions that were raised on Monday.

NSDFA did deploy one of the current meters so we will follow up once we confirm any of the data from our end.

Please let me know if you wish us to follow up with KCS to confirm with Marshall at SimCorp once he is back from Newfoundland.

Thank you,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8

T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

NOTE: REFER TO THE RESPONSE FROM THE APPLICANT ABOVE.

From: Watts, Melinda
Sent: August 27, 2020 4:27 PM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Cc: Jeff Nickerson <jnickerson@cookeaqua.com>; Shaun Allain <sallain@simcorp.ca>
Subject: RE: QUESTION: Liverpool aquaculture proposals

Hi Jen,

I spoke to our operations group they noted the following regarding DFO's question regarding height from the seabed and the transducer face:

Based on the 2010 NSDFA deployment (Sept 2 to Oct 4) for the 1205x application, the tripod frames put the transducer faced about 0.6m above the sea floor. Worth noting that the 1st bin range is the distance from the transducer to the middle of the first bin. So in the case of this deployment, bin #1 is centered 2.7m above bottom but is averaging the current between 2.2m and 3.2m above bottom.

I see that Marshall could only provide a best guess so I can follow up with DFO based on what our group calculated and possibly SimCorp could follow up once they are back in the Province?
Secondly, it was confirmed that no further ADCP deployments in Liverpool Bay have been conducted by the Department so no other data can be shared at this time.

Thank you,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

From: Marshall Elsemore <melsemore@simcorp.ca>
Sent: September 9, 2020 2:12 PM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Cc: 'Shaun Allain' <sallain@simcorp.ca>
Subject: RE: QUESTION: Liverpool aquaculture proposals

This message originated from outside your organization.

Hello Jennifer,

My mistake, looking back at my files I remembered that these deployments were done a while back and would have been deployed using the tripod frame. The deployment done in 2019 was done using the same frame. I had first replied with our current SUBS frame setup in mind so I had answered your question incorrectly.

The frame used in the 3 Liverpool Bay would have 0.6 m of space between the top of the transducer face and the seabed.

Hopefully this helps,
Marshall

From: Watts, Melinda
Sent: September 16, 2020 3:35 PM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>; 'jnickerson@cookeaqua.com' <jnickerson@cookeaqua.com>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: Network Comments for Liverpool Bay Applications (Brooklyn, Mersey Point, Liverpool Boundary Amendment)

Good afternoon Jennifer and Jeff,

Please see the attached table, which summarizes the network comments provided for each of the three applications submitted for Liverpool Bay. Comments from ECCC/CWS are also attached separately as their response was too lengthy to include in the table.

Further conversations will be required between some of the network partners, including Lands and Forestry and Environment and Climate Change Canada, based on the comments and recommendations included.

Please do not hesitate to reach out if you have any questions and wish to discuss further.

Cheers,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca



Network Comments
Re. KCS Liverpool Ba

NOTE: ONLY INCLUDING THE EXCEL SPREEDSHET INCLUDING DFO'S COMMENTS HERE. PLEASE REFER TO APPENDIX F FOR THOSE QUESTIONS RAISED BY ECCC/CWS.

Network Review Partner	Network Questions to be clarified by KCS	Additional Comments/Recommendations from Network Partner	KCS Response
Fisheries and Oceans Canada (DFO)	<p>1.Area of the seabed impacted by each 2000 kg shovel anchor, as well as a description of plans, if any, to uninstall and reinstall anchors and weights (or any equipment physically attached to the benthic substrate) in different locations.</p> <p>2.Will there be any use of acoustic predator deterrents?</p> <p>3.Will there be introduced artificial light?</p> <p>Additional questions sent to KCS from DFO on August 26,2020 (Still waiting on confirmation from KCS via SIMCORP on the values provided from DFA):</p> <p>1.Are the depths in the provided current meter data files measured from the seabed or from the transducer face?</p> <p>2. What is the distance between the seabed and the transducer face? The excel sheets have the bin size and the 1st bin range (which we understand is the distance from the transducer face to the first bin). The requested information is to calculate the distance from the seabed to the first bin.</p>	The Brooklyn wharf is managed by the Harbour Authority of Brooklyn. Jim Fralic is the President of the Harbour Authority and can be reached at 1-902-354-5682. DFO recommends this information be shared with Kelly Cove Salmon Ltd. if they intend to use the Brooklyn wharf facilities.	
Canadian Food Inspection Agency (CFIA)	No comments or concerns regarding the applications for the proposed developments		
Transport Canada (TC)	Comments not provided for 1432/1433 - TC not likely to approve the notice of works prior to approval of the amendment. No concerns from Transport Canada for 1205		
Environment and Climate Change Canada (ECCC)	<p>1. As indicated on page 117 of the application, the shorelines from Eastern Head to Beach Meadows, and Black Point to Western Head, are wintering habitat for Harlequin Ducks. It should be clarified whether the "significant habitat" identified by provincial wildlife biologists and illustrated on Figure 54 is Harlequin Duck wintering habitat. If not, it should be clarified what is this "significant habitat", and the distance of the proposed aquaculture lease to Harlequin Duck wintering habitat should be clarified.</p> <p>2. It should be clarified whether grow lights are proposed for this site.</p> <p>3.On page 15 of the Wildlife Interaction Plan, it is stated that "Migratory birds that are more commonly seen around the sites or have the greatest potential to be seen include:", and photos of 4 migratory bird SAR (e.g. Barrow s Goldeneye, Harlequin Duck, Ivory Gull, Roseate Tern) photos are presented. However, the species in the photos do not reflect the broad range of sensitive species of migratory birds most likely to be seen around aquaculture sites in the area. This section should be updated accordingly. Similarly, the "Nova Scotia Protected Wildlife" sheets in the "REFERENCED MATERIALS" section should be updated.</p>	See attached comments for 1432/1433 and 1205x with full network comments, including recommendations and mitigation measures for consideration.	
NS Environment (Enforcement Division)	There were no questions raised by NSE, however, there were recommendations to be considered as conditions of the licence. See next column.	<p>Concerns with development are that there has been complaints with this company of debris breaking loose and washing up on shore on/or near private lands. But also when notified about debris from site, the site manager has sent out workers and had site cleaned up with in a few days of being notified and pictures of clean up sent to Officer.</p> <p>Required or Recommended Conditions:</p> <p>1) Instead of Styrofoam buoys being used for corner markers, recommend that heavier material inflatable floats/ buoys be used which would cause less/no debris of small Styrofoam balls left behind on land or water.</p> <p>2) Corner blocks for site markers be placed by a qualified third party with highly accurate GPS technology.</p>	
NS Agriculture	No comments or concerns regarding the proposed development		
NS Municipal Affairs	Notification not sent - Management working with the Municipality		
NS Communities Culture and Heritage (CCH)	There were no concerns or issues raised by CCH, however, there are comments to be shared with the applicant. See next column.	<p>1. Though there are no recorded archaeology sites in the area of the proposed aquaculture development, the larger vicinity has a number of recorded sites.</p> <p>2. If during the course of the development and operation of the cages, archaeological materials are observed, immediately contact the Coordinator of Special Places. The contact phone number is 902-424-6475.</p>	
NS Office of Aboriginal Affairs (OAA)	Internal consultation		
NS Lands and Forestry	The Department of Lands and Forestry recommends that before the operation is expanded, a study be conducted on the number of bird interactions with the existing site. If this study has already been completed the Department would like to see the study and review the survey and/or monitoring protocols. See next column for further comments from Lands and Forestry.	<p>1.This proposal is adjacent to Coffin Island. An important area for herons, terns, and ducks. This area is also an important area for the Harlequin duck, an endangered species in Nova Scotia.</p> <p>2. According to the records on file at the Crown Land Information Management Centre, any land lying below the original ordinary high water mark of Liverpool Bay, at the three locations provided, is considered ungranted Crown land with no encumbrances.</p>	
NS Fisheries and Aquaculture (Inland Fisheries)	No comments or concerns regarding the proposed development		

From: Watts, Melinda
Sent: September 18, 2020 12:08 PM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Subject: RE: QUESTION: Liverpool aquaculture proposals

Hi Ed,

Our Operations group confirmed there was no further ADCP deployments in Liverpool Bay conducted by the Department so no other data can be shared at this time.

In addition, based on the 2010 NSDFA deployment (Sept 2 to Oct 4) for the 1205x application, the tripod frames put the transducer faced about 0.6m above the sea floor. Worth noting that the 1st bin range is the distance from the transducer to the middle of the first bin. So in the case of this deployment, bin #1 is centered 2.7m above bottom but is averaging the current between 2.2m and 3.2m above bottom. Also, worth noting is that a hurricane came through during that deployment so there could be some abnormally high readings. This was confirmed by SimCorp when they re-visited their files.

Any other questions, please don't hesitate.

Thank you,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: October 26, 2020 6:57 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; FitzGerald, Jennifer L <Jennifer.FitzGerald@dfo-mpo.gc.ca>; Brager, Lindsay <Lindsay.Brager@dfo-mpo.gc.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment - AQ1205

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Hi Lynn,

DFO is requesting the following information to assist in our ongoing review:

Historical stocking events from 2011 onwards (it is our understanding that this is the year the site was acquired by Kelly Cove Salmon Ltd.)

Reported breaches of containment to NSDFA (i.e. escapes) – no records of escapes on <https://www.dfo-mpo.gc.ca/aquaculture/protect-protege/escape-prevention-evasions-eng.html>, please confirm.

Reported entanglements at the site.

Thanks,
Ed

Edward Parker
Regional Senior Aquaculture Management Officer
Telephone | Téléphone 902-402-0298
Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca
Fisheries and Oceans Canada | Pêches et Océans Canada
PO Box 1006, P600, Dartmouth, NS B2Y 4A2
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From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: October 30, 2020 4:25 PM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>; Jeff Nickerson <jnickerson@cookeaqua.com>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: Request for Information on AQ1205 Boundary Amendment

This message originated from outside your organization.

Good afternoon Jennifer and Jeff,

Please see the attached request from DFO, seeking more information on your boundary amendment for Liverpool AQ#1205.

Please provide this to us at your earliest convenience.

Thank you so much,

Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC

Halifax, NS B3J 3N8
 T: (902) 483-7668
 E: Melinda.Watts@novascotia.ca

NOTE: REFER TO THE EMAIL AND INFORMATION REQUEST BY DFO ABOVE.

From: Jennifer Hewitt <Jennifer.Hewitt@cookeaqu.com>
Sent: November 2, 2020 4:20 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>; Jeff Nickerson <jnickerson@cookeaqu.com>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Request for Information on AQ1205 Boundary Amendment

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Hi Melinda,

The stocking for Liverpool since 2011 is as follows:

Liverpool
 Site
 #1205

Stocking Year	Stocking Number

I believe site is approved for 420,000

There have been no reported escapes and/or entanglements on site since that time period.

Best Regards
 Jennifer

From: Watts, Melinda
Sent: November 5, 2020 10:38 AM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment - AQ1205

Good morning Ed,

We have received this information back from Kelly Cove Salmon but after discussing internally are

wondering where this request stems from and whether this information will be kept confidential? Looking at what is requested there is some questions around what, if any, of these records DFO would already have on file? Please clarify the intent of this request and certainly if it is easier to discuss over the phone, please give me a call.

Thank you,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

From: Watts, Melinda
Sent: November 20, 2020 3:16 PM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment - AQ1205

Hi Ed,

Still waiting to hear back from you on my question below but in addition to that, and to clarify, reported entanglements is related to mortality events only? If a seal was to get into a cage but was successfully released (alive), is that included in this request?

Thank you,

Melinda

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: Friday, December 4, 2020 3:19 PM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: FW: Request for Information on AQ1205 Boundary Amendment

Good afternoon Ed,

Please see the response from the applicant below. Again, we would like to discuss the purpose of this request at some point around what, if any, of these records DFO would already have on file (such as reported breaches). Please note that stocking information should be kept confidential at this time.

If there is more information required, please let us know.

Thank you,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

NOTE: REFER TO THE EMAIL AND RESPONSE FROM THE APPLICANT SENT ON NOVEMBER 2, 2020.

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: December 7, 2020 1:51 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>; Dobson, Suzanne <Suzanne.Dobson@dfo-mpo.gc.ca>
Subject: RE: Request for Information on AQ1205 Boundary Amendment

Hi Melinda,

Thanks for the information. Request for confidentiality is noted. The reason we are asking for this historical information is to assist in our risk assessment of what is being proposed by use of information on what has occurred, and under what conditions they occurred, in the past. In doing so, we do not rely solely on it by any means, and are careful to consider all other factors and information, and to not draw simple conclusions. This also allows us to confirm and compare our data holdings against yours. Please advise if more discussion is needed on this.

Here is what we have in our files for fish numbers:

2011:
2014:
2017:
2020:

There are apparent discrepancies in fish numbers for the two most recent production cycles.

Our records related to breaches of containment and entanglements also showed nothing.

Thanks,
Ed

Edward Parker
Regional Senior Aquaculture Management Officer
Telephone | Téléphone 902-402-0298
Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca
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CP 1006, P600, Dartmouth, N-É B2Y 4A2
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From: Watts, Melinda
Sent: January 28, 2021 4:17 PM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Network Comments for Liverpool Bay Applications (Brooklyn, Mersey Point, Liverpool Boundary Amendment)

Hi Jen,

I'm just touching base with you on the questions that were sent back in September from the network review for the Liverpool sites (see attached). We are ramping up with these applications and I'm going through what is still outstanding on these files.

The DFO and ECCC questions to be clarified should be pretty straightforward. The comment from Lands and Forestry regarding the bird survey is still an ongoing discussion as they may be similar to what CWS is asking for the Centreville application.

Please give a shout if you want to discuss any of these comments/questions.

Thank you,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

NOTE: REFER TO THE EXCEL SPREADSHEET SENT TO KCS ON SEPTEMBER 16, 2020.

-----Original Appointment-----

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: April 9, 2021 10:56 AM
To: Parker, Edward V
Cc: Winfield, Lynn
Subject: Accepted: Liverpool Bay Aquaculture Site Proposals
When: April 15, 2021 11:00 AM-12:00 PM (UTC-04:00) Atlantic Time (Canada).
Where: Microsoft Teams Meeting

Good morning Ed,

I'm the advisor on the Liverpool files so I can attend this meeting to discuss the requested information.

The first three points in your list were already been provided to you on December 4, 2020. Is there any additional information that is required or is this just a general discussion?

We have requested the information on artificial illumination and ADDs from the applicant, which has not yet been provided, however I did follow up on this last week and was told I should have this information shortly.

Regarding the mitigation measures related to fish containment, this appears to be a new request from DFO regarding the Liverpool applications correct? This information is provided in their Farm Management Plan and I can request this from them.

Melinda

-----Original Appointment-----

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>

Sent: April 8, 2021 2:41 PM

To: Parker, Edward V; Winfield, Lynn; Feehan, Jennifer; Greenwood, Megan N; FitzGerald, Jennifer L

Subject: Liverpool Bay Aquaculture Site Proposals

When: April 15, 2021 11:00 AM-12:00 PM (UTC-04:00) Atlantic Time (Canada).

Where: Microsoft Teams Meeting

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

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Hello NSDFA colleagues,

In follow up to our previous requests for additional information, and to build on a working level meeting Jennifer Fitzgerald and I had with Jennifer and Megan, we would like to have another discussion pertaining to Liverpool and the following pieces of additional information:

Historical stocking events from 2011 onwards (it is our understanding that this is the year the site was acquired by Kelly Cove Salmon Ltd.)

Reported breaches of containment to NSDFA (i.e. escapes) – no records of escapes on <https://www.dfo-mpo.gc.ca/aquaculture/protect-protege/escape-prevention-evasions-eng.html>, please confirm.

Reported entanglements at the site.

Please provide all mitigation measures related to fish containment, including but not limited to the following:

Operating procedures that limit the risk of a breach, including the identification of critical control points, critical control limits, monitoring and corrective actions.

Operating procedures for net maintenance (surface and below surface) such as inspection procedures, cleaning, disinfection, testing, repair, changing procedures, biofouling strategies as well as recording and reporting procedures for these activities.

Mooring and anchor inspection, grid system inspection and recording and reporting procedures for these activities.

Engineer approved minimum infrastructure requirements, and minimum infrastructure maintenance and inspection requirements in place for containment management.

Corrective actions related to the above procedures.

Procedures for site management in the event of severe weather.

Procedures for response to breaches or suspected breaches, including mandatory reporting.
Will artificial illumination be used?

If so, please provide details of equipment used, timing, and procedures, etc.

To ensure that non-target species are not negatively impacted, KCS will limit the use of any Acoustic Deterrent Devices (ADDs) during periods of high population densities. As such, the use of ADDs will NOT BE PERMITTED during the months of June through September.

Please feel free to suggest a better date and time if this doesn't work for you at NSDFA.

Thanks,
Ed

Microsoft Teams meeting

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From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>

Sent: April 12, 2021 1:39 PM

To: Watts, Melinda <Melinda.Watts@novascotia.ca>

Cc: FitzGerald, Jennifer L <Jennifer.FitzGerald@dfo-mpo.gc.ca>

Subject: RE: Liverpool Bay Aquaculture Site Proposals

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Hi Melinda,

Sorry that I had lost track of the fact you are the lead for this file. My apologies!

I did receive the historic stocking levels, but lost track of that so thanks for pointing that out. We hadn't received anything about entanglements or containment breaches, however. We can discuss these things and also the information on containment, because related to the latter, we recently received something

for 0814.

Looking forward to the discussion.

Thanks,
Ed

Edward Parker
Regional Senior Aquaculture Management Officer
Telephone | Téléphone 902-402-0298
Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca
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From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: April 12, 2021 3:54 PM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Cc: FitzGerald, Jennifer L <Jennifer.FitzGerald@dfo-mpo.gc.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Liverpool Bay Aquaculture Site Proposals

Not a problem Ed! There's a lot of files and individuals responsible for each one.

It also may have been missed as it was very brief in the email with the stocking levels but KCS confirmed there were no reported escapes or entanglements on that site. I will forward that email here again separately. As you noted we can discuss this further.

I just want to confirm again that the mitigation measures related to fish containment is a new request from DFO regarding the Liverpool applications correct?

Thank you,
Melinda

Melinda Watts
Aquaculture Advisor
Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: April 13, 2021 1:19 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Cc: FitzGerald, Jennifer L <Jennifer.FitzGerald@dfo-mpo.gc.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Liverpool Bay Aquaculture Site Proposals

Correct. I don't think we asked for these mitigation measures yet for this file.

Edward Parker
Regional Senior Aquaculture Management Officer
Telephone | Téléphone 902-402-0298
Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca
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From: Watts, Melinda
Sent: April 13, 2021 2:30 PM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Network Comments for Liverpool Bay Applications (Brooklyn, Mersey Point, Liverpool Boundary Amendment)

Hi Jen,

DFO has requested more information regarding the Liverpool applications, which I have added to the table attached. A reminder that there are still outstanding answers to the original questions DFO requested as well as from Environment Canada. These are all captured in the table.

We are meeting with DFO on Thursday morning to discuss their requested information if there is anyway you could provide a ahead of that time that would be most helpful. I can request that the meeting be moved to next week if this is not feasible. Please let me know.

Thank you for your work on this.

Cheers,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca



Network Comments
Re. KCS Liverpool Ba

Network Review Partner	Network Questions to be clarified by KCS	Additional Comments/Recommendations from Network Partner	KCS Response
Fisheries and Oceans Canada (DFO)	<p>1.Area of the seabed impacted by each 2000 kg shovel anchor, as well as a description of plans, if any, to uninstall and reinstall anchors and weights (or any equipment physically attached to the benthic substrate) in different locations.</p> <p>2.Will there be any use of acoustic predator deterrents?</p> <p>3.Will there be introduced artificial light? If so, please provide details of equipment used, timing, and procedures, etc.</p> <p>4.Please provide all mitigation measures related to fish containment, including but not limited to the following:</p> <ul style="list-style-type: none"> -Operating procedures that limit the risk of a breach, including the identification of critical control points, critical control limits, monitoring and corrective actions. -Operating procedures for net maintenance (surface and below surface) such as inspection procedures, cleaning, disinfection, testing, repair, changing procedures, biofouling strategies as well as recording and reporting procedures for these activities. -Mooring and anchor inspection, grid system inspection and recording and reporting procedures for these activities. -Engineer approved minimum infrastructure requirements, and minimum infrastructure maintenance and inspection requirements in place for containment management. -Corrective actions related to the above procedures. -Procedures for site management in the event of severe weather. -Procedures for response to breaches or suspected breaches, including mandatory reporting. 	<p>The Brooklyn wharf is managed by the Harbour Authority of Brooklyn. Jim Fralic is the President of the Harbour Authority and can be reached at 1-902-354-5682. DFO recommends this information be shared with Kelly Cove Salmon Ltd. if they intend to use the Brooklyn wharf facilities.</p>	
Canadian Food Inspection Agency (CFIA)	No comments or concerns regarding the applications for the proposed developments		
Transport Canada (TC)	Comments not provided for 1432/1433 - TC not likely to approve the notice of works prior to approval of the amendment. No concerns from Transport Canada for 1205		
Environment and Climate Change Canada (ECCC)	<p>1.As indicated on page 117 of the application, the shorelines from Eastern Head to Beach Meadows, and Black Point to Western Head, are wintering habitat for Harlequin Ducks. It should be clarified whether the “significant habitat” identified by provincial wildlife biologists and illustrated on Figure 54 is Harlequin Duck wintering habitat. If not, it should be clarified what is this “significant habitat”, and the distance of the proposed aquaculture lease to Harlequin Duck wintering habitat should be clarified.</p> <p>2. It should be clarified whether grow lights are proposed for this site.</p> <p>3. On page 15 of the Wildlife Interaction Plan, it is stated that “Migratory birds that are more commonly seen around the sites or have the greatest potential to be seen include:”, and photos of 4 migratory bird SAR (e.g. Barrow s Goldeneye, Harlequin Duck, Ivory Gull, Roseate Tern) photos are presented. However, the species in the photos do not reflect the broad range of sensitive species of migratory birds most likely to be seen around aquaculture sites in the area. This section should be updated accordingly. Similarly, the “Nova Scotia Protected Wildlife” sheets in the “REFERENCED MATERIALS” section should be updated.</p>	<p>See attached comments for 1432/1433 and 1205x with full network comments, including recommendations and mitigation measures for consideration.</p>	
NS Environment (Enforcement Division)	There were no questions raised by NSE, however, there were recommendations to be considered as conditions of the licence. See next column.	<p>Concerns with development are that there has been complaints with this company of debris breaking loose and washing up on shore on/or near private lands. But also when notified about debris from site, the site manager has sent out workers and had site cleaned up with in a few days of being notified and pictures of clean up sent to Officer.</p> <p>Required or Recommended Conditions:</p> <ol style="list-style-type: none"> 1) Instead of Styrofoam buoys being used for corner markers, recommend that heavier material inflatable floats/ buoys be used which would cause less/no debris of small Styrofoam balls left behind on land or water. 2) Corner blocks for site markers be placed by a qualified third party with highly accurate GPS technology. 	
NS Agriculture	No comments or concerns regarding the proposed development		
NS Municipal Affairs	Notification not sent - Management working with the Municipality		
NS Communities Culture and Heritage (CCH)	There were no concerns or issues raised by CCH, however, there are comments to be shared with the applicant. See next column.	<ol style="list-style-type: none"> 1. Though there are no recorded archaeology sites in the area of the proposed aquaculture development, the larger vicinity has a number of recorded sites. 2. If during the course of the development and operation of the cages, archaeological materials are observed, immediately contact the Coordinator of Special Places. The contact phone number is 902-424-6475. 	
NS Office of Aboriginal Affairs (OAA)	Internal consultation		

NS Lands and Forestry	The Department of Lands and Forestry recommends that before the operation is expanded, a study be conducted on the number of bird interactions with the existing site. If this study has already been completed the Department would like to see the study and review the survey and/or monitoring protocols. See next column for further comments from Lands and Forestry.	1. This proposal is adjacent to Coffin Island. An important area for herons, terns, and ducks. This area is also an important area for the Harlequin duck, an endangered species in Nova Scotia. 2. According to the records on file at the Crown Land Information Management Centre, any land lying below the original ordinary high water mark of Liverpool Bay, at the three locations provided, is considered ungranted Crown land with no encumbrances.	
NS Fisheries and Aquaculture (Inland Fisheries)	No comments or concerns regarding the proposed development		

From: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Sent: April 14, 2021 9:54 AM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: DFO Response

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Hi Melinda,
Please see attached documents, let me know if this all makes sense for the DFO review.
Jen

Jennifer Hewitt

Kelly Cove Salmon Ltd.

Division of Cooke Aquaculture INC

Compliance Manager, NS

Cell (902) 521-8604

134 North Street

Bridgewater, NS

B4V 2V6



Network Comments Liverpool Network Appendix D - Risk Appendix G -
Re. KCS Liverpool BaResponse DFO Que:Control plan LiverpcEnhanced risk contr

NOTE: Kelly Cove Salmon Limited does not object to the filing of this response with the Nova Scotia Aquaculture Review Board. It does so without waiving its entitlement to maintain as confidential and privileged the contents of the Liverpool Farm Management Plan, except to the extent disclosed in this document.

Network Review Partner	Network Questions to be clarified by KCS	Additional Comments/Recommendations from Network Partner	KCS Response
Fisheries and Oceans Canada (DFO)	<p>1.Area of the seabed impacted by each 2000 kg shovel anchor, as well as a description of plans, if any, to uninstall and reinstall anchors and weights (or any equipment physically attached to the benthic substrate) in different locations.</p> <p>2.Will there be any use of acoustic predator deterrents?</p> <p>3.Will there be introduced artificial light? If so, please provide details of equipment used, timing, and procedures, etc.</p> <p>4.Please provide all mitigation measures related to fish containment, including but not limited to the following:</p> <ul style="list-style-type: none"> -Operating procedures that limit the risk of a breach, including the identification of critical control points, critical control limits, monitoring and corrective actions. -Operating procedures for net maintenance (surface and below surface) such as inspection procedures, cleaning, disinfection, testing, repair, changing procedures, biofouling strategies as well as recording and reporting procedures for these activities. -Mooring and anchor inspection, grid system inspection and recording and reporting procedures for these activities. -Engineer approved minimum infrastructure requirements, and minimum infrastructure maintenance and inspection requirements in place for containment management. -Corrective actions related to the above procedures. -Procedures for site management in the event of severe weather. -Procedures for response to breaches or suspected breaches, including mandatory reporting. 	<p>The Brooklyn wharf is managed by the Harbour Authority of Brooklyn. Jim Fralic is the President of the Harbour Authority and can be reached at 1-902-354-5682. DFO recommends this information be shared with Kelly Cove Salmon Ltd. if they intend to use the Brooklyn wharf facilities.</p>	<p>#1.The area of seabed impacted is between 5-10m. This was determined by pull tests of shovel anchors on a beach a few years back. Assuming the bottom is sand, mud or clay (soft bottom), the anchors will usually take anywhere from 5-10 m to dig on initial set. Once they have dug in there is very little of the anchor sticking out above the seabed as its mostly impacted into the sand.</p> <p>#2. We will not be using predator deterrents at this site.</p> <p>#3. Artificial lighting will be used on the site between November 15-April 15th. LED lights from the blue spectrum are used, all lights will be pointed downward towards the bottom of the cage there will be no glow as was observed when using halogen lights.. The lights will be powered from the on site feed barge.</p> <p>#4 All questions raised are a part of the farm management plan. I took out the relevant sections. We are in the process of having all the sites approved by an engineer. Any new sites will follow the below standards.: TheFuture sites will be modeled using guidance from the following engineering standards:</p> <ul style="list-style-type: none"> •NS 9415:2009 – “Marine fish farms: Requirements for site survey, risk analyses, design, dimensioning, production, installation and operation” • “Marine Scotland: A Technical Standard for Scottish Finfish Aquaculture” •SO16488 – “International Standard: Marine fish farms – open net cage – design and operation” •API RP 25K – “Design and Analysis of Stationkeeping Systems for Floating Structures” •DNV-OS-E301 – “Position Mooring”
Canadian Food Inspection Agency (CFIA)	No comments or concerns regarding the applications for the proposed developments		
Transport Canada (TC)	<p>Comments not provided for 1432/1433 - TC not likely to approve the notice of works prior to approval of the amendment.</p> <p>No concerns from Transport Canada for 1205</p>		
Environment and Climate Change Canada (ECCC)	<p>1. As indicated on page 117 of the application, the shorelines from Eastern Head to Beach Meadows, and Black Point to Western Head, are wintering habitat for Harlequin Ducks. It should be clarified whether the “significant habitat” identified by provincial wildlife biologists and illustrated on Figure 54 is Harlequin Duck wintering habitat. If not, it should be clarified what is this “significant habitat”, and the distance of the proposed aquaculture lease to Harlequin Duck wintering habitat should be clarified.</p> <p>2. It should be clarified whether grow lights are proposed for this site.</p> <p>3. On page 15 of the Wildlife Interaction Plan, it is stated that “Migratory birds that are more commonly seen around the sites or have the greatest potential to be seen include:”, and photos of 4 migratory bird SAR (e.g. Barrow Goldeneye, Harlequin Duck, Ivory Gull, Roseate Tern) photos are presented. However, the species in the photos do not reflect the broad range of sensitive species of migratory birds most likely to be seen around aquaculture sites in the area. This section should be updated accordingly. Similarly, the “Nova Scotia Protected Wildlife” sheets in the “REFERENCED MATERIALS” section should be updated.</p>	<p>See attached comments for 1432/1433 and 1205x with full network comments, including recommendations and mitigation measures for consideration.</p>	
NS Environment (Enforcement Division)	There were no questions raised by NSE, however, there were recommendations to be considered as conditions of the licence. See next column.	<p>Concerns with development are that there has been complaints with this company of debris breaking loose and washing up on shore on/or near private lands. But also when notified about debris from site, the site manager has sent out workers and had site cleaned up with in a few days of being notified and pictures of clean up sent to Officer.</p> <p>Required or Recommended Conditions:</p> <ol style="list-style-type: none"> 1) Instead of Styrofoam buoys being used for corner markers, recommend that heavier material inflatable floats/ buoys be used which would cause less/no debris of small Styrofoam balls left behind on land or water. 2) Corner blocks for site markers be placed by a qualified third party with highly accurate GPS technology. 	
NS Agriculture	No comments or concerns regarding the proposed development		
NS Municipal Affairs	Notification not sent - Management working with the Municipality		
NS Communities Culture and Heritage (CCH)	There were no concerns or issues raised by CCH, however, there are comments to be shared with the applicant. See next column.	<ol style="list-style-type: none"> 1. Though there are no recorded archaeology sites in the area of the proposed aquaculture development, the larger vicinity has a number of recorded sites. 2. If during the course of the development and operation of the cages, archaeological materials are observed, immediately contact the Coordinator of Special Places. The contact phone number is 902-424-6475. 	
NS Office of Aboriginal Affairs (OAA)	Internal consultation		

<p>NS Lands and Forestry</p>	<p>The Department of Lands and Forestry recommends that before the operation is expanded, a study be conducted on the number of bird interactions with the existing site. If this study has already been completed the Department would like to see the study and review the survey and/or monitoring protocols. See next column for further comments from Lands and Forestry.</p>	<p>1.This proposal is adjacent to Coffin Island. An important area for herons, terns, and ducks. This area is also an important area for the Harlequin duck, an endangered species in Nova Scotia.</p> <p>2.According to the records on file at the Crown Land Information Management Centre, any land lying below the original ordinary high water mark of Liverpool Bay, at the three locations provided, is considered ungranted Crown land with no encumbrances.</p>	
<p>NS Fisheries and Aquaculture (Inland Fisheries)</p>	<p>No comments or concerns regarding the proposed development</p>		

7.2 Hazard analysis for Containment Management

A hazard analysis for Containment Management is required. Similar to the Fish Health Management hazard analysis, it begins by examining the steps of the process flow and listing the hazards associated with each. This is followed by an examination of each hazard to determine which process steps are critical control points for the hazards.

Do you have a documented hazard analysis for Containment Management?

YES NO

If yes, attach and indicate the name of the documentation that describes the hazard analysis.

If no, complete sections 7.2.1 to 7.2.4.

7.2.1 Containment hazards

To initiate the hazard analysis for Containment Management, the aquaculture licence holder must list the Containment Management hazards associated with each of the steps of the operation's process.

In order to assist with this process, a table of possible containment hazards have been listed for each of the generic processing steps defined in the *sample* process flow provided in Section 4.0.

The first step is to identify those process steps that are applicable to your operation by checking the appropriate boxes. You must also add process steps that are specific to your operation if they are not included below. Space is provided between each defined production step as well as at the end to do so.

Next determine which risks are associated with each process step. Indicate these risks by checking the appropriate boxes. You must also add hazards that are specific to your operation if they are not included below. Space is provided for each production step to do so.

The table below may not be an exhaustive list of hazards, and not all of these hazards may be applicable to your operation. The onus is on each operation to ensure that they have identified all hazards for their unique operation.

Process Step	Containment Hazards
<input checked="" type="checkbox"/> Fish transport in, Shore to boat	<input type="checkbox"/> Fish jumping out of transfer net <input checked="" type="checkbox"/> Weak or incorrectly attached equipment <ul style="list-style-type: none"> • _____ • _____ • _____
<input checked="" type="checkbox"/> Fish transport in, boat to cage	<input type="checkbox"/> Fish jumping out of transfer net <input checked="" type="checkbox"/> Weak or incorrectly attached equipment <input checked="" type="checkbox"/> Fish release during transfer to and from well boat <ul style="list-style-type: none"> • _____ • _____ • _____
<input checked="" type="checkbox"/> Stocking of cages	<input checked="" type="checkbox"/> Fish too small for mesh <ul style="list-style-type: none"> • _____ • _____ • _____
<input checked="" type="checkbox"/> Grow out	<input checked="" type="checkbox"/> Hole in net due to chafing/ other equipment wear <input checked="" type="checkbox"/> Predator attacks <input checked="" type="checkbox"/> Storms <input checked="" type="checkbox"/> Net Washing <ul style="list-style-type: none"> • _____ • _____ • _____ • _____
<input checked="" type="checkbox"/> Feeding	<input checked="" type="checkbox"/> None identified <ul style="list-style-type: none"> • _____ • _____

<input checked="" type="checkbox"/> Sampling (fish health, sea lice counting, biomass estimates, R&D)	<input checked="" type="checkbox"/> Fish jumping out of transfer net <input type="checkbox"/> Weak or incorrectly attached equipment <ul style="list-style-type: none"> • _____ • _____ • _____
<input checked="" type="checkbox"/> Sea lice treatment management	<input checked="" type="checkbox"/> Fish release during transfer to and from well boat <ul style="list-style-type: none"> • _____ • _____ • _____
Process Step	Containment Hazards
<input checked="" type="checkbox"/> Disease treatment management	<input checked="" type="checkbox"/> None identified <ul style="list-style-type: none"> • _____ • _____
<input checked="" type="checkbox"/> Net changing	<input checked="" type="checkbox"/> Fish released due to insecure new net <input checked="" type="checkbox"/> Net not removed properly <input type="checkbox"/> Fish too small for net <ul style="list-style-type: none"> • _____ • _____ • _____
<input type="checkbox"/> Grading	<input type="checkbox"/> Fish jumping out of transfer net <input type="checkbox"/> Weak or incorrectly attached equipment <ul style="list-style-type: none"> • _____ • _____
<input type="checkbox"/> Marking of fish	<input type="checkbox"/> None identified <ul style="list-style-type: none"> • _____ • _____ • _____

<input checked="" type="checkbox"/> Mortality and maintenance dives	<input checked="" type="checkbox"/> Not dropping the net properly for diver entry may allow fish escape <input checked="" type="checkbox"/> Not closing the net after entry may allow fish escape <input checked="" type="checkbox"/> Fish released from collection bags/equipment <ul style="list-style-type: none"> • _____ • _____ • _____
<input type="checkbox"/> Splitting & Transfers	<input type="checkbox"/> Fish release from the transfer to and from well boat
<input checked="" type="checkbox"/> Harvest, fish transport out, cage to boat	<input checked="" type="checkbox"/> Last fish in cage difficult to see and may be released if net is dropped prior to emptying <input type="checkbox"/> Fish jumping out of transfer net <input checked="" type="checkbox"/> Equipment breakage <input checked="" type="checkbox"/> Fish release during the transfer to harvest boat <ul style="list-style-type: none"> • _____ • _____
<input checked="" type="checkbox"/> Fish transport out, boat to shore	<input type="checkbox"/> Fish jumping out of transfer net <input checked="" type="checkbox"/> Weak or incorrectly attached equipment <input checked="" type="checkbox"/> Fish release during the transfer from harvest boat <ul style="list-style-type: none"> • _____

7.2.2 Determination of critical control points for Containment Management

As explained previously, critical control points (CCPs) are points within production where action could be taken, if necessary, to prevent, eliminate or reduce a risk (hazard). They are identified in a hazard analysis as those hazards which:

1. are significant;
2. are reasonable to occur;
3. are not controlled elsewhere in the production process; and
4. are controllable.

Each production step with its associated hazards must be evaluated to determine if they meet the criteria for being a CCP.

In order to assist with this process, assessment tables of risks defined in Section 7.2.1 that are associated with each of the generic processing steps that formed part of the *sample* process flow provided in Section 4.0 have been provided.

You must review these assessments and check off the determinations that are applicable to your operation. Checking off the box means you agree with the assessment as shown. If you disagree with the assessment, re-record the risk on another line and record your own assessment in the space provided.

You must also add hazards that are specific to your operation if they are not included in the table below. Space is provided within each production step to do so.

You must also add process steps that are specific to your operation if they are not included below. Blank tables for doing so can be found in Appendix A.

The evaluations in the tables that follow may not apply to all operations. The onus is on the aquaculture licence holder to evaluate their process and their hazards to determine the most appropriate CCPs for their unique operation.

Process Step: [Fish transport in, shore to boat](#); determination if containment hazard has a critical control point

Check if Applicable	Potential Containment Hazard	Is the hazard significant? (Y/N)	Is it reasonable to occur? (Y/N)	Is it controlled elsewhere? (If yes, where?)	Do control measures exist?	Justification for inclusion or exclusion as a CCP
<input type="checkbox"/>	Fish jumping out of transfer net	Y	Y	Controlled with SOP for fish transport in FMP		Not a CCP, Already controlled within FMP.
<input checked="" type="checkbox"/>	Weak or incorrectly attached equipment	Y	Y	Controlled with SOP for fish transport in FMP Smolt Delivery BMP SOP #23		Not a CCP, Already controlled within FMP.

Process Step: [Fish transport in, boat to cage](#); determination if containment hazard has a critical control point

Check if Applicable	Potential Containment Hazard	Is the hazard significant? (Y/N)	Is it reasonable to occur? (Y/N)	Is it controlled elsewhere? (If yes, where?)	Do control measures exist?	Justification for inclusion or exclusion as a CCP
<input type="checkbox"/>	Fish jumping out of transfer net	Y	Y	Controlled with SOP for fish transport in FMP		Not a CCP, Already controlled within FMP.
<input checked="" type="checkbox"/>	Weak or incorrectly attached equipment	Y	Y	Controlled with SOP for fish transport in FMP		Not a CCP, Already controlled within FMP.

				Smolt Delivery BMP SOP #23		
<input checked="" type="checkbox"/>	Fish release during transfer to and from well boat	Y	Y	Well Boat treatment Procedures FHMP SOP #15	Y	A CCP. Should be controlled within procedures.

Process Step: [Stocking of cages](#); determination if containment hazard has a critical control point

Check if Applicable	Potential Containment Hazard	Is the hazard significant? (Y/N)	Is it reasonable to occur? (Y/N)	Is it controlled elsewhere? (If yes, where?)	Do control measures exist?	Justification for inclusion or exclusion as a CCP
<input checked="" type="checkbox"/>	Fish too small for mesh	Y	Not without prior knowledge	Controlled with COFHT and review of production plan with NSDFA. Also controlled with net mesh sizing strategy within FMP.		Not a CCP. Already controlled with approval process and within FMP.

Process Step: [Grow out](#); determination if containment hazard has a critical control point

Check if Applicable	Potential Containment Hazard	Is the hazard significant? (Y/N)	Is it reasonable to occur? (Y/N)	Is it controlled elsewhere? (If yes, where?)	Do control measures exist?	Justification for inclusion or exclusion as a CCP
<input checked="" type="checkbox"/>	Hole in net due to chafing or other equipment wear	Y	Y	Controlled with equipment maintenance and inspection requirements within FMP		Not a CCP. Already controlled within FMP
<input checked="" type="checkbox"/>	Predator attacks	Y	Y	N	N	Not a CCP. Cannot be controlled during production. Reduce risk with predator deterrence and predator netting as part of FMP.
<input checked="" type="checkbox"/>	Storms	Y	Y	N	N	Not a CCP. Cannot be controlled during production. Reduce risk with emergency plans that are part of FMP.
<input checked="" type="checkbox"/>	Net Washing	Y	Y	Controlled with biofouling control plan of FMP BMP SOP #20 Net Washing Protocols		Not a CCP. Already controlled within FMP

Process Step: [Sampling \(fish health, sea lice counting, biomass estimates, R&D\)](#); determination if containment hazard has a critical control point.

Check if Applicable	Potential Containment Hazard	Is the hazard significant? (Y/N)	Is it reasonable to occur? (Y/N)	Is it controlled elsewhere? (If yes, where?)	Do control measures exist?	Justification for inclusion or exclusion as a CCP
<input checked="" type="checkbox"/>	Fish jumping out of transfer net	Y	Y	Controlled with SOP #9 Weight Sampling by Hand in FMP	Y	A CCP. Should be controlled within procedures.
<input type="checkbox"/>	Weak or incorrectly attached equipment	Y	Y	Controlled with SOP for mean weight sampling in FMP but not in others.	Y	A CCP. Should be controlled within procedures.

Process Step: [Sea lice treatment management](#); determination if containment hazard has a critical control point.

Check if Applicable	Potential Containment Hazard	Is the hazard significant? (Y/N)	Is it reasonable to occur? (Y/N)	Is it controlled elsewhere? (If yes, where?)	Do control measures exist?	Justification for inclusion or exclusion as a CCP
<input checked="" type="checkbox"/>	Fish release during transfer to and from well boat	Y	Y	Well Boat Treatment Procedures FHMP SOP #15	Y	A CCP. Should be controlled within procedures.

Process Step: [Net change](#); determination if potential containment hazard has a critical control point.

Check if Applicable	Potential Containment Hazard	Is the hazard significant? (Y/N)	Is it reasonable to occur? (Y/N)	Is it controlled elsewhere? (If yes, where?)	Do control measures exist?	Justification for inclusion or exclusion as a CCP
<input checked="" type="checkbox"/>	Fish released due to insecure new net	y	N	Controlled with BMP SOP #15 for net changing in FMP		Not a CCP, Already controlled within FMP.
<input checked="" type="checkbox"/>	Net not removed properly	Y	N	Controlled with BMP SOP #15 for net changing in FMP		Not a CCP, Already controlled within FMP.
<input checked="" type="checkbox"/>	Fish too small for mesh	Y	Y	Controlled with net sizing strategy within FMP.		Not a CCP. Already controlled within FMP.

Process Step: [Mortality, maintenance dives](#); determination if potential containment hazard has a critical control point.

Check if Applicable	Potential Containment Hazard	Is the hazard significant? (Y/N)	Is it reasonable to occur? (Y/N)	Is it controlled elsewhere? (If yes, where?)	Do control measures exist?	Justification for inclusion or exclusion as a CCP
<input checked="" type="checkbox"/>	Not dropping the net properly for diver entry	y	N	Controlled with FHMP SOP #6 for mortality		Not a CCP. Already controlled within FMP

	may allow fish escape			removal in FMP.		
<input checked="" type="checkbox"/>	Not closing the net after dive entry may allow fish escape	Y	Y	Controlled with FHMP SOP #6 for mortality removal in FMP.		Not a CCP. Already controlled within FMP
<input checked="" type="checkbox"/>	Fish released from collection bags/equipment	Y	Y	Controlled with FMHP SOP #6 for mortality removal in FMP.		Not a CCP. Already controlled within FMP

Process Step: [Harvest, fish transport out- cage to boat](#); determination if containment hazard has a critical control point.

Check if Applicable	Potential Containment Hazard	Is the hazard significant? (Y/N)	Is it reasonable to occur? (Y/N)	Is it controlled elsewhere? (If yes, where?)	Do control measures exist?	Justification for inclusion or exclusion as a CCP
<input checked="" type="checkbox"/>	Last fish in cage difficult to see and may be released if net is dropped prior to emptying	Y	Y	Controlled with SOP 18 for Harvesting, & SOP WI 18-A Seining & Corking	Y	A CCP. Last fish in cage easy to miss. May be inadvertently released.
<input type="checkbox"/>	Fish jumping out of transfer net	Y	Y	Control with SOP #18 for harvesting in FMP		Not a CCP. Already controlled within FMP
<input checked="" type="checkbox"/>	Weak or incorrectly attached equipment	Y	Y	Control with SOP #18 for harvesting in FMP		Not a CCP. Already controlled within FMP

<input checked="" type="checkbox"/>	Fish release during transfer to and from well boat	Y	Y	Well Boat treatment Procedures FHMP SOP #15	Y	A CCP. Should be controlled within procedures.
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Process Step: [Harvest, fish transport out - boat to shore](#); determination if potential containment hazard has a critical control point.

Check if Applicable	Potential Containment Hazard	Is the hazard significant? (Y/N)	Is it reasonable to occur? (Y/N)	Is it controlled elsewhere? (If yes, where?)	Do control measures exist?	Justification for inclusion or exclusion as a CCP
<input type="checkbox"/>	Fish jumping out of transfer net	Y	Y	Control with SOP #18 for harvesting in FMP		Not a CCP. Already controlled within FMP
<input checked="" type="checkbox"/>	Weak or incorrectly attached equipment	Y	Y	Control with SOP #18 for harvesting in FMP		Not a CCP. Already controlled within FMP
<input checked="" type="checkbox"/>	Fish release during transfer to and from well boat	Y	Y	Well Boat treatment Procedures FHMP SOP #15	Y	A CCP. Should be controlled within procedures.

7.2.3 CCP listing for Containment

In the table below, list the process steps and hazards that have CCPs for Containment Management as determined from the assessment in 7.2.2. Add lines as required.

Process Step	Potential Containment Management Hazard
Fish Transport in - boat to cage	Fish released during transfer to and from well boat.
Sampling	Fish Jumping out of transfer net
Sea Lice Treatment	Fish released during transfer into well boat

Harvesting fish transport out - cage to boat	Last fish in cage easy to miss. May be inadvertently released.
	Fish Released during transfer to and from harvest boat.
Harvesting fish transport out – boat to shore	Fish Released during transfer from harvest boat.

7.2.4 Risk Control Plans for Containment Management

A risk control plan needs to be developed for each of the critical control points identified in the hazard analysis. This plan must list the following:

1. Process step for which the CCP applies.
2. Specific hazard to be addressed.
3. Control measures that can be applied.
4. Critical limits (the level or range of a value measured at a critical control point at which no remedial action is required).
5. Monitoring procedures to ensure the critical limit is not exceeded.
6. Corrective actions to be taken in the event that the process deviates outside of the critical limits.
7. Record keeping to demonstrate that the step is under control or appropriate action has been taken to bring it under control.

This risk control plan must become part of any procedure for which it may apply.

Complete risk control plans for each CCP identified in the hazard analysis. Generic risk control plans for the CCPs identified in the tables above are in Appendix D.

See Appendix D – Risk control plans for containment

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirements: <ul style="list-style-type: none"> • <i>A hazard analysis of the production process must be completed for Containment Management</i> • <i>Each procedure contained in a Farm Management Plan must include any of the following that apply to with respect to that procedure:</i> <ol style="list-style-type: none"> <i>a) Critical control points</i> <i>b) Critical control limits</i> <i>c) Details about how the procedure is monitored</i> <i>d) Details about corrective actions to be taken</i>

**APPENDIX D: GENERIC RISK CONTROL PLANS FOR FISH
HEALTH AND CONTAINMENT MANAGEMENT, MARINE FINFISH**

Contents

Risk Control Plans, Fish Health..... 1
Risk Control Plans, Containment..... 2

Risk Control Plans, Fish Health

CCP Process Step: Fish transport in - shore to boat

Fish Health Hazard: Disease within incoming stock.

Control Measure: Review of performance and health records from incoming stock (including mortality, growth, vaccination, health testing). Only fish with Certificate of Fish Health for Transfer may be stocked on site. All fish come from Company facilities, or facilities under contract which are growing Company stock. All facilities are attended by a Company or Provincial veterinarian.

Critical Limit: Incoming stock must be performing according to Company's expectations, be vaccinated according to expectations and be free of diseases of concern to the operation.

Monitoring Procedure: Prior to receipt of each shipment, the manager or designate will inspect all available health and performance records for the stock.

Corrective Actions:

1. Reject fish stocks for which performance and/or health records are not available or for which records, or health testing demonstrates a fish health concern for the receiving operation.
2. Get health testing completed for stocks with no records or with insufficient testing
3. Review requirements with suppliers
4. Record an incident report

Records:

1. Fish Health Testing Results
2. Vaccination Records
3. IMS Incident Report

Risk Control Plans, Containment

CCP Process Step: Fish transport in - boat to cage

Containment Hazard: Fish release during transfer to and from well boat

Control Measure: Placement and proximity of well boat to cage edge and pump/hose assembly. If the hose were to separate from the pump, the fish would be contained on deck. The hose is a single hose with no connections.

Critical Limit: Vessel secured to cage edge and end of hose below surface of the water.

Monitoring Procedure: Prior to use, the pump and pipe are inspected for damaged.

Corrective Actions:

1. Un-inspected or damaged set up will not be used until inspection has been completed.
2. The transfer will be stopped and the pump, hose and/or position will be fixed, as required
3. Requirements will be reviewed with relevant staff.
4. Corrective action will be recorded.

Records:

1. IMS Incident Report

CCP Process Step: Sampling (fish health, sea lice counting, biomass estimates, R&D)

Containment Hazard: Fish jumping out of transfer net.

Control Measure: Dip net inspection prior to use and limited number of fish in dip net per dip.

Critical Limit: Dip net inspected prior to dipping first fish and throughout the sampling process if debris present or if snagged during process. Fish will be limited in number based on size and depth of dip net.

Monitoring Procedure: Prior to the sampling and throughout the sampling process, the site manager or designate will visually inspect the net. Individual designated to dip fish will only handle as many fish as he/she can easily manage. Large fish will be dipped individually.

Corrective Actions:

1. Un-inspected or damaged nets will not be used until inspection or repairs have been completed.
2. The sampling will be stopped, and the dip net fixed, as required
3. Requirements will be reviewed with relevant staff.
4. Record an incident report

Records:

1. KCS Surface Inspection Report (Pronto)
2. IMS Incident Report

CCP Process Step: Sea lice treatment management

Containment Hazard: Fish release during transfer to and from well boat

Control Measure: Placement and proximity of well boat to cage edge and pump/hose assembly. If the hose were to separate from the pump, the fish would be contained on deck. The hose is a single hose with no connections.

Critical Limit: Vessel secured to cage edge and end of hose below surface of the water.

Monitoring Procedure: Prior to use, the pump and pipe are inspected for damaged.

Corrective Actions:

5. Un-inspected or damaged set up will not be used until inspection has been completed.
6. The transfer will be stopped and the pump, hose and/or position will be fixed, as required.
7. Requirements will be reviewed with relevant staff.
8. Corrective action will be recorded.

Records:

2. IMS Incident Report

CCP Process Step: Harvesting Fish Transport out Boat to Cage

Containment Hazard #1: Last fish in cage easy to miss. May be inadvertently released.

Control Measure: The entire fish containment net is brought the surface with a cork line, exposing any remaining fish which are then removed by fish pump thus all fish will be removed from the cage.

Critical Limit: No fish remaining in cage.

Monitoring Procedure: Inspection of cage contents prior to dropping nets.

Corrective Actions:

1. Stop dropping net if fish are noticed.
2. Remove remaining fish in cage.
3. Requirements will be reviewed with relevant staff.
4. Corrective action will be recorded.

Records:

1. IMS Incident Report

Containment Hazard#2: Fish release during transfer to and from well boat

Control Measure: Placement and proximity of well boat to cage edge and pump/hose assembly. If the hose were to separate from the pump, the fish would be contained on deck. The hose is a single hose with no connections.

Critical Limit: Vessel secured to cage edge and end of hose below surface of the water.

Monitoring Procedure: Prior to use, the pump and pipe are inspected for damaged.

Corrective Actions:

1. Un-inspected or damaged set up will not be used until inspection has been completed.
2. The transfer will be stopped and the pump, hose and/or position will be fixed, as required
3. Requirements will be reviewed with relevant staff.
4. Corrective action will be recorded.

Records:

3. IMS Incident Report

CCP Process Step: Harvesting Fish Transport out Boat to Shore

Containment Hazard#2: Fish release during transfer from well boat

Control Measure: Placement and proximity of well boat to cage edge and pump/hose assembly. If the hose were to separate from the pump, the fish would be contained on deck. The hose is a single hose with no connections.

Critical Limit: Vessel secured to cage edge and end of hose below surface of the water.

Monitoring Procedure: Prior to use, the pump and pipe are inspected for damaged.

Corrective Actions:

1. Un-inspected or damaged set up will not be used until inspection has been completed.
2. The transfer will be stopped and the pump, hose and/or position will be fixed, as required.
3. Requirements will be reviewed with relevant staff.
4. Corrective action will be recorded.

Records:

4. IMS Incident Report

Farm Management Plan

APPENDIX G: ENHANCED RISK CONTROL PLANS FOR: ENVIRONMENTAL IMPACT

CCP List for Environmental Impact

The table below lists the process steps and hazards that have been identified in the Farm Management Plan that have enhanced CCPs for Environmental Impact.

Process Step	Potential Environmental Impact Hazard
3 – Stocking of Cages	Overstocking of site, or specific areas of site
4 – Grow Out	Settlement of feces affects bottom sediments
	Cleaning of nets causes release of biofouling
5 - Feeding	Overfeeding causes settlement of uneaten feed
	Improper feeding technique causes settlement of uneaten feed or overfeeding

Enhanced Risk Control Plans, Environmental Impact

These risk control plans will provide options for mitigation procedures to be instituted in the event that poor environmental performance is indicated by monitoring efforts. In this situation, the risk control plan must become part of any procedure for which it may apply.

CCP Process Step: Stocking of Cages

Environmental Impact Hazard: Overstocking of site, or specific area(s) of site.

Control Measure: Cage stocking strategy.

Critical Limit: Cage stocking that allows maintenance of oxidic conditions as determined by environmental monitoring.

Monitoring Procedure:

- Conduct environmental monitoring according to site classification
- Review current EMP results with historical EMP results and stocking levels

Corrective Actions:

1. Adjust cage stocking level or cage position according to environmental monitoring and other data analysis results
2. Review requirements with staff
3. Record corrective action

Records:

1. Environmental monitoring results, current and historical
2. Cage biomasses, current and historical
3. Compliance Deviation Report

CCP Process Step: Grow Out

Environmental Impact Hazard: Settlement of feces affects bottom sediments.

Control Measure: Site management changes determined by increased scrutiny of site operations via more frequent and intense data collection.

Critical Limit: Maintenance of oxic conditions.

Monitoring Procedure: Adjust site data collection and monitoring and/or initiate tidal current measurements and modelling according to descriptions within Appendix A1 of NS EMP Framework 2016.

Corrective Actions:

1. Adjust cage stocking according to monitoring, modelling, and data analysis results
2. Adjust cage position according to monitoring, modelling, and data analysis results
3. Adjust feeding method or training according to monitoring, modelling, and data analysis results
4. Adjust harvest schedule according to monitoring, modelling, and data analysis results
5. Adjust other site practices according to monitoring, modelling and data analysis results
6. Review requirements with staff
7. Record corrective action

Records:

1. Environmental monitoring results
2. Site operations data
3. Compliance Deviation Report

CCP Process Step: Grow Out

Environmental Impact Hazard: Cleaning of nets causes release of biofouling

Control Measure: Review and improve site cleaning practices: frequency, timing, methods, on-site vs. off-site.

Critical Limit: Operator defined limitations regarding acceptable biofouling level before cleaning or other means for biofouling control

Monitoring Procedure: Monitor and record level of biofouling over time. Monitor frequency and method of biofouling control, timing during tidal cycle and level of biofouling at cleaning

Corrective Actions:

1. Adjust biofouling control and procedures according to biofouling monitoring
2. Review requirements with staff
3. Record corrective action

Records:

1. Net history records (KCS-GMG Net Shop – Asset History Detail)
2. Compliance Deviation Report

CCP Process Step: Feeding

Environmental Impact Hazard: Overfeeding causes settlement of uneaten feed.

Control Measure: Check to ensure feeding rate is within operator defined limits.

Critical Limit: Over a 7-day average, +/- 25% of anticipated feed rate.

Monitoring Procedure: Monitor amounts fed and feeding rate weekly (Calculation % daily feed rate based on biomass and feed fed).

Corrective Actions:

1. Adjust feed given according to expected rate
2. Review results of latest biomass sampling and length of time since last sample
3. Review requirements with staff
4. Record corrective action

Records:

1. Feeding records
2. Biomass records
3. % feeding records
4. Compliance Deviation Report

CCP Process Step: Feeding

Environmental Impact Hazard: Improper feeding technique causes settlement of uneaten feed or overfeeding

1st Control Measure: Employee training.

Critical Limit: Minimum training requirements.

Monitoring Procedure: Evaluation of the site staff in terms of experience, qualifications, and awareness of site policies and procedures

Corrective Actions:

1. Update staff training, as required
2. Review requirements with staff
3. Record corrective action

Records:

1. Staff training records
2. Compliance Deviation Report

2nd Control Measure: Improved maintenance of feed equipment.

Critical Limit: Minimum equipment maintenance schedule.

Monitoring Procedure: Review of record of inspection and maintenance activities.

Corrective Actions:

1. Review camera settings or calibration of feeding equipment
2. Update maintenance and inspection schedule, as required
3. Review requirements with staff
4. Record corrective action

Records:

1. Equipment maintenance records
2. Compliance Deviation Report

3rd Control Measure: Switch to dry feed instead of moist feed

Critical Limit: Operator defined duration regarding minimum time required for moist feeding before fish can be weaned to dry feed.

Monitoring Procedure: Evaluate feed records to confirm that the switch to dry feed is being made at the correct time according to the critical limit. Compare feeding activities of the fish, feed conversion rates and feed usage per cage for cages fed moist feed and dry feed to determine if the switch can be made earlier.

Corrective Actions:

1. Adjust duration of moist feeding events
2. Review requirements with staff
3. Record corrective action

Records:

1. Environmental monitoring results
2. Feeding records
3. Compliance Deviation Report

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: April 14, 2021 3:22 PM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>; FitzGerald, Jennifer L <Jennifer.FitzGerald@dfo-mpo.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Liverpool Bay Aquaculture Site Proposals

Hi Ed and Jennifer,

Ahead of our conversation tomorrow, we have received the outstanding requested information from the applicant (in blue). I have also noted the other requested information and when it was provided to your department.

Requested by DFO Jan 29, 2020:

Area of the seabed impacted by each 2000 kg shovel anchor, as well as a description of plans, if any, to uninstall and reinstall anchors and weights (or any equipment physically attached to the benthic substrate) in different locations.

The area of seabed impacted is between 5-10m. This was determined by pull tests of shovel anchors on a beach a few years back. Assuming the bottom is sand, mud or clay (soft bottom), the anchors will usually take anywhere from 5-10 m to dig on initial set. Once they have dug in there is very little of the anchor sticking out above the seabed as its mostly impacted into the sand.

Will there be any use of acoustic predator deterrents?

We will not be using predator deterrents at this site. ***Request that the development plan be updated to remove their original statement about using ADDs

Will there be introduced artificial light? If so, please provide details of equipment used, timing, and procedures, etc.

Artificial lighting will be used on the site between November 15-April 15th. LED lights from the blue spectrum are used, all lights will be pointed downward towards the bottom of the cage there will be no glow as was observed when using halogen lights.. The lights will be powered from the on site feed barge.

Requested by DFO Aug 24, 2020. Responded to DFO with updated values on September 18, 2020

1. Are the depths in the provided current meter data files measured from the seabed or from the transducer face?
2. What is the distance between the seabed and the transducer face? The excel sheets have the bin size and the 1st bin range (which we understand is the distance from the transducer face to the first bin). The requested information is to calculate the distance from the seabed to the first bin.

Requested by DFO Oct 27, 2020. Responded to DFO with information on December 4, 2020

1. Historical stocking events from 2011 onwards
2. Reported breaches of containment to NSDFA (i.e. escapes) – no records of escapes on <https://www.dfo-mpo.gc.ca/aquaculture/protect-protege/escape-prevention-evasions-eng.html>, please confirm.
3. Reported entanglements at the site.

Requested by DFO April 8, 2021 *I am reviewing what has been provided and will provide to you once I've confirmed it captures the requested information.**

Please provide all mitigation measures related to fish containment, including but not limited to the following:

1. Operating procedures that limit the risk of a breach, including the identification of critical control points, critical control limits, monitoring and corrective actions.
2. Operating procedures for net maintenance (surface and below surface) such as inspection procedures, cleaning, disinfection, testing, repair, changing procedures, biofouling strategies as well as recording and reporting procedures for these activities.
3. Mooring and anchor inspection, grid system inspection and recording and reporting procedures for these activities.
4. Engineer approved minimum infrastructure requirements, and minimum infrastructure maintenance and inspection requirements in place for containment management.
5. Corrective actions related to the above procedures.
6. Procedures for site management in the event of severe weather.
7. Procedures for response to breaches or suspected breaches, including mandatory reporting.

All questions raised are a part of their Farm Management Plan (FMP). KCS took out the relevant sections. KCS is in the process of having all their sites approved by an engineer. Any new sites will follow the below standards.

The Future sites will be modeled using guidance from the following engineering standards:

- NS 9415:2009 – “Marine fish farms: Requirements for site survey, risk analyses, design, dimensioning, production, installation and operation”
- “Marine Scotland: A Technical Standard for Scottish Finfish Aquaculture”
- ISO16488 – “International Standard: Marine fish farms – open net cage – design and operation”
- API RP 2SK – “Design and Analysis of Station keeping Systems for Floating Structures”
- DNV-OS-E301 – “Position Mooring”

We can discuss further tomorrow.

Thank you,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

On Apr 15, 2021, at 3:42 PM, Watts, Melinda <Melinda.Watts@novascotia.ca> wrote:
This message originated from outside your organization.

Hi Jen,

Our meeting with DFO went well this morning and I will be providing them with the containment management mitigation measures you provided once I go through them to confirm they cover everything that was requested.

They did have one further question about the artificial lighting that will be used regarding 1) the number of lights and 2) where they will be placed within the cages if you could provide any further insight on that?

I'm in a call the rest of today but I can call you tomorrow if you have any questions about this.

Thanks,
Melinda

From: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Sent: April 15, 2021 4:11 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: Re: DFO Response

We have 4 lights per cage and 5 meters deep....

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: April 23, 2021 11:57 AM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: DFO Response

This message originated from outside your organization.

Hi Jen,

I've reviewed what you provided and the CCPs only appear to apply to satisfy #1 on the list of requested information. Can you please re-review the requested information and provide that information, which should all be in your FMP. I've gone through the Template and indicated in **BLUE** where this information should be found.

Please provide all mitigation measures related to fish containment, including but not limited to the following:

Operating procedures that limit the risk of a breach, including the identification of critical control points, critical control limits, monitoring and corrective actions.

Operating procedures for net maintenance (surface and below surface) such as inspection procedures, cleaning, disinfection, testing, repair, changing procedures, biofouling strategies as well as recording and

reporting procedures for these activities. [Section 6.3.1.3](#), [Section 6.3.1.4](#), [Section 6.4.1](#), [Section 6.4.2](#).
Mooring and anchor inspection ([Section 6.3.4](#)), grid system inspection and recording and reporting procedures for these activities ([Section 6.3.5](#)).

Engineer approved minimum infrastructure requirements, and minimum infrastructure maintenance and inspection requirements in place for containment management. [Section 6.4](#)

Corrective actions related to the above procedures. [Section 7.2.4](#) – this should be covered in what you provided but please review.

Procedures for site management in the event of severe weather. [Section 6.6](#)

Procedures for response to breaches or suspected breaches, including mandatory reporting. [Section 6.5](#)

Any questions, give me a call.

Thanks,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>

Sent: April 23, 2021 1:28 PM

To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>; Watts, Melinda <Melinda.Watts@novascotia.ca>

Subject: RE: DFO Response

Hi Jennifer and Melinda,

The protection of the information requested below via provincial and federal laws would be the same as level of protection of the information previously provided. We are not asking for the Farm Management Plan. We are simply asking for the information listed in bullets 1 to 7 below. We'd rather not wade through 1200 pages for it.

Hope this helps.

Thanks,
Ed

Edward Parker
Regional Senior Aquaculture Management Officer
Telephone | Téléphone 902-402-0298
Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca
Fisheries and Oceans Canada | Pêches et Océans Canada
PO Box 1006, P600, Dartmouth, NS B2Y 4A2
CP 1006, P600, Dartmouth, N-É B2Y 4A2

Government of Canada | Gouvernement du Canada

If you have received this communication by mistake, please notify the sender immediately and delete the communication without printing, copying or forwarding it. Thank you.

Si vous avez reçu cette communication par erreur, veuillez en aviser l'expéditeur immédiatement et la supprimer sans l'imprimer, la copier, ou la faire suivre. Merci.

From: Jennifer Hewitt <Jennifer.Hewitt@cookeaquaculture.com>

Sent: May 13, 2021 2:35 PM

To: Watts, Melinda <Melinda.Watts@novascotia.ca>

Subject: KCS response to DFO

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Melinda,

Please see attached response to DFO's questions concerning Liverpool.

This attachment has privileged and confidential information and should not be publicly shared.

Regards Jennifer

Jennifer Hewitt

Kelly Cove Salmon Ltd.

Division of Cooke Aquaculture INC

Compliance Manager, NS

Cell (902) 521-8604

134 North Street

Bridgewater, NS

B4V 2V6



KCS Response to
DFO.docx

NOTE: Kelly Cove Salmon Limited does not object to the filing of this response with the Nova Scotia Aquaculture Review Board. It does so without waiving its entitlement to maintain as confidential and privileged the contents of the Liverpool Farm Management Plan, except to the extent disclosed in this document.

KCS Response to DFO

2. **Operating procedures for net maintenance (surface and below surface) such as inspection procedures, cleaning, disinfection, testing, repair, changing procedures, biofouling strategies as well as recording and reporting procedures for these activities.**

KCS Response - Below is taken from the Liverpool Farm Management Plan with supporting SOP's.

Enclosure and Predator Nets

Replacement schedule

Nets can be left in the water for one production cycle. After each production cycle the nets must be removed from the site and taken to a land-based facility for cleaning and disinfection. Nets will not be moved to other marine aquaculture sites prior to cleaning and disinfecting.

What is the typical lifespan on the use of your nets? Explain.

At smolt entry, cages are stocked with smolt nets which are left on site until the average weight of the site reaches the 600 grams for transfer to market nets. Market nets will remain on site until the fish are harvested and are generally not changed unless required due to damage, improper fit or excessive fouling. Lifecycle of the nets depends on a variety of factors. It is not company policy to limit a net simply by age but rather its strength, likewise a net may be retired due to the number and/or severity of repairs required but with passing break strength scores. Nets that do not meet the break strength testing requirements are retired.

Once removed from the water after the production cycle, where are nets cleaned and disinfected? Explain.

No nets, (smolt, market, bird or Predator) are moved to other marine aquaculture sites prior to cleaning, disinfecting, repair and testing (if applicable.) After each production cycle has been harvested, the nets are removed from the site, placed in a sealed container and taken to Future Nets in Pennfield, New Brunswick for net washing.

Nets must be identified and tracked. How are your nets identified (e.g. serial number) to track the net's age, condition, maintenance, inspection, etc.?

Explain:

All nets – bird nets, smolt nets, market nets and predator nets, are given a unique Identifier and the history/maintenance of that net is maintained in a database managed by GMG.

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirements: <ul style="list-style-type: none"> • Removal of nets from the water after each production cycle for cleaning, disinfection, and testing • Up to date net inventory records • Up to date net history records

Net testing

Before they are re-used, all nets must be tested by a net testing provider who will follow a standard net testing procedure that is equivalent to, or is more stringent than, that appended (Net testing SOP within Appendix B). The results of these tests must be recorded.

Who performs net testing for your nets?

Net testing provider: GMG

Do they follow the _____ procedure detailed in Appendix B?

YES NO

If no, attach, the procedure used to test your nets.

All nets, be it a new net or a repaired net are tested by personnel at GMG prior to installation at a site. GMG follows established testing protocols and break strength requirements which are specific to the materials used. The procedure used is in alignment with the NSDFA requirements.

[Reference](#) - GMG SOP 1 Net Testing Guidelines.

[Records](#) - GMG Mess Break Strength Testing Record (iMaint)

COMPLIANCE REQUIREMENT:	
	Specific Requirement: Up to date net testing records

Net biofouling control

Ensuring clean nets, in terms of biofouling control, is one way to decrease the strain on the cage system and infrastructure and assist with maintaining appropriate water flow for the farmed fish. This helps to maintain a healthy environment within the cage and reduces unwarranted stress on the system components.

Copper based anti-foulant dips or coatings are not allowed on any new nets to be used in marine finfish farms. Nets currently in inventory that have copper based anti-foulant dips or coatings must be replaced at the end of their life span with nets without such copper based anti-foulants.

Maintenance washing of lightly-to-moderately fouled nets still attached to cage structures is allowed on-site. Biofouling control through net washing at the site may contribute to benthic environmental impacts and therefore should only be considered under circumstances where: biofouling is light-to-moderate, when conditions that maximize dispersal of the dislodged materials away from the site and neighboring sites (e.g. strongest currents) are in effect, or under emergency conditions when fouling is affecting the welfare of the enclosed fish (e.g. reduced dissolved oxygen). Sites classified as Hypoxic B, or Anoxic should ensure that any on-site net cleaning is conducted frequently enough that only light fouling is removed.

Once nets are removed from the cage structure, they must be brought to shore for cleaning.

Timing for net biofouling control should be based on best management practices for each location. Several thresholds can be used to trigger fouling control. These include: % of net visibly fouled, oxygen differential between inside and outside of cage, or a pre-determined maintenance schedule. Regardless, a net biofouling control strategy is required.

Do you have a net biofouling control strategy described elsewhere?

YES NO

If no, describe your net biofouling control strategy by answering the following questions:

Do you have any nets with copper based anti-foulant dips or coatings in use?

YES NO

Will an alternative antifoulant (not a copper-based dip or coating) be used?

YES NO

Will you be changing nets to control fouling?

YES NO

If no, why not?

Kelly Cove Salmon sites are cleaned regularly during the warmer months when fouling rates are higher, to ensure that the amount of fouling remains light to moderate. We have invested significant funds in remote operated net washing vessels and because of the success of this investment we will be able to control the amount of biofouling on the nets at sites by frequently washing the lightly fouled nets on site reducing the need to replace the nets due to biofouling. Nets will be washed every two weeks from June to October – exceptions will be made during periods of extreme tide. This schedule was determined based on historic monitoring of biofouling on nets.

Will you be using on site net cleaning?

YES NO

If yes, what will determine when net cleaning on site will be conducted?

Based on maintenance schedule. Indicate schedule and how this was determined:

Nets will be washed every two weeks from June to October – exceptions will be made during periods of extreme tide. This schedule was determined based on historic monitoring of biofouling on nets.

What will be the net cleaning technique (to control biofouling)? Include the procedures for on-site net cleaning that would minimize organic loading to the environment? Describe:

Reference Material - BMP SOP 20: Net Washing
Record – KCS SW Net Washing (Pronto Form)

Will the tidal cycle play a role in determining when net cleaning may take place?

YES NO

If yes, during what part of the tidal cycle will the nets be cleaned?

Once full tides have passed, nets will resume regular scheduled cleaning.

Net history records, including timing of net cleaning to control fouling, method, and tidal cycle, must be maintained by the aquaculture licence holder.

Record – KCS SW Net Washing (Pronto Form)

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirements: <ul style="list-style-type: none"> • Net biofouling control strategy(ies) described • Up to date net history records

Net repair

Nets must be repaired as soon as wearing, weakness or holes are noted. These may be noted during routine operations or during the required scheduled net inspections described in 6.4.1, 6.4.2 and 6.4.4.

A net repair kit must be available for immediate use and a procedure for net repair must be described. Attach this to the FMP.

Appendix B includes a net repair SOP that can be modified to meet the site's unique requirements.

All incidences of net repair must be recorded on a net history record. This record must include the date, the person who performed the repair and the location of the repair, at a minimum.

A template net history record is in Appendix A.

Reference Material - BMP WI 1-A – On-Site Net Repair,

[Records - KCS-GMG Net Shop Asset History Detail \(imaint\), Net Repair – On Site Records, KCS Below Water Inspection form \(Pronto Form\).](#)

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirements: <ul style="list-style-type: none"> • <i>On-site net repair kit</i> • <i>Net repair procedure described</i> • <i>Up to date net history and inspections records (For inspection, refer to 6.4.1, 6.4.2, 6.4.4)</i>

Net changing for mesh size

If the enclosure net mesh size is too small, the fish within the cage may become affected by poor water movement, poor water quality, fouling and inadequate oxygen due to the restrictive action of small net mesh size.

On the other hand, if the enclosure mesh size is too large, fish may get caught in the mesh (“gilled”) or escape from the net.

Industry best practices should be used to determine the size of mesh to be used. For example, the Newfoundland Code of Containment for the Culture of Salmonids in Newfoundland and Labrador, March 2014, suggests that net mesh size should be 1/3 the size of the widest part of the fish body. The aquaculture licence holder is required to specify the mesh size to be used at each stage of production.

Please complete the table below to describe the operation’s net changing strategy for mesh size.

Average fish size (g)	Minimum fish size (g)	Mesh size (inches)
100	50	1 ^{1/8}
600	450	2 ^{1/4}

How was the above net mesh sizing strategy determined to be adequate?

The net mesh sizing strategy was determined to be adequate based on thirty-years of experience fish farming in Atlantic Canada and exceeds the guidelines proposed by research conducted at Memorial University of Newfoundland Marine Institute in March 2000.

An SOP for net changing is required. It must consider minimizing stress on the fish while ensuring complete containment.

Attach this to the FMP.

[Reference Material](#) - KCS SOP 3 – Net Install/Change (Smolt/Main Net) – Barge, KCS SOP 4: Net Install (Smolt/Main Net) – Divers, KCS SOP 5: Net Install (Predator) – Divers, KCS SOP 6: Net Change – Divers

[Records - GMG Net Install/Removal Tracking, KCS-GMG Net Shop-Asset History Detail, KCS-GMG Net Shop-Net/Cage Details by Location, Dive Log](#)

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirement: <ul style="list-style-type: none"> • <i>Net mesh sizing strategy described</i> • <i>Net changing procedure described</i> • <i>Records to support application of net changing SOP</i>

6.3.3 Bird Nets

Bird nets must be inspected regularly for holes, areas of weakness or damage. Their condition should be observed daily. Bird nets will be formally inspected weekly according to the weekly above water inspection schedule described in 6.4.1.

Issues with bird nets will be repaired and records will be kept regarding location of repair, date damage observed, date of repair, and the person who performed the repair. The reason for the issue will be determined and fixed as soon as possible (e.g. chafing, other).

[Reference - KCS SOP 1 Net Install/Removal – Bird Net/Predator Lid – Barges, BMP SOP 1 Daily Site Inspections.](#)

[Records – KCS Surface Inspection \(Pronto Form\); Net Install/Removal Tracking \(Pronto Form\); Net Repair on site Record.](#)

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirements: <ul style="list-style-type: none"> • <i>Minimum weekly bird net inspections</i> • <i>Up to date inspection and history records for bird nets (For inspection, refer to 6.4.1, 6.4.4)</i>

Equipment inspection

6.4.1 Above water nets and infrastructure

Any irregularities, damage, or points of wear must be investigated as soon as possible and recorded on the surface inspection record. Above water inspections will be continuous as staff work on the site on a daily basis. In addition, formal inspections must occur on a weekly basis for surface components. This inspection will examine compensator buoys, visible portions of the grid, shackles, thimbles, cages, support, jump net rails, above water nets (containment, bird), attachment of nets, and site markers, at a minimum. A record of inspection will be taken.

Any weaknesses in the above water structure will be repaired as soon as possible and any observations that would suggest an underwater problem must be investigated as soon as possible.

Above water inspections will be continuous as staff work on the site daily – any net repairs will be recorded on the Net Repair On-Site Record. In addition, formal inspections will occur on a weekly basis for surface components and recorded on the Surface Inspection Record. This inspection examines compensator buoys, visible portions of the grid, shackles, thimbles, cages, support, jump net rails, above water nets (containment, bird), attachment of nets, and site markers.

Reference - BMP WI 1-A On-Site Net Repair.

Records – Net repair On-Site, KCS SW Surface Inspection (Pronto), KCS SW Below Water Inspection (Pronto), KCS grid Inspection, KCS Dive log,

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirements: <ul style="list-style-type: none"> • <i>Weekly surface inspections</i> • <i>Up to date surface inspection records (to include enclosure nets, bird nets, predator nets, moorings and anchors, and grid)</i>

6.4.2 Below-water nets

Suspected underwater irregularities, damage, or points of wear noted on any dive or via surface observations must be investigated and repaired as soon as possible and recorded on the inspection record. Furthermore, below-water net inspections will be formally completed every 60 days. A checklist is to be completed by the diver in charge of the inspection.

A template below-water inspection checklist is in Appendix A.

Any weaknesses in the containment structure will be repaired as soon as possible.

Suspected underwater irregularities, damage, or points of wear noted on any dive or via surface observations will be investigated and repaired as soon as possible and recorded on Net Repair On-Site Record. Furthermore, below-water net inspections will be formally completed every 60 days. A Below Surface Inspection checklist is to be completed.

Reference - BMP WI 1-A On-Site Net Repair, KCS SOP 1 Net Install/Removal – Bird Net/Predator Lid – Barges, KCS SOP 2 Net Install/Removal – Predator Net – Barge,

Records - KCS Below Water Inspection (Pronto). Net Repair – On Site record, KCS Dive Log.

COMPLIANCE REQUIREMENT:

Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirements: <ul style="list-style-type: none"> • <i>Below-water net inspection (every 60 days)</i> • <i>Up to date below-water net inspection records (to include enclosure nets, predator nets)</i>
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GMG SOP	01	Net Testing Guidelines	
Created or Revised by:	Version:	Replaces Version:	Reason for Revision:
R – Jennifer Wiper	19-Apr-21	15-Dec-20	Clarify APP protocols vs routine; APP sample size.

SCOPE

This procedure specifies the methodology that will be used in New Brunswick, Nova Scotia, Newfoundland and Maine for determining the tensile (breaking) strength of mesh used for the containment of farmed fish. It is intended for use with current net materials common to the finfish aquaculture industry.

OBJECTIVE

To ensure that nets are tested as per their requirements and to update testing procedures from regulations with current net materials while ensuring that regulatory and best practice limits are adhered to across the various operating areas.

EQUIPMENT

- Dynamometer
 - Dyna 600 DP
 - Dyna 300 DP – Handheld
- Net Testing Panel (for Asset Performance Project Testing)

RESPONSIBILITIES

- **DYNAMOMETER OPERATOR(s)** – ensure that nets are tested according to the procedure and equipment operating instructions. Alert Senior Management when net test records indicate a fail.
- **SENIOR MANAGEMENT** – ensure that nets are tested at the required frequency and that nets are retired from service when required.
- **QUALITY CONTROL STAFF** – conduct net testing using the Dyna 300 DP. Prepare patches for testing using the Dyna 600 DP.

PROCEDURE

Current net technologies and materials are made with both knotless and knotted High Density Polyethylene (HDPE) mesh with published breaking strengths of between 50 and 639 pounds (lbs.). As net

materials have evolved, new methods of break strength testing have also evolved to test these new materials that have a much greater break strength than traditional nylon – which most regulations that are currently in force today were designed around.

GMG utilizes several different types of mesh material for smolt, market and predator net construction. These include nylon, Dyneema, Star-K (knotless) and Sapphire Ultra-Core (UC).

As technologies are constantly evolving, this procedure will be reviewed annually to remain current.

NET INVENTORY

Each net has been assigned an inventory tracking number, this number can be found on an ID tag attached to one of the loops on the top line and identifies the type of net, the year of construction and the individual net number (**Fig. 1**).

Figure 1. Example of net ID tags for the various types of net. Coding may vary.



The ID tag ensures net history remains with the net. When a net is serviced (repaired), a work order assigned to the individual net, and these records will follow the net for its life span. Each record will have the following data:

- Number of holes repaired
- Size of each hole repaired
- Breaking strength test results
- Employees working on net
- Time associated (elapsed time) that the net was serviced
- Dimensions of net
- Specifications of net (manufacturer, year of construction, type, size, etc.)

DYNAMOMETER

Break strength tests are performed using a suitable apparatus, the dynamometer, that records or indicates the load at the point of rupture. The machine is operated at a rate of elongation which is both constant and within prescribed limits. The mesh is extended until it ruptures under the applied load.

The Dyna 600 DP (**Pic. 1**) is a complete unit capable of testing the stretching to a hook displacement of 600 mm. It has a built-in certificate of test report complying with ISO 1806 – DIN 53 844 standards of Load Peak in Newton (N), Force (kgf) and pound (lb.) as well as of Elongation Peak in inches (in) and millimeters (mm).

The Dyna 600 DP is used for the testing of the Asset Performance Project (APP) nets – this includes **Sapphire UC Market, Sapphire UC Predator** as well as **Star Smolt Knotless nets**.

Picture 1. Dyna 600 DP by Buraschi.



The Dyna 300 DP (**Pic. 2**) is a handheld unit with a digital display which allows you to obtain tensile strength in KG, stretching of the mesh in mm and stretching percentage.

The Dyna 300 DP is used for the testing of **nylon**, **Dyneema** and **Star Smolt Knotless** nets that are opened on the floor for repair. The 300 DP has a 100 mm max extension between hooks and as such, it does not have the capacity to test Sapphire UC Predator mesh and must not be used to test nets that use that mesh type, and ideally will not be used to test any Sapphire UC mesh.

Picture 2.
DP by



Dyna 300
Buraschi.

Persons who operate the Dyna 600 DP must be trained by the manufacturer (Buraschi) in safe operation and use. Quality Control (QC) personnel may conduct net testing using the Dyna 300 DP once trained in GMG Standard Operating Procedures for break strength testing.

CALIBRATION AND MAINTENANCE

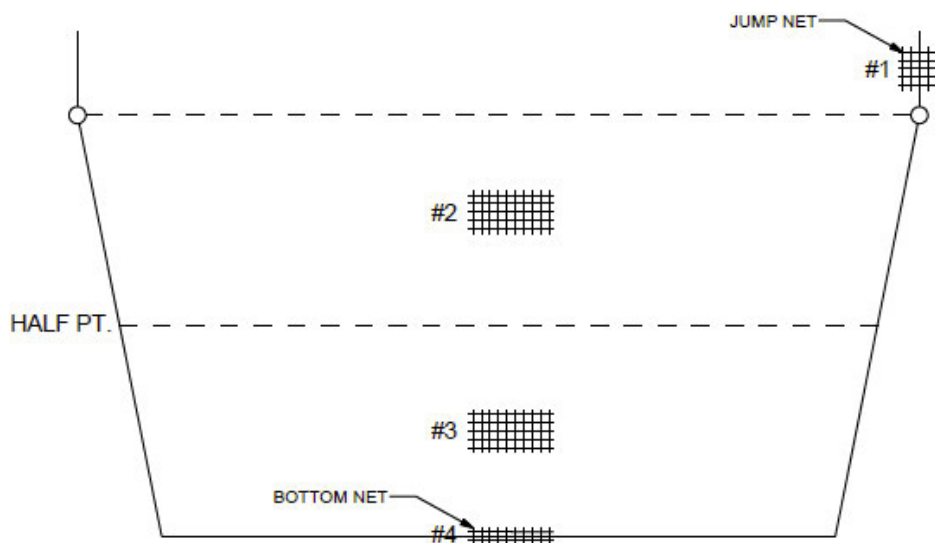
The machine shall be calibrated annually in accordance with the manufacturer's recommendations. The owner of the machine shall keep calibration certificates on file, with a copy kept with the machine. The machine shall be properly maintained in order to continue to provide accurate results, this includes the replacement of the testing hooks as necessary due to wear, corrosion or roughness.

TEST PROCEDURE

Bird nets are not subjected to break strength testing. However, the nets are cleaned, repaired, and evaluated between each use and repaired while in-use by marine site employees.

For all other nets, a **minimum of 5 breaks** must be completed for **each location (Fig. 2)** and the average of those breaks used to establish if the net passes or fails the requirement for that section of the net. There are different requirements for net that is above water (#1) than net that is below (#2 - #4) (Table 2).

Figure 2. GMG Mesh Sample Locations – Schematic.



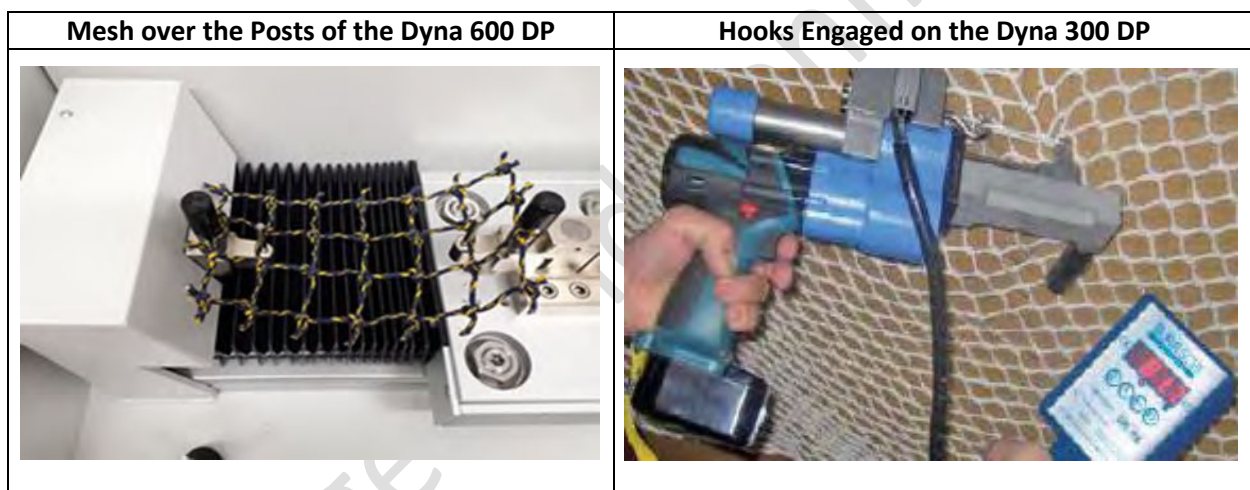
Testing may be performed on dry or wet mesh - tests shall not be conducted on frozen mesh. The temperature shall be within normal ambient temperatures for the Atlantic Canada/Gulf of Maine coast.

Nets used in Newfoundland that require the use of the Dyna 600 DP must send all mesh samples to GMG in St. George, NB for testing and storage.

Both devices use the same method to stretch the mesh, the pillars which are the bar of the mesh must be engaged over the pins or hooks for the test to work. Whereas the Dyna 600 DP runs the test automatically, once programmed, the Dyna 300 DP requires the user hold the trigger until the mesh breaks, or the elongation is maxed out.

Testing shall be performed on a single mesh, oriented so that the pillars (bars) of the mesh are engaged over the pins or hooks, not the knots of joints of the mesh.

- Mount the mesh over the hooks and take up the slack, see below:



- Apply load at a steady rate of elongation, until the mesh breaks.
- Record the peak load indicated.
- Repeat for a total of five breaks for the location tested.
- Average the five (5) results to get the recorded breaking strength for that location.
 - Record breaking strength to the nearest Force (kgf).
- Broken mesh must be flagged for repair.

NET CLASSIFICATION AND BREAK STRENGTH REQUIREMENTS

According to the net classification as per the table below (adapted from the *British Columbia Fisheries Act, Aquaculture Regulation, B.C. Reg. 78/2002* and the *Code of Containment for the Responsible Containment of Farmed Atlantic Salmon in Maine Waters, October 2002*), the mesh of any part of a net, including any repairs, must meet the minimum breaking strength standards that have been established.

Table 1. Net Dimension Classification.

Depth ^a	Circumference						
	>50m	>50 m, ≤60m	>60m, ≤70m	>70m, ≤80m	>80m, ≤90m	>90m, ≤110m	>110m
≤5m	A	A	B	C	D	D	E
>5m, ≤10m	A	A	B	C	D	D	E
>10m, ≤15m	A	B	B	C	D	D	E
>15m, ≤20m	B	B	C	D	D	D	E
>20m, ≤30m	D	D	D	D	D	E	E
>30m	E	E	E	E	E	E	E

^a Depth is from waterline rope to net bottom.

Table 2. Minimum Break Strength for Net Dimension Classification C, D & E. **NOTE:** ‘mesh size’ refers to the distance between the centers of two opposite joints (or knots) in the same mesh when fully stretched.

Mesh Size	CLASS C (KG)		CLASS D (KG)		CLASS E (KG)	
	Above Water	Below Water	Above Water	Below Water	Above Water	Below Water
<38 mm	33	36	38	41	43	46
=38 mm	43	46	47	51	57	62
>38 mm, ≤75 mm	47	51	57	62	71	77
>75 mm	NA ^b	72 ^c	NA ^b	72 ^c	NA ^b	77 ^d

^b Nets do not have above water sections, only below water.

^c Calculated value, 160 lbs. stated in ME Code of Containment.

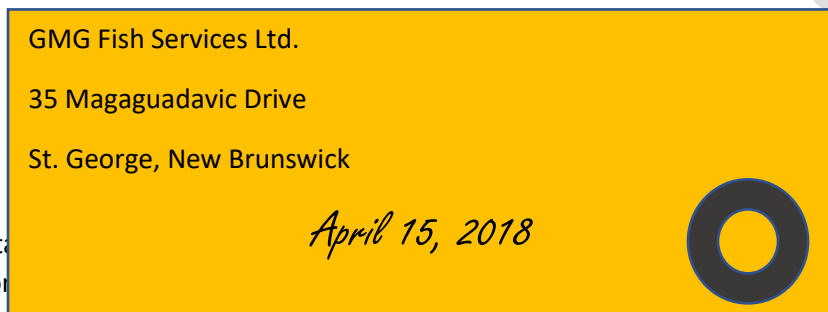
^d Value from BC Fisheries Act, Aquaculture Regulation for nets > 38mm mesh as value exceeds Maine requirements.

- A newly manufactured net does not require break strength testing the manufacturer (Garware) performs testing during construction as per ISO 1806.
 - On machine, net is checked – for every BEAM of yarn loaded. First few meshes are tested, based on which approval is given to continue production.
 - For every BEAM change, above procedure is followed.
 - At final production state – Minimum Break Strength (MBS) is checked for each bale.
- In addition to break strength testing, all nets will be inspected for imperfections prior to re-use. Such inspections will include visual inspection for holes, broken or damaged ropes, chafing and fouling. **All holes and patches must be repaired/sewn in prior to re-entry.**
- **Nets not passing break tests are to be taken out of service immediately.**



Section removal must be cut using the proper process for the mesh type. **Star netting must be removed using heat knife to ensure a clean cut, serrated shears can be used for all other mesh type.** Sections removed must be replaced with a new section – not the section that was removed, tested, and repaired.

The removed sections must be labeled with the 1) date the sample was taken from the net, 2) net ID number and 3) what section of the net the sample is from (1, 2, 3 or 4).



Samples must be taken from the side wall (#3) and the bottom (#4) of the net. Samples will be taken from points #2, #3 and #4.

the side wall samples will be

REPORTING

Test results are recorded on the GMG Mesh Break Strength Testing Record and associated GMG iMaint Work Order. This Order is uploaded to the iMaint system that also includes other information about the net. Information recorded shall include:

- a. Owner of net and net identification number
- b. Mesh manufacturer and manufacturer's published mesh-breaking strength
- c. Net fabricator and date of net fabrication
- d. Accumulated in-water service time
- e. Size and gauge of mesh and dimensions of the net
- f. Date and location of testing, company and name of person doing test
- g. Information on antifoulant treatment, if any
- h. Whether net was tested wet or dry
- i. Approximate ambient temperature at test
- j. Breaking strength test results for each location and pass/fail grades
- k. General comments and notes on overall condition of net
- l. Signature of tester

ON-SITE NET REPAIR

GMG has conducted break strength testing on elements used for net repairs to ensure that the repaired net maintains the structural integrity to meet required break strengths. Items such as cable ties or zap straps have been specifically sourced and made available to the marine farms in Net Repair Kits. These kits are maintained through GMG and must be updated with appropriate materials as net materials or testing parameters/break strength requirements change. GMG has provided instruction on how to

repair the nets utilizing the elements of the kit in BMP WI 01-A: On-Site Net Repair, which is available on marine farms.

SAFETY

All staff and contractors are expected to perform the necessary tasks in a safe manner and utilize Personal Protective Equipment such as eye protection during testing as well, the cover of the Dyna 600 DP should be closed during break strength testing. Only designated individuals who have been instructed how to use of the Dyna 600 DP and the Dyna 300 DP should operate the machines.

RECORDS

- GMG Work Order
- GMG Dyna 600 Test Report Tool

ASSOCIATED MATERIALS

- DYNA 300 DP Dynamometer Specifications
- DYNA 600 DP Dynamometer Specifications
- Garware Wall Ropes Limited SOP for Mesh Size Measurement, Knot BS and Mesh BS Testing for Customer GMG
- BMP WI 01.A – On-Site Net Repair
- GMG APP SOP 1 – Asset Performance Project/Samples – Sample Collecting
- GMG APP SOP 2 – Asset Performance Project – Break Testing SOP Dyna 600
- GMG BTSS SOP 1 – Break Test – Star Sapphire SOP

BMP SOP	20	Net Washing Vessel	
Created or Revised by: R – Joel Messer	Version: 6-Aug-20	Replaces Revision: April 21, 2013	Reason for revision: Inclusion into BMP

SCOPE

This procedure details the general requirements related to net washing, primarily focused on cleaning and disinfection protocols while at sea sites located in New Brunswick, Newfoundland, Nova Scotia, and Maine.

OBJECTIVE

To ensure that employees are aware of all necessary procedures with regards to net cleaning methods to standardize net washing technique and decrease associated risks.

EQUIPMENT

- Cleaning Picks
- Deck Hose
- Disinfectant
- Dosatron
- Footbath
- Scrub Brush or Deck Broom
- Wash Head Disinfectant Tub

RESPONSIBILITIES

- NET WASHER OPERATOR – follow procedures and work instructions related to equipment operation. Report any snags in netting or pieces of netting found in the net washer to Site Manager.
- DECKHAND – prepare cages for cleaning – removing ropes and wires. Assist Net Washer Operator.
- VESSEL CAPTAIN – provide notice to Site Manager prior to arrival at site and ensure that net washers are operational. Overall responsibility for biosecurity aboard vessel. Ensure that spare parts are available for commonly replaced items such as high pressure hoses, socks, and filters, etc.
- SITE CREW – reassemble cages once cleaning is complete – recover cage with bird net, install cameras, etc.
- SITE MANAGER – ensure that crew and all visitors are following biosecurity protocols and to ensure farm equipment is maintained. Communicate with net washing crew of cage priorities and any other issues such as tide that may affect net cleaning.

PROCEDURE

As we move away from the use of antifoulants, nets need to be cleaned in-situ, or on site, of fouling materials such as mussels and kelp to ensure that water quality inside the cage remains high and that the extra weight of the growth does not place too much pressure on the nets to cause ripping or tearing. Net Washing Vessels and Net Washers are not site specific, therefore strict biosecurity and cleaning protocols must be followed.

GENERAL BIOSECURITY

The vessel must be kept clean, keeping non-essential equipment and work gear to a minimum. Lines used for tying the vessel should be hung up when not in use. New rope or straps should be stored in watertight compartments or storage containers.

All vessels are required to have a footbath(s) made with approved disinfectants.

- Footbath(s) should be made at the beginning of each day.
- All persons accessing the vessel must use the footbath upon boarding.
- Footbath(s) must be maintained such that the level allows the entire foot to be submerged.
- During rough sea conditions or rain/snow, the footbath(s) should be covered when not in use and may need to be replenished or changed more than once a day.
- Footbath(s) must be kept clean of organic materials – if heavily soiled with organics, the footbaths must be changed.

NET WASHING EQUIPMENT DESCRIPTIONS

- Cleaning Picks: tools used to remove debris from the wash head in hard to reach places.
- Deck Hose: a general-purpose water hose that is connected to a pump that distributes seawater.
- Dosatron: a water-powered dosing pump used to mix disinfectant and water to a pre-programmed concentration for dispensing.
- Footbath: a small container, preferably with a lid used to contain disinfectant for the purpose of disinfecting boots/shoes. Other acceptable forms (location specific) include a footbath mat – absorbent or bermed.
- Wash Head Disinfection Tub: a large, designated box used to contain the wash head and allows the wash head to be submerged in water/disinfectant mix.

NET WASHING EQUIPMENT DISINFECTION

The net washing head will be stored in a disinfection tub whenever it is not in use. All organic material needs to be removed from the disinfectant tub.

- The disinfection tub is prepared using disinfectants such as Premise or adage. Dawn dish soap can be used in combination with disinfectants - **DO NOT mix dawn and bleach.**
- Water suction lines and the wash head umbilical need to be disinfected with the Dosatron and kept clean of organic material.
- Water filtration socks can be cleaned and disinfected using the Dosatron.

ONSITE DAILY DISINFECTION PROCEDURES

Between Cages

When washing has been completed on a cage, the wash head is connected to the crane for removal. The Wash head should be lifted out of the water and sprayed down with the deck hose to remove any seaweed or kelp.

- Once the Wash head has been loaded on the vessel the crew must now clean all kelp and seaweed from the wash head. Cleaning Picks are sometimes needed for hard to reach places
- The umbilical line can be coiled on the deck of the vessel and cleaned of any kelp or seaweed - some vessels are equipped with a hose reel. If the vessel is equipped with a hose reel, the hose reel must be disinfected with the Dosatron before being spooled.
- The raw water suction lines are lifted out of the water and placed on the deck of the vessel. The suction lines need to be cleaned. The suction lines need to be cleaned of any seaweed or debris that may have become attached to the surface of the hose. The strainer attached to the hose may need to be removed in some instances for proper cleaning.
- The entire deck of the vessel needs to be sprayed with disinfectant using the Dosatron. All water suction lines, and umbilical should be thoroughly sprayed with disinfectant as well.
- The sides of the vessel are sprayed with disinfectant.
- Remove the filter sock from the filter cannister. Disinfectant can now be sprayed inside the filter cannister using the Dosatron.
- After each cage, the filter sock should be cleaned with the deck hose, disinfected, and hung up to dry.
- A new filter sock is placed in the filter cannister after each cage. **DO NOT use the same filter sock on the next cage.** Exchanging filter socks allows an adequate amount of time for drying and thorough disinfection.

End of Day - Before Leaving Site

- The deck of the vessel is washed with the deck hose and scrubbed with the deck broom as needed.
- The wash head disinfectant tub is drained and cleaned of any debris using the deck hose and deck broom.
- The wash head disinfection tub is filled with fresh seawater, Dawn dish soap and disinfectant.
- Once all raw water lines, umbilical and tie up ropes have been hung up or coiled on the vessel, the entire deck is sprayed with disinfectant.
- The sides of the vessel should be sprayed with the Dosatron prior to leaving the cage site.
- The filter sock is removed, cleaned, and disinfected.
- Disinfectant needs to be sprayed into the filter cannister by using the Dosatron and a new filter sock installed.
- A Cleaning and Disinfection Checklist (Pronto Form) should now be completed.

SITE MOVEMENT INSIDE OF BMA ZONE

Following all previous procedures, once the vessel has moved away from the site, **at approximately 1 km away:**

- Place the raw water suction lines into the water with the wash head hung over the side of the vessel and the wash pump engine started.
 - This allows fresh sea water to be pumped through the wash system and all water lines.
- Wash pump should run for approximately 5 minutes to thoroughly flush water through the system.
- All hoses are placed on deck and the wash head returned to the disinfectant tub.
- Disinfect the entire deck of the vessel, sides of the vessel, all hoses and net washing equipment with the Dosatron.
- Before proceeding to another site, you must first call management.
- A Cleaning and Disinfection Checklist (Pronto Form) should now be completed.

MOVEMENT TO ANOTHER BMA ZONE OR REGION

The vessel is not permitted to transfer from one BMA zone to another until proper approval has been granted. To gain approval, the vessel must adhere to all previous procedures plus:

- The vessel must be placed on a beach, or in a haul out facility that allows the vessel to be completely removed from the water.
- The entire vessel must be pressure washed and disinfected.
- All rain gear, footwear and gloves must be disinfected.
- The wheelhouse and crew areas should be thoroughly cleaned with Complex Orange or similar industrial grade cleaning products.
- Take pictures of pressure washing and disinfection and complete the Vessel Transfer Form (Pronto Form).
 - In New Brunswick, to move between BMAs, the vessel must obtain clearance from the Department of Agriculture, Aquaculture and Fisheries (DAAF). Saltwater Maintenance Manager, Regional Production Manager or Area Manager is responsible for communicating with DAAF and advising vessel that transfer is permitted.
 - In other regions, Saltwater Management and the vessel must abide by regulatory requirements for their region or in the event of a fish health event.

RECOMMENDED CLEANING PRODUCTS

Complex Orange, Spray 9, Mr. Clean, can be used in areas that cannot be pressure washed and disinfected.

The table below list disinfectants that are used on marine sites with minimum concentration and contact time requirements. These concentrations and durations may be exceeded, especially at times of heightened biosecurity. Other products may be used but must be done so under the knowledge and guidance of the Head Corporate Veterinarian and Saltwater Management. **Cleaners** help remove dirt, grease and debris from surfaces. **Disinfectants** are appropriate for frequently touched surfaces and

surfaces likely to harbour pathogens (bacteria, viruses, fungus) - disinfecting a surface will kill pathogens.

Disinfectant	Strength	Dilution	Contact time
Iodine-based (Wescodyne®, Premise®, Adage® II, Iodor®)	250 ppm	300 mL : 20 L	10 minutes
Cleaner	Strength	Dilution	Contact time
Hot Water Applied Under Pressure	>65°C	N/A	>5 minutes
Complex Orange	3%	1:30	>5 minutes
Spray 9	Pre-mixed	N/A	>5 minutes
Mr. Clean	Full or Diluted	Disinfecting – apply full strength Cleaning - add ¼ cup per 1 gallon	10 minutes @ Full Strength
Dawn Dish Soap	-	1 tsp per 1 gallon	Until Clean

If disinfectant is used as a cleaner to help remove debris, disinfectant must be reapplied after the debris has been removed.

SAFETY

Read Safety Data Sheets regarding possible interactions between cleaning agents and disinfectants – ex. do not mix ammonia based products and bleach. All staff and contractors are expected to perform the necessary tasks in a safe manner following instructions on manufacturer labels and utilize appropriate Personal Protective Equipment for the task.

RECORDS

- Pronto Forms: Net Washing
- Pronto Forms: Cleaning and Disinfection Checklist
- Pronto Forms: Vessel Transfer Form

ASSOCIATED MATERIALS

- BMP WI 20.A – RONC Operation
- BMP WI 20.B – AutoBoss Operation
- BMP WI 20.C – Multi-Head Net Washers
- BMP WI 20.D – RACEMASTER Operation

BMP WI	01-A	On-Site Net Repair	
Created or Revised by:	Version:	Replaces Version:	Reason for Revision:
C – Scott Dougan	5-Apr-18	NEW	-
Risk Ranking	9	Associated Risk(s)	Fish Escape

SCOPE

This work instruction is intended to provide net repair guidelines for on-site repairs that may be noted during daily inspections or underwater inspections by divers or ROV and is to be followed in conjunction with the related Standard Operating Procedure(s), as applicable.

INSTRUCTIONS

Repairing of nets must be conducted as soon as possible and must ensure that the repaired area is as effective as the rest of the net for containment of fish and the exclusion of predators. Attempt to determine reason for premature net wear and fix as soon as possible (e.g. chafing, other).

A small repair kit should be available on each site at a minimum with preference for each vessel to have a kit. The kits are prepared by GMG and should include:

- **1 m² Net Patch:**
 - Smolt (Star 26mm 360ply)
 - Market (Sapphire UC 57mm 2.6mm)
 - Pred (Sapphire UC 150mm 3.8mm)
- **2 x Rolls of Twine:**
 - 2.5mm Nylon Twine
 - 2.6mm Sapphire Twine
- **6 x Net Needles:**
 - 14mm Needles (3)
 - 16mm Needles (3)
- **300 pcs 8" x 0.18" Power Phase Cable Ties TSL-200-S-YB. Fastenal Part #63126**

1. DIP NETS

- 1.1. Inspect after use when dip net has been used for purposes outside of fish handling such as dipping rockweed or removing debris. Any holes must be repaired, and all debris should be removed to prevent damaging the fish during handling.
- 1.2. Inspect prior to use when preparing to handle fish.
 - 1.2.1. Repair holes prior to handling fish.
 - 1.2.2. Zap straps should not be used to repair holes in dip nets as the strap may cause damage to the fish while in the net.
- 1.3. Dip nets should be disinfected prior to be used, between cages and after use.

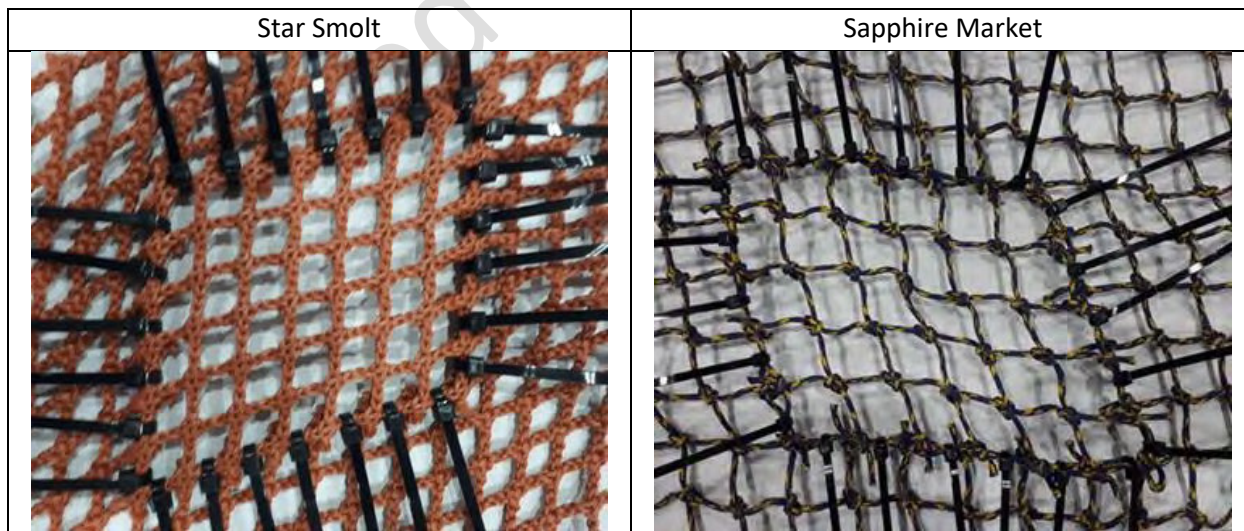
Disinfectant	Strength	Dilution	Contact time
Iodine-based (Wescodyne®, Premise®, Adage® II, Iodor®)	250 ppm	300 mL : 20 L	10 minutes

2. BIRD NETS

- 2.1. Inspect daily – pay close attention to areas of strain or wear areas such as near spreaders.
- 2.2. Pull net tight prior to repairing so that the repair holds up to stretched width.
- 2.3. If damage is significant, request a new bird net.
 - 2.3.1. If significant damage is due to feed spreader, considering adjusting location of spreader.
- 2.4. Record repairs on **Pronto Form: Net Repair – On-Site Record**

3. MAIN NETS (SMOLT, MARKET)

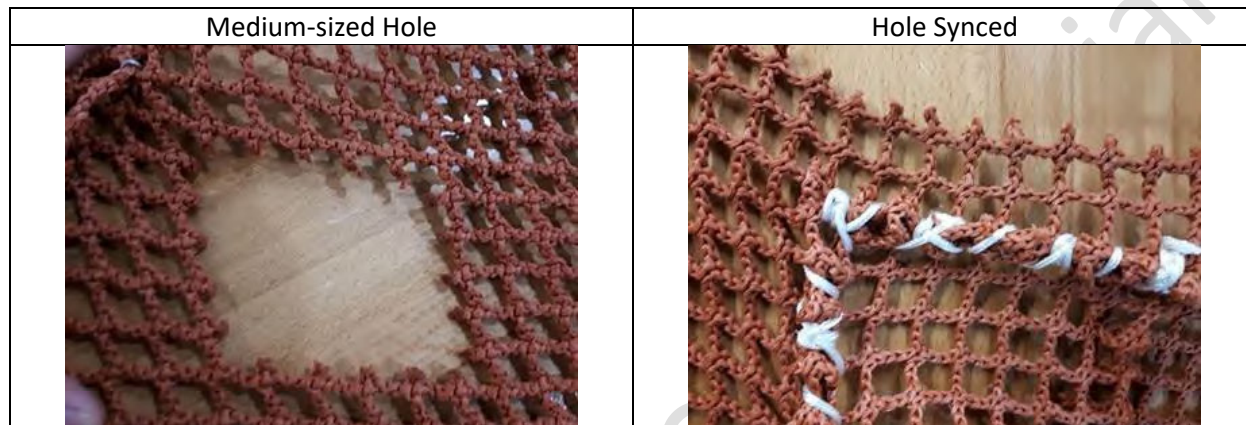
- 3.1. A daily visual inspection above the waterline and just below the surface should be done daily during feeding or routine cage inspections.
- 3.2. If holes are found, follow procedures to repair net based on size and shape of hole.
 - 3.2.1. If holes are large enough for fish escape or scales are seen in the area, alert divers and follow escape response and reporting to Senior Management.
 - 3.2.2. Inspect predator net to determine if fish are likely between the nets or if the predator net has been breached as well.
 - 3.2.3. Use Net Repair Kit contents to repair hole.
- 3.3. Cable ties should only be used for short term or temporary repairs.
 - 3.3.1. To maintain break strength, if cable ties are used, **they must be applied at every mesh.**



3.4. When cutting twine to synch a hole, ensure you leave about an inch of material from your finishing knot so it will seal properly (Star Smolt) or not unravel causing a hole (Sapphire Market).

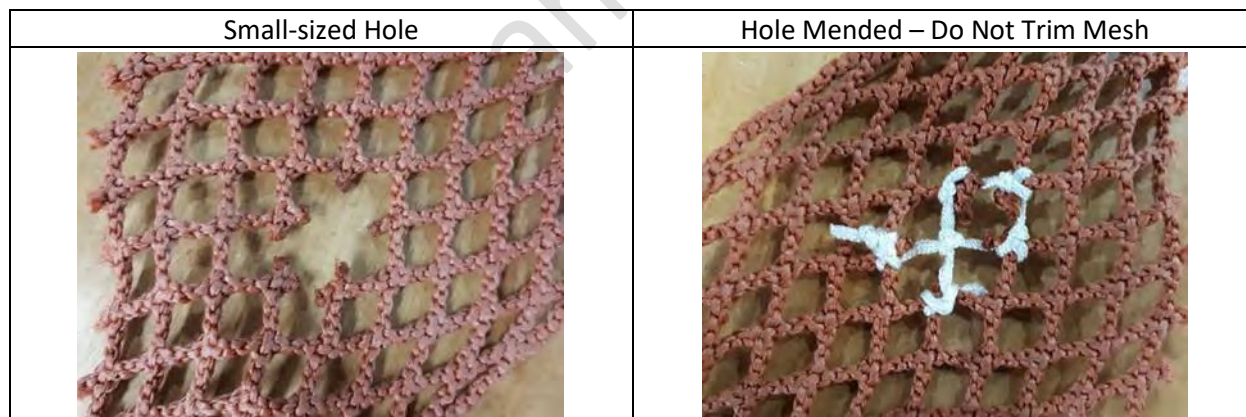
3.4.1. Use 2.5mm nylon twine when repairing star smolt nets.

3.4.2. Use 2.6 sapphire twine when repairing sapphire market nets.

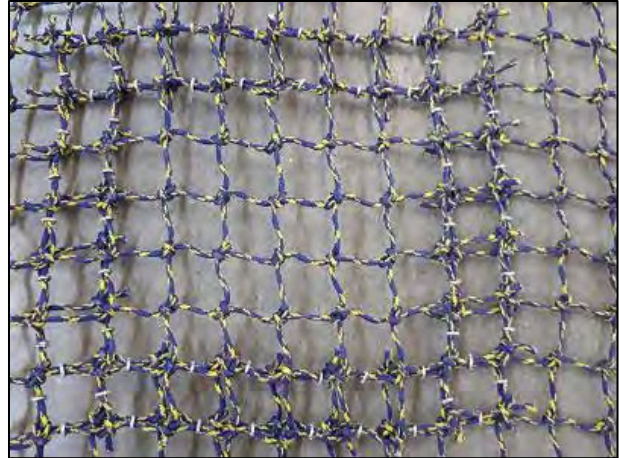


3.5. When mending, ensure that the mesh size being mended is the same as the netting.

3.6. Mend in points do-not cut out square – notice below, points are not trimmed back.

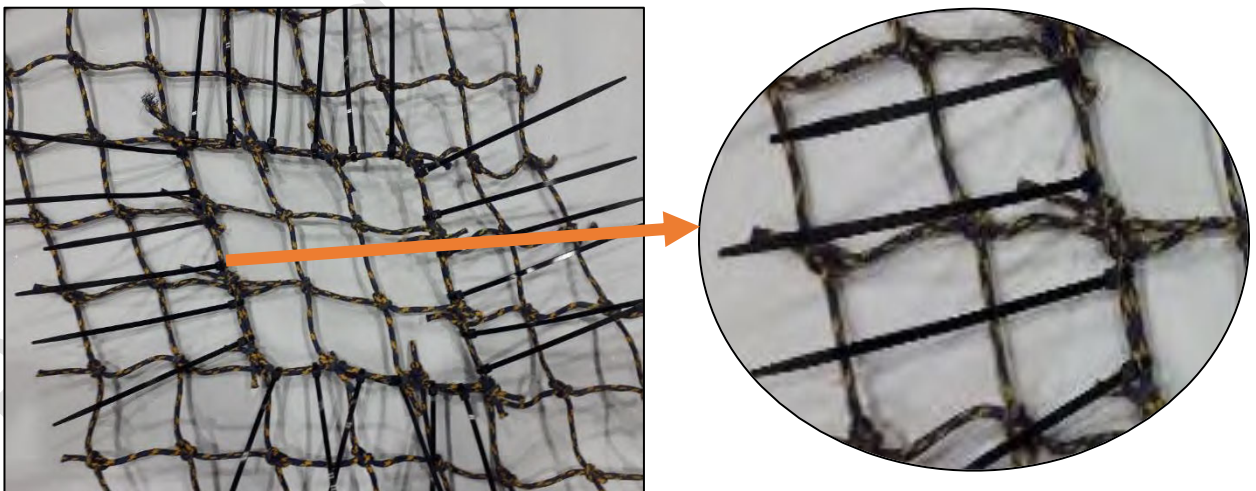


- 3.7. When sewing in patches, go through every mesh, tying knots (2 in front and 1 in the back) on every other mesh. Image on the right, a large hole patched – notice all mesh have been tied.
- 3.8. Make sure your patching that is being sewn in is **pulling the same way as the existing netting**.
- 3.9. Record repairs on **Pronto Form: Net Repair – On-Site Record**



4. PREDATOR NETS

- 4.1. A daily visual inspection above the waterline and just below the surface should be done daily during feeding or routine cage inspections.
- 4.2. If holes are found, follow procedures to repair net based on size and shape of hole.
 - 4.2.1. If holes are large enough for fish escape or scales are seen in the area, alert divers and follow escape response and reporting to Senior Management.
- 4.3. Using cable ties, net needle and twine, and net patch (if required), reinforce the worn area.
 - 4.3.1. If the hole cannot be safely repair by synching or sewing, a panel should be used.
- 4.4. Cable ties should only be used for short term or temporary repairs.
 - 4.4.1. To maintain break strength, if cable ties are used, **they must be applied two (2) ties to every mesh**



- 4.5. When cutting twine ensure you leave about an inch of material from your finishing knot so it will not unravel causing a hole.

- 4.6. Ensure that the mesh size being mended is the same as the netting.
- 4.7. Mend in points do-not cut out square – notice below, points are not trimmed back.
- 4.8. When sewing in patches, go through every mesh, tying knots (2 in front and 1 in the back) on every other mesh.
 - 4.8.1. Make sure your patching that is being sewn in is pulling the same way as the existing netting.
- 4.9. Record repairs on **Pronto Form: Net Repair – On-Site Record**

5. REPAIR KIT REFILL AND RETURN

- 5.1. As materials are used from the kit, refills can be obtained from GMG.
- 5.2. At the end of the production cycle, the Net Repair Kits must be returned to GMG for refill and storage until the next production cycle.

DEVIATIONS

Other materials may be used to repair tears and holes, such as rag rope, if more suitable materials are not immediately available. If temporary repairs have been made, such as the use of cable ties, once better suited materials are available, the repair must be fixed using appropriate materials. Senior Management in consultation with GMG will determine when a net must be removed and replaced.

SAFETY

All staff and crew are expected to conduct operations in a safe manner and utilize protective equipment as needed, such as life vests, while working around water.

REFERENCE

- BMP SOP 01 – Daily Site Inspections
- BMP EPRP D – Escape Prevention and Response



SOP	1	Net Install/Removal– Bird Net/Predator Lid - Barges	
Created by:	Revision:	Replaces Revision :	Reason for revision:
Sherri Deveau	01-Feb-16	New	Standardized Procedure

SCOPE

This procedure details the requirements for all personnel and maintenance vessels that are involved in installing, changing and removing nets using maintenance vessels. This SOP applies for sea sites located in New Brunswick, Nova Scotia, Maine and Newfoundland.

OBJECTIVE

To develop efficient, safe and standardized procedure to install/remove Bird Nets and Predator Lids.

EQUIPMENT

- Maintenance Vessel(Barge) – KCS/COS/PS Saltwater
 - Has boom/crane
- Rope – ¾” for running lines
- ¾” for tying up old nets
- Mauler skiff (if available), is not required but helpful
- PFD for all employees involved in process
- Hard hats for all employees on the Maintenance vessel while crane/ boom is operating

RESPONSIBILITIES

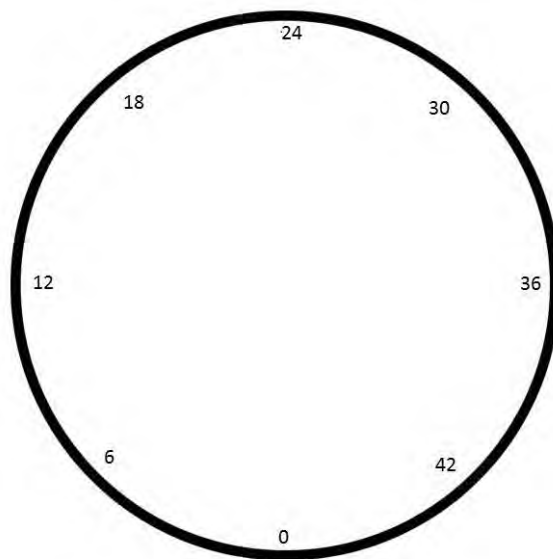
- GMG – to prepare the nets to be delivered to Maintenance Vessel as described in SOP Finished Net Transfers.
- Boom Truck Operator– delivery nets to Maintenance Vessel as per scheduled
- Divers (contract or in house) – complete their responsibilities for net install/change as described in the Divers, SOP No. 5 Net Install (Predator Nets) – Divers
- Maintenance Vessel Captain –
 - count and inspect the rope to be used for running lines
 - Operate boom/crane and roller
 - Direct crew on proper installation or removing process
 - Confirm all crew is wearing correct safety gear
 - Complete Mobile Crane and Hoisting Apparatus (Vessel Crane) Daily Pre-Use Inspection Checklist
- Site Crew-

- Follow maintenance vessel captain's direction for install or removal (tying and untying ropes, etc.)
- Wear all safety equipment as required
- Be aware of their surroundings

PROCEDURE

- **Net Install(Top Net)**

- Net is rolled on the barge deck
- Start putting on running lines on new net, there will be 3 in total for both 100m and 150m you will start at the top of the net, one ear from where it is marked with a 6' tie on the corner. You will be using the 3/4" rope. These lines will be placed at 12, 24 and 36) see diagram below.
- You start at "0", make sure you tie where there is no ring line. (See Diagram below)
- The ears on new bird nets will be on the 2nd line, every 6 has an ear. Count out ears and tie on pull line over to 6, 12, 24.
- Second barge pull on 24 and once it is pulled $\frac{3}{4}$ of the way over, the first barge on 12 and then 36 over bird ring. Continue to follow procedure using two barges until the bird net is in place



100 m cage, go every 12
to install 7 running lines

150m cage, go every 9 to
install 7 running lines

- Once the bird net is in place, the site crew will tie three ties per bay
- To remove top net untie hand rail ties to bird net and pull off using boom

SAFETY

- Follow safe barge crane operating procedures as per Mobile Crane and Hoisting Apparatus guidelines
- Wear all safety equipment as required in provincial regulations

RECORDS

- GMG Net Install/Removal Tracking
- KCS Net Install and Removal (Pronto Form)
- Daily visual inspection of crane using Mobile Crane and Hoisting Apparatus (Vessel Crane) Daily Pre-Use Inspection Checklist

ASSOCIATED MATERIALS

- Diver SOP #5 Net Install Predator Nets - Diver
- GMG SOP Fleeting/ bagging / preparing nets for transport
- Mobile Crane and Hoisting Apparatus (Vessel Crane) Daily Pre-Use Check Inspection Checklist
- Break Strength, please see chart below:

Rope Selection Chart

Rope Size		Working load limit / kg	5:1 Safety Factor ratio / Kg
3/8"	9mm	353	1766
1/2"	13mm	539	2699
5/8"	15mm	925	4626
3/4"	19mm	1160	5800
1"	25mm	1979	9897
1 1/8"	29mm	2631	13154
1 1/4"	32mm	2998	14991
1 1/2"	38mm	4259	21296
1 5/8"	40mm	5130	25654
2"	50mm	7320	36600



SOP	2	Net Install/Removal– Predator Net - Barge	
Created by:	Revision:	Replaces Revision :	Reason for revision:
Sherri Deveau	01-Feb-16	New	Standardized Procedures

SCOPE

This procedure details the requirements for all personnel and maintenance vessels that are involved in installing, changing and removing nets using maintenance vessels. This SOP applies for sea sites located in New Brunswick, Nova Scotia, Maine and Newfoundland.

OBJECTIVE

To develop efficient, safe and standardized procedure to install Predator Nets.

EQUIPMENT

- Maintenance Vessel(Barge) – KCS Saltwater
 - Has to have net reel
 - Has boom/crane
- Rope – ¾” for running lines
- Rope - 1 1/8” for changing and tying up old nets for shipment(to be used for removal)
- Mauler skiff (if available), is not required but helpful
- PFD for all employees involved in process
- Hard hats for all employees on the Maintenance vessel while crane/ boom is operating

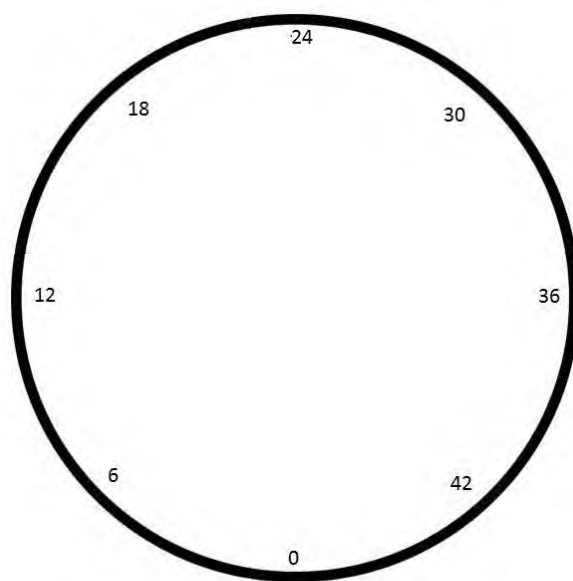
RESPONSIBILITIES

- GMG – to prepare the nets to be delivered to Maintenance Vessel as described in SOP Finished Net Transfer.
- Boom Truck Operator– delivery nets to Maintenance Vessel as per scheduled
- Divers (contract or in house) – complete their responsibilities for net install/change as described in the applicable Diving SOP (SOP No.4 Net Install (Smolt and Main Nets) – Divers, SOP No. 5 Net Install (Predator Nets) – Divers and SOP No.6 Net Change (Divers).)
- Maintenance Vessel Captain –
 - Count and inspect the rope to be used for running lines
 - Operate boom/crane and roller
 - Direct crew on proper installation or removing process
 - Confirm all crew is wearing correct safety gear

- Complete Mobile Crane and Hoisting Apparatus (Vessel Crane) Daily Pre-Use Inspection Checklist
- Site Crew-
 - Follow maintenance vessel captain's direction for install or removal (tying and untying ropes, etc.)
 - Wear all safety equipment as required
 - Be aware of their surroundings

PROCEDURE

- **Net Install(Predator Net)**
 - Untie all water lines
 - Check to see which way the tide is running, (will use tide to help the process)
 - **If the divers are not ready to roll net in:**
 - Using 10' rope on two ears of the old net, hook net on boom and pick up in the air (8 ties going on either side)
 - Then run winch line to center of bottom of new net
 - Pick up using boom and haul net right into cage where it needs to go
 - If divers have cage untied drop center of bottom, if not leave in the air so not in the divers way to untie
 - Start putting on running lines on new net, there will be 7 in total for both 100m and 150m you will start at the top of the net, one ear from where it is marked with a 6' tie on the corner, but on second ear with new skirt style. You will be using the 3/4" rope
 - You start at "0", make sure you tie where there is no ring line. (See Diagram below) Make sure for predator nets you run line inside the cage when you get to #6 then underneath both float pipes and back to handrail so you are on the outside of the cage.



100 m cage, go every 12
to install 7 running lines

150m cage, go every 9 to
install 7 running lines

- Then count 6 ears over, tie running line to that ear, through post and back to barge. Count 6 more and repeat the process until all 7 running lines are on
- Divers will untie old net and put two down lines on (see diver SOP)
- Then hook winch through 3 or 4 of the ears while net is laying on the deck
- Then use winch line to pull net up right into cage
- Tie "0" on hand rail on center of two posts and then pull #6 line, will haul net right to post, tie back half a bay.
- On opposite side of cage, pull # 42 line, this will haul net right to post but this time tie ahead half a bay
 - Note if net is fletted right you will start at #6, if fletted left start at # 42.
- Repeat the process by going next to #12, second barge will lift main net by two bottom ears (paying close attention to fish density, then #36, then #18, then # 30, the two barges working together on opposite sides of the net, #24 is last. (this one is tied back half bay)
- Make sure rope is on inside of float pipe so that you can tie predator net to
- Then put 20' rope on predator half way in between the running lines (so 3, 9, 15 etc.). This will be used to help pull net in place.
- Once predator net is in place, the site crew will tie rope to loop ears on every float pipe between posts (there are 48 on 100m cage, 72 on 150m cage)
- Once the barge and site crew have completed their responsibilities of net install/change, divers will tie in bottom using procedure in the diving SOP #4 or #5.
- Barge may need to assist diver on haul down

When removing:

- Barge untie all the ties on the predator net except for 6
- Divers will untie bottom of the net and put a tie on the center of the bottom and go under weight ring with rope and back up to barge
- Usually tie barge on opposite cage of the cage you are working on
- Once divers are done, untie the six ropes that are left
- Then start reeling up net
- Once net is up on deck, roll it up and tie with 1 1/8" rope
- Record the net number in Net Log

SAFETY

- Follow safe barge crane operating procedures as per Mobile Crane and Hoisting Apparatus guidelines
- Wear all safety equipment as required by provincial regulations

RECORDS

- Net Log – tag numbers of nets removed or changed are recorded in Net Log. A copy is given to disinfection station and boom truck driver. Also emailed to site manager
- Daily visual inspection of crane using Mobile Crane and Hoisting Apparatus (Vessel Crane) Daily Pre-Use Inspection Checklist

ASSOCIATED MATERIALS

- Diver SOP #4 and #5
- GMG SOP Fleeting/ bagging / preparing nets for transport
- Mobile Crane and Hoisting Apparatus (Vessel Crane) Daily Pre-Use Check Inspection Checklist
- GMG Net Log
- Rope Break Strength, please see chart below.

Rope Selection Chart

Rope Size		Working load limit / kg	5:1 Safety Factor ratio / Kg
3/8"	9mm	353	1766
1/2"	13mm	539	2699
5/8"	15mm	925	4626
3/4"	19mm	1160	5800
1"	25mm	1979	9897
1 1/8"	29mm	2631	13154
1 1/4"	32mm	2998	14991
1 1/2"	38mm	4259	21296
1 5/8"	40mm	5130	25654
2"	50mm	7320	36600



SOP	3	Net Install/Change – Smolt/Main Net - Barge	
Created by:	Revision:	Replaces Revision :	Reason for revision:
Sherri Deveau	26-Jan-16	New	Standardized Procedures

SCOPE

This procedure details the requirements for all personnel and maintenance vessels that are involved in installing, changing and removing nets using maintenance vessels. This SOP applies for sea sites located in New Brunswick, Nova Scotia, Maine and Newfoundland.

OBJECTIVE

To develop efficient, safe and standardized procedure to install and change smolt and main nets.

EQUIPMENT

- Maintenance Vessel(Barge) – KCS Saltwater
 - Has to have net reel
 - Has boom/crane
- Rope – ¾” for running lines
- Rope - 1 1/8” for changing and tying up old nets for shipment
- Mauler skiff (if available), is not required but helpful
- PFD for all employees involved in process
- Hard hats for all employees on the Maintenance barge and site crew while crane/ boom is operating

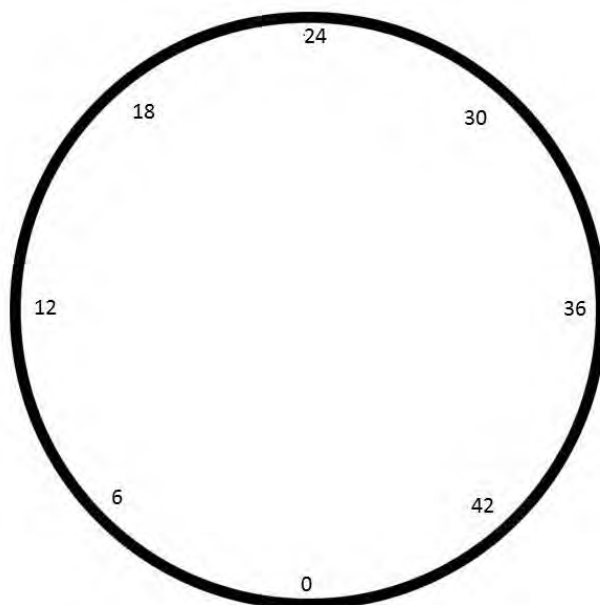
RESPONSIBILITIES

- GMG – to prepare the nets to be delivered to Maintenance Vessel as described in SOP Finish Net Transfer SOP.
- Boom Truck Operator – delivery nets to Maintenance Vessel as per scheduled
- Divers (contract or in house) – complete their responsibilities for net install/change as described in SOP No.4 Net Install (Smolt and Main Nets – Divers and SOP No.6 Net Change Divers.
- Maintenance Vessel Captain –
 - Count and inspect the rope to be used for running lines
 - Operate boom/crane and roller
 - Direct crew on proper installation or removing process
 - Confirm all crew is wearing correct safety gear
 - Complete Mobile Crane and Hoisting Apparatus (Vessel Crane) Daily Pre-Use Inspection Checklist

- Site Crew-
 - Follow maintenance vessel captain's direction for install or removal (tying and untying ropes, etc.)
 - Wear all safety equipment as required
 - Be aware of their surroundings

PROCEDURE

- **Net Change(Market/Smolt)**
 - Count cage brackets prior to starting to confirm there are 48 posts on 100m cage
 - Untie all water lines (remove for install)
 - Check to see which way the tide is running, (will use tide to help the process)
 - Untie all hand rail ties except one per bay (not for new net install)
 - **If the divers are not ready to roll net in:**
 - Using 10' rope on two ear of the old net, hook net on boom and pick up in the air (8 ties going on either side)
 - Then run winch line to center of bottom of new net
 - Pick up using boom and haul net right into cage where it needs to go
 - If divers have cage untied drop center of bottom, if not leave in the air so not in the divers way to untie
 - Start putting on running lines on new net, there will be 7 in total for both 100m and 150m you will start at the top of the net, one ear from where it is marked with a 6' tie on the corner. You will be using the 3/4" rope
 - You start at "0", make sure you tie where there is no ring line. (See Diagram below)



100 m cage, go every 12
to install 7 running lines

150m cage, go every 9 to
install 7 running lines

- Then count 6 ears over, tie running line to that ear, through post and back to barge. Count 6 more and repeat the process until all 7 running lines are on
- Divers will untie old net and put two down lines on (see diver SOP)
- Then hook winch through 3 or 4 of the ears while net is laying on the deck
- Then use winch line to pull net up right into cage
- Tie "0" on hand rail on center of two posts and then pull #6 line, will haul net right to post, tie back half a bay.
- On opposite side of cage, pull # 42 line, this will haul net right to post but this time tie ahead half a bay
 - Note if net is fleeted right you will start at #6, if fleeted left start at # 42.
- Repeat the process by going next to #12, then #36, then #18, then # 30, the two barges working together on opposite sides of the net, #24 is last.
- Once second barge rolls up net, opposite barge will pull two lines, the same process followed until done
- Site crew will then begin to tie one tie a bay to the bird net
- Site crew lets old net go (confirms it is all untied), captain already has net on pull out roller on barge. Captain will roll up net using the net roller and tie up using 1 1/8" rope
- The site will tie in all water line and hand rail ties of the new net
- Once the barge and site crew have completed their responsibilities of net install/change, divers will tie in bottom using procedure in SOP #4 Net Install – Divers or SOP #6 Net Change – Divers.

SAFETY

- Follow safe barge crane operating procedures as per Mobile Crane and Hoisting Apparatus guidelines
- Wear all safety equipment as required by provincial regulations

RECORDS

- GMG Net Install/Removal Tracking
- KCS Net Install and Removal (Pronto Form)
- Daily visual inspection of crane using Mobile Crane and Hoisting Apparatus (Vessel Crane) Daily Pre-Use Inspection Checklist

ASSOCIATED MATERIALS

- Diver SOP for net install/change(#4 and #5)
- GMG SOP Fleeting/ bagging / preparing nets for transport
- Mobile Crane and Hoisting Apparatus (Vessel Crane) Daily Pre-Use Check Inspection Checklist
- GMG Net Log
- Rope Break Strength Chart, please see below.

Rope Selection Chart

Rope Size		Working load limit / kg	5:1 Safety Factor ratio / Kg
3/8"	9mm	353	1766
1/2"	13mm	539	2699
5/8"	15mm	925	4626
3/4"	19mm	1160	5800
1"	25mm	1979	9897
1 1/8"	29mm	2631	13154
1 1/4"	32mm	2998	14991
1 1/2"	38mm	4259	21296
1 5/8"	40mm	5130	25654
2"	50mm	7320	36600

SOP	4	Net Install (Smolt and Main Nets) – Divers	
Created by:	Revision:	Replaces Revision :	Reason for revision:
Sherri Deveau	18-Feb-16	New	Standardized Procedures

SCOPE

This procedure details the requirements for all divers, contract or in house, that are involved in installing, changing and removing nets. This SOP applies for sea sites located in New Brunswick, Nova Scotia, Maine and Newfoundland.

OBJECTIVE

To develop efficient, safe and standardized procedure to install and change all nets.

EQUIPMENT

- Dive Gear
 - Hood
 - Mask
 - Dry suit
 - Scuba tanks
 - Regulator
 - Back pack
 - Fins
 - Weight belt
 - Gloves
 - Knife
 - Light, if applicable
 - Buoyancy compensator
- Rope
 - ½" rope

RESPONSIBILITIES

- Divers (contract or in house) – complete their responsibilities for net install/change as described in Divers SOP's No. 4, 5 and 6
- Barge Captain – make sure the barge is not in gear while divers are in the water on the outside of the net. Also to follow the SOP's for barges (No. 1,2 and 3) for net installs, changes, removals.
- Site Crew-
 - Assist divers if needed (i.e. get ropes)

PROCEDURE

- Net Install 100m (Ties 24 or 48 depending on style of net)
 - Divers take premeasured (1/2" x 36 ' rope) diver ties and secure the ties to the weight ring on either side of the weight ring line with a clove hitch, a half hitch and a tuck.
 - When the diver puts the first tie on the net, diver has to make sure the down line on the net is perpendicular with weight ring line.
 - Divers will now tie in the net on the ear using two wraps and two half hitches, starting on tide side, depending on tide barge may need to assist divers.
 - While tying in the net, divers should move in the same direction around the cage to make sure no ties are missed.
 - Make sure the net bottom is centered in the weight ring as much as possible(see diagram 1.1 and 1.2)
 - Once the net is tied in, the divers will go inside the net and complete a net inspection to make sure nothing was missed and that there are no holes or failures in the nets.

- Net Install 150m (Ties 36 or 72 depending on style of net)
 - Divers take premeasured (1/2" x 48 ' rope) diver ties and secure the ties to the weight ring on either side of the weight ring line with a clove hitch, a half hitch and a tuck.
 - When the diver puts the first tie on the net, diver has to make sure the down line on the net is perpendicular with weight ring line.
 - Divers will now tie in the net on the ear using two wraps and two half hitches, starting on tide side, depending on tide barge may need to assist divers.
 - While tying in the net, divers should move in the same direction around the cage to make sure no ties are missed.
 - Make sure the net bottom is centered in the weight ring as much as possible(see diagram 1.1 and 1.2)
 - Once the net is tied in, the divers will go inside in the net and complete a net inspection to make sure nothing was missed and that there are no holes or failures in the nets.

SAFETY

- Ensure all divers are wearing proper equipment and complying with provincial regulations when completing dive.

RECORDS

- Diver completes personal dive log
- Pre Dive checklist to be completed prior to dive

ASSOCIATED MATERIALS

- One of the divers has to sign the pronto form time sheets on the Ipad on site or barge

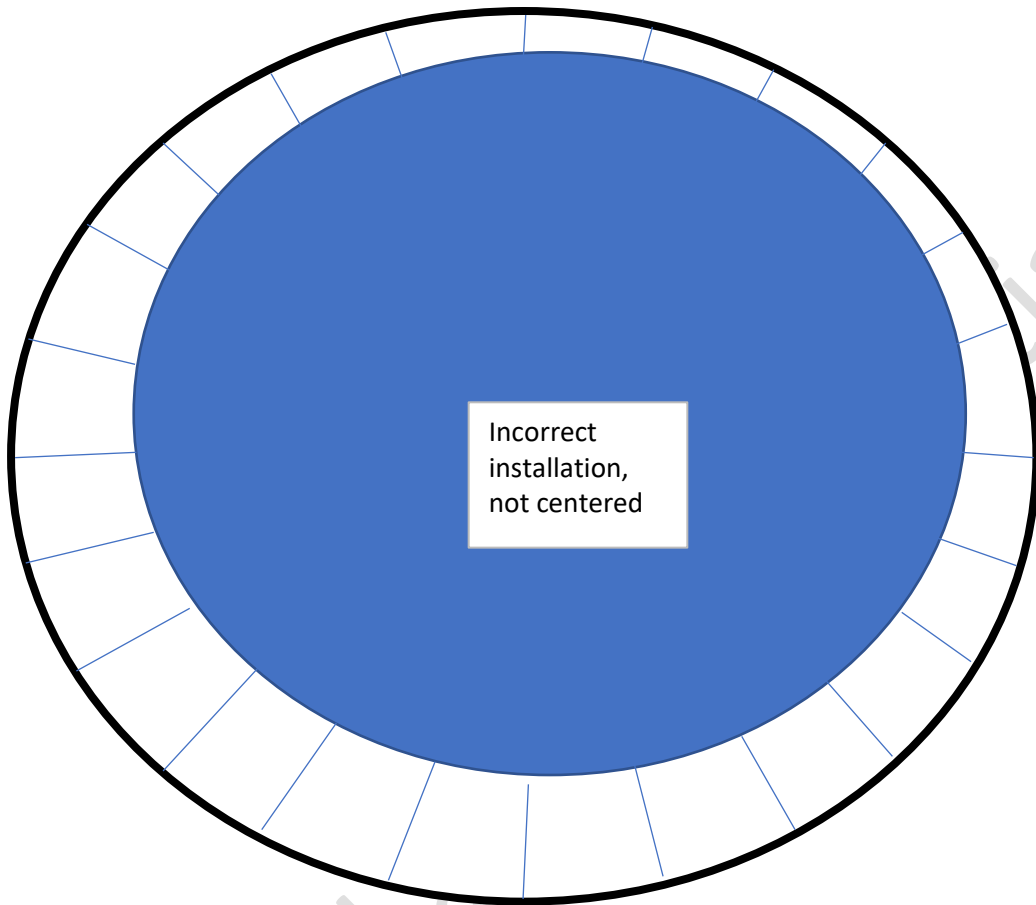


Diagram 1.1

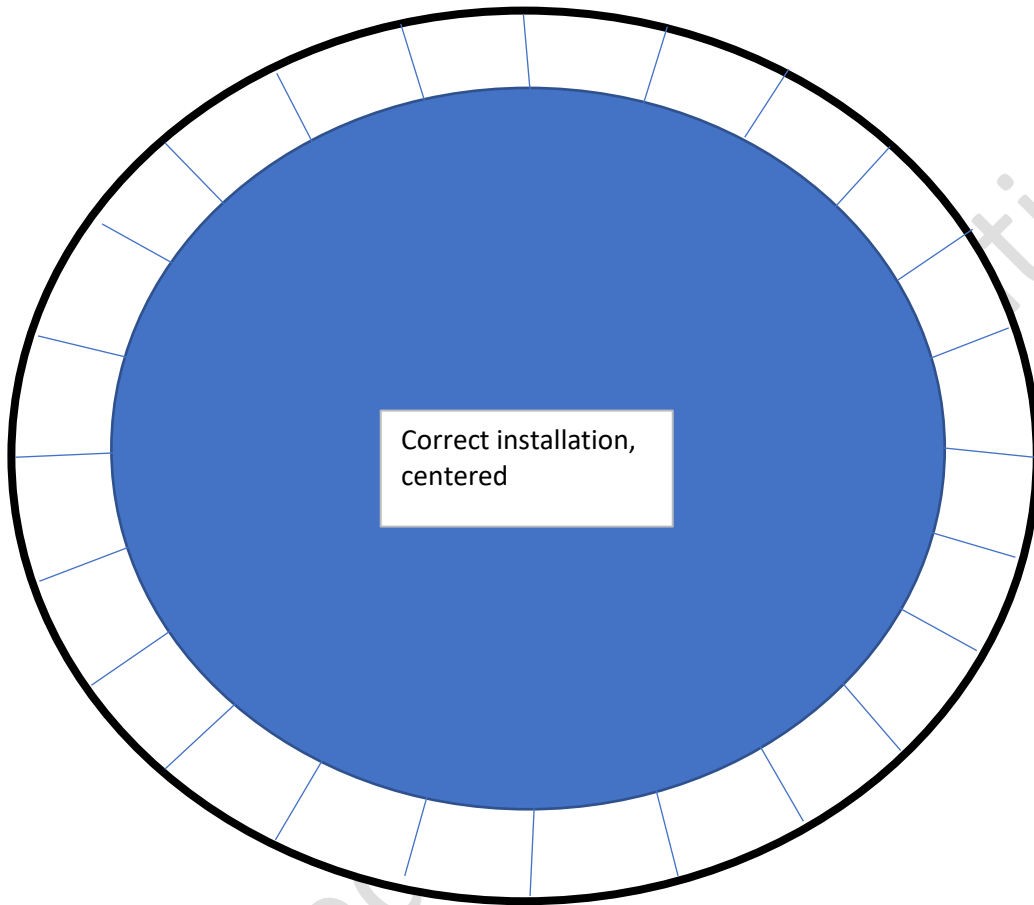


Diagram 1.2

SOP	5	Net Install (Predator Nets) – Divers	
Created by:	Revision:	Replaces Revision :	Reason for revision:
Sherri Deveau	19-Feb-16	New	Standardized Procedures

SCOPE

This procedure details the requirements for all divers, contract or in – house, that are involved in installing, changing and removing nets. This SOP applies for sea sites located in New Brunswick, Nova Scotia, Maine and Newfoundland.

OBJECTIVE

To develop efficient, safe and standardized procedure to install, remove and change all nets.

EQUIPMENT

- Complete dry dive gear
 - Hood
 - Mask
 - Dry suit
 - Scuba tanks
 - Regulator
 - Back pack
 - Fins
 - Weight belt
 - Gloves
 - Knife
 - Light, if applicable
 - Buoyancy compensator
- Rope
 - ½" rope
 - ¾" rope

RESPONSIBILITIES

- **Divers** (contract or in house) – complete their responsibilities for net install/change as described in SOP No.5 Net Install Predator Nets –Divers.
- **Barge Captain** – make sure the barge is not in gear while divers are in the water on the outside of the net. Also to follow SOP No. 2 Net Install/Removal Predator Nets – Barges.

- **Site Crew-**
 - Assist divers if needed (i.e. get ropes)

PROCEDURE

- **Predator Net Install (with no main net in place)**
 - Divers take premeasured rope (1/2" x (36' for 100m cage and 48' for 150m cage) diver ties and secure the ties to the weight ring on either side of the weight ring line with a clove hitch, a half hitch and a tuck.
 - When the diver puts the first tie on the net, diver has to make sure the down line on the net is perpendicular with weight ring line.
 - Divers will now tie in the net on the ear using two wraps and two half hitches, starting on tide side, depending on tide, barge may need to assist divers.
 - When the rope is passed through the predator it is to be underneath the bottom line to help with main net installation in the future.
 - While tying in the net, divers should move in the same direction around the cage to make sure no ties are missed.
 - Make sure the net bottom is centered in the weight ring as much as possible(see diagram 1.1 and 1.2)
- **Predator Net Install (with main net in place)**
 - Divers will untie knots off the bottom ears of the main net, with the ties remaining on the weight ring, divers will use these ties to tie net in place once barge crew places predator net underneath the main net
 - When the diver puts the first tie on the net, diver has to make sure the down line on the net is perpendicular with weight ring line.
 - Divers will now tie in the net on the ear using two wraps and two half hitches, starting on tide side, depending on tide, barge may need to assist divers.
 - When the rope is passed through the predator it is to be underneath the bottom line to help with main net installation in the future.
 - While tying in the net, divers should move in the same direction around the cage to make sure no ties are missed.
 - Make sure the net bottom is centered in the weight ring as much as possible(see diagram 1.1 and 1.2)

SAFETY

- Ensure all divers are wearing proper equipment and complying with provincial regulations when completing dive.

RECORDS

- Diver completes personal dive log
- Pre Dive checklist to be completed prior to dive

ASSOCIATED MATERIALS

- One of the divers has to sign the pronto form time sheets on the Ipad on site or barge

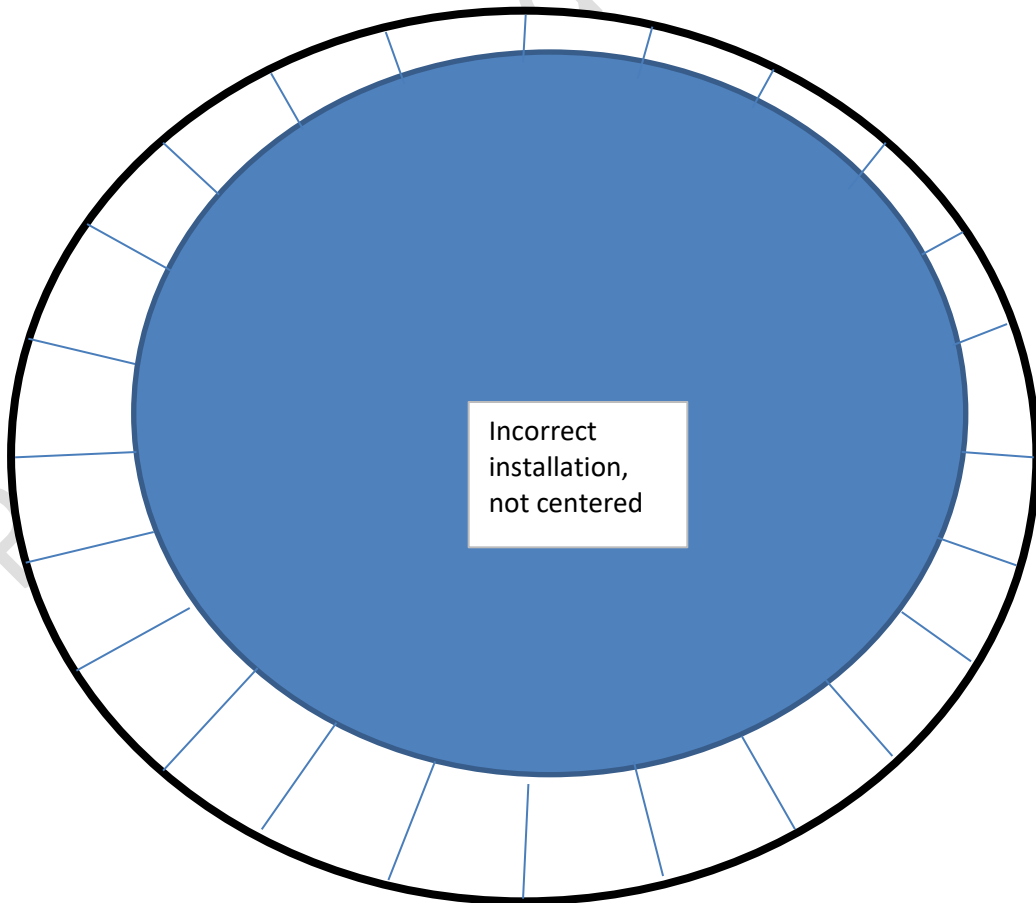


Diagram 1.1

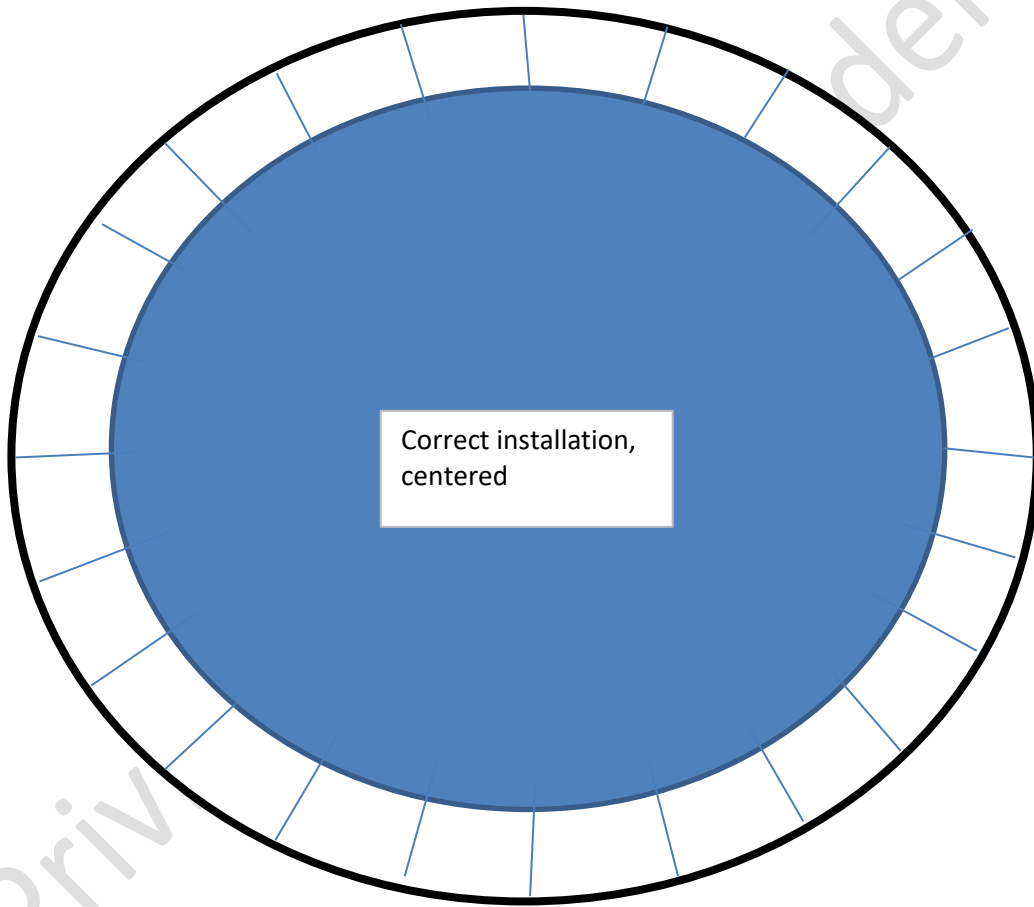


Diagram 1.2

SOP	6	Net Change – Divers	
Created by:	Revision:	Replaces Revision :	Reason for revision:
Sherri Deveau	19-Feb-16	New	Standardized Procedures

SCOPE

This procedure details the requirements for all personnel and maintenance vessels that are involved in installing, changing and removing nets using maintenance vessels. This SOP applies for sea sites located in New Brunswick, Nova Scotia, Maine and Newfoundland.

OBJECTIVE

To develop efficient, safe and standardized procedure to install and change all nets.

EQUIPMENT

- Complete dry dive gear
 - Hood
 - Mask
 - Dry suit
 - Scuba tanks
 - Regulator
 - Back pack
 - Fins
 - Weight belt
 - Gloves
 - Knife
 - Light, if applicable
 - Buoyancy compensator
- Rope
 - ½" rope
 - ¾" rope

RESPONSIBILITIES

- Divers (contract or in house) – complete their responsibilities as described in SOP No.6 Net Change.
- Barge Captain – make sure the barge is not in gear while divers are in the water on the outside of the net. Complete their responsibilities as described in SOP No.1,2,3 for Barges.
- Site Crew-

- Assist divers if needed (i.e. get ropes)

PROCEDURE

- Predator Net Removal
 - Diver will untie the main net from the predator net
 - Then the predator net will be untied from weight ring with ties remaining on the weight ring.
 - Divers will untie bottom of the net and put a tie on the center of the bottom (using 3/4" rope and go under weight ring with rope and back up to barge.)
 - Site crew will then let net go from the surface so it will go down underneath cage and be rolled up on the barge.
 - When the diver puts the first tie on the net, diver has to make sure the down line on the net is perpendicular with weight ring line.
 - Divers will now tie in the main net on the ear using two wraps and two half hitches, starting on tide side, depending on tide, barge may need to assist divers.
 - While tying in the net, divers should move in the same direction around the cage to make sure no ties are missed.
 - Make sure the net bottom is centered in the weight ring as much as possible(see diagram 1.1 and 1.2)

- Net Change (with predator net in place)
 - Diver will untie the old net from the predator net
 - Divers will tie on rope on two double ears of the old net, then diver will bring ropes to the surface for the barge to hook on to.
 - Barge and site crew will place new net underneath the net to be removed.
 - As barge rolls up old net divers will stay on site to assist barge if needed.
 - Then divers will tie in the new net
 - When the diver puts the first tie on the net, diver has to make sure the down line on the net is perpendicular with weight ring line.
 - Divers will now tie in the net on the ear using two wraps and two half hitches, starting on tide side, depending on tide, barge may need to assist divers.
 - The diver will make sure the rope is underneath the bottom line of the pred net before tying the main net in
 - While tying in the net, divers should move in the same direction around the cage to make sure no ties are missed.
 - Make sure the net bottom is centered in the weight ring as much as possible(see diagram 1.1 and 1.2)

- Net Change (without predator net in place)
 - Diver will untie the old net from the weight ring with the ties remaining on the weight ring
 - Divers will tie on rope on two double ears of the old net, then diver will bring ropes to the surface for the barge to hook on to.
 - Barge and site crew will place new net underneath the net to be removed.

- As barge rolls up old net divers will stay on site to assist barge if needed.
- Then divers will tie in the new net
- When the diver puts the first tie on the net, diver has to make sure the down line on the net is perpendicular with weight ring line.
- Divers will now tie in the net on the ear using two wraps and two half hitches, starting on tide side, depending on tide, barge may need to assist divers.
- While tying in the net, divers should move in the same direction around the cage to make sure no ties are missed.
- Make sure the net bottom is centered in the weight ring as much as possible(see diagram 1.1 and 1.2)

SAFETY

- Ensure all divers are wearing proper equipment and complying with provincial regulations when completing dive.

RECORDS

- Diver completes personal dive log
- Pre Dive checklist to be completed prior to dive

ASSOCIATED MATERIALS

- One of the divers has to sign the pronto form time sheets on the Ipad on site or barge

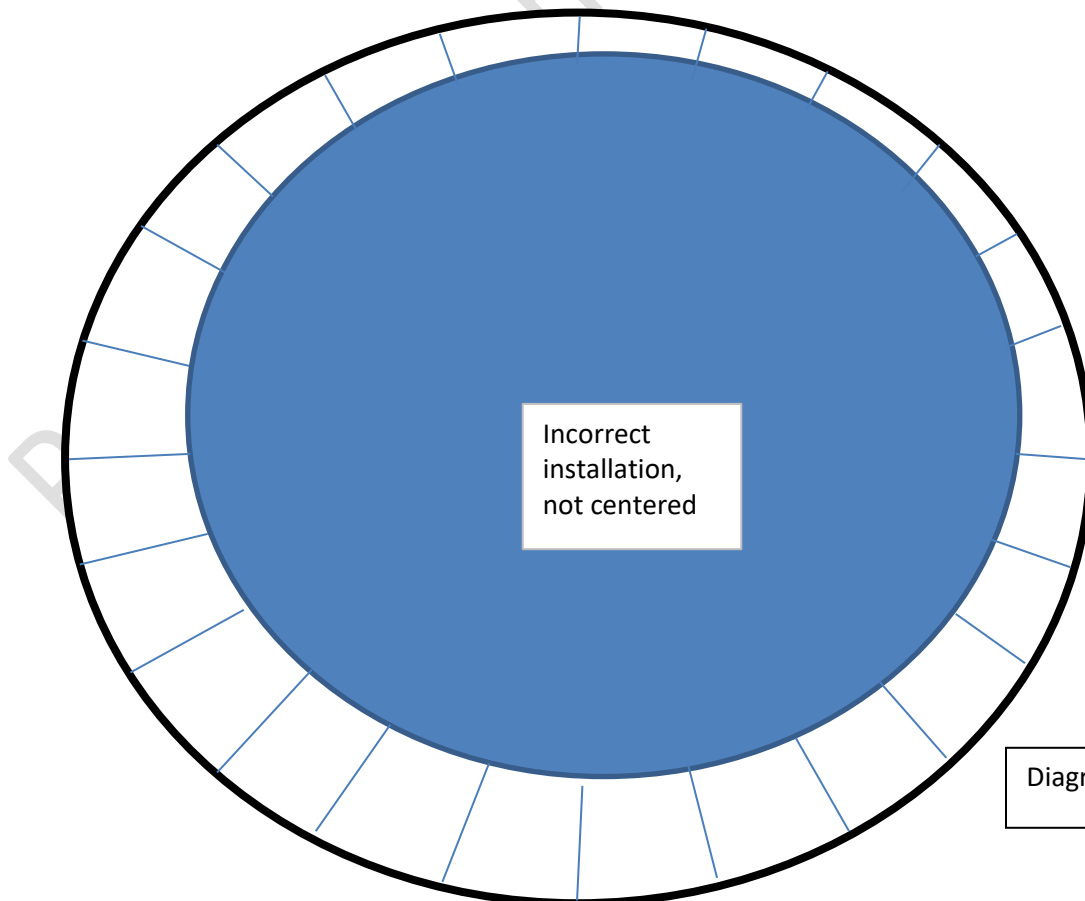
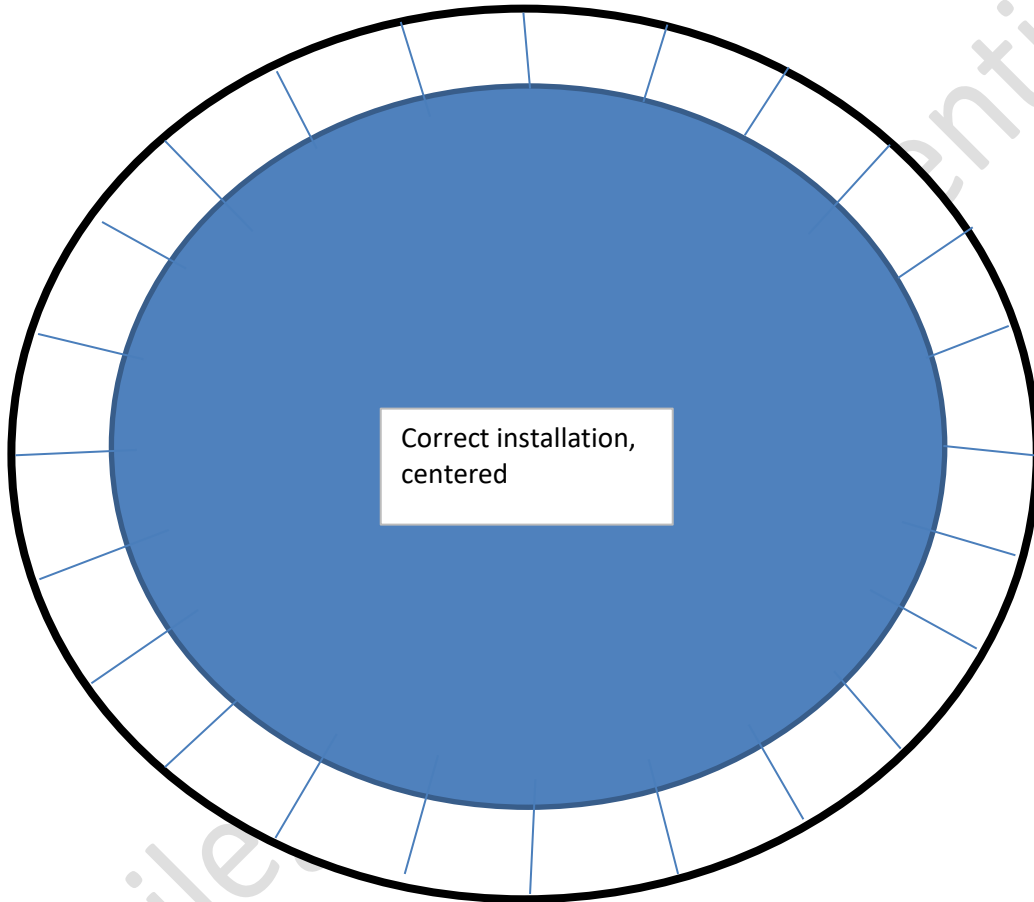


Diagram 1.1

Diagram 1.2



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BMP SOP	1	Daily Site Inspections	
Created or Revised by:	Version:	Replaces Version:	Reason for Revision:
C – Jennifer Wiper	16-Jan-18	NEW	-
Risk Ranking	6	Associated Risk(s)	Man Overboard, Injury

SCOPE

This procedure details the requirements with regards to daily site inspections for sea sites located in New Brunswick, Newfoundland, Nova Scotia and Maine. This procedure also addresses the objectives of the Corporate Safety Management System.

OBJECTIVE

To ensure that employees are aware of all necessary procedures with regards to daily site inspections and the associated controls to decrease risk.

EQUIPMENT

- Life Vest / Survival Suit
- Sheathed Knife
- Gaff
- Dip Net
- Rope

RESPONSIBILITIES

- SITE CREW – ensure that safety precautions are taken during site inspections.
- SITE MANAGER – ensure that crew are completing site inspections daily and that any repairs or concerns are reported to the Area Manager.

PROCEDURE

Each day, cages should be checked for floating debris and garbage. Water lines, bird nets and bridles should be checked for chafing, that they are tied properly, and any missing or untied ropes adjusted.

Employees undertaking the task shall wear a life vest and appropriate footwear. While walking the cage, NOT RUNNING, employees shall maintain one hand contact with the rail when possible. Employees shall have on their person a sharp, sheathed knife to use for repairs and in the event of an emergency.

IF WORKING ALONE: cage inspections shall NOT be performed by walking on the cage, rather through observations from the deck of the vessel.

REMOVAL OF DEBRIS AND GARBAGE

- Floating debris that may cause harm to the fish (either from ingestion or impact) shall be removed and disposed of accordingly.
- Garbage must be removed and placed in garbage bins for disposal.
- Logs or large sticks floating outside the system should be pulled away from the site to reduce potential for chaffing or punctures in nets or vessel collision.

DIPPING ROCK WEED AND OTHER ORGANIC MATERIAL

- Rock weed shall be removed from cages with a dip net and placed outside the cage.
- Ensure that once the net is no longer used for dipping rock weed that it is inspected for damage and disinfected prior to storage.

Disinfectant	Strength	Dilution	Contact time
Iodine-based (Wescodyne®, Premise®, Adage® II, Iodor®)	250 ppm	300 mL : 20 L	10 minutes
Virkon®	1%	250 g : 25 L – mix with freshwater only	10 minutes

INSPECTING WATER LINES AND ROPES

- Water line ties should be tied to each ear and tied to the float pipe, check that lines are tied.
- Bridals should be inspected to ensure that they are intact and checked for chaffing.
- Ropes or ties securing bird nets and stands should be checked to ensure that they are tied tight and that the stand is in the center of the cage – adjust as required.

INSPECTING BIRD AND MAIN NETS

- Bird Nets will be inspected daily for tightness and wear. Any holes discovered should be repaired. If repairs are inadequate, the net should be replaced as soon as possible.
 - Winter: sites that experience ice buildup during the winter months are required to sim the bird nets to the main nets. This can be achieved by weaving rope through and around the bird net and main net (sewing) or the use of zap straps.

- Main nets shall be inspected above the water line, and just below, for protruding debris and holes. Any holes discovered should immediately be repaired or covered and divers called in for underwater repairs.
- Predator nets should be visually inspected for check for damage below the water line (to visible depth) and that the predator net ties are intact and checked for chaffing or deterioration.

REMOVING FREEZING SPRAY/ICE

- m. When required, when ice buildup is thick or making work unsafe, a mallet should be used to remove buildup from the cages.
- n. If required, and only if the **BIRD NET AND MAIN NET SIMMED TOGETHER**, the ties between stanchions can be removed so that the net sags between stanchions to reduce weight and strain.

REMOTE FEEDING SYSTEMS

- Check electrical boxes are secure to cages and antenna is pointed towards the feed shed/feeding system.
- Check camera wires are connected and that connections are clean.

SAFETY

All staff and contractors are expected to perform the necessary tasks in a safe manner and utilize Personal Protective Equipment such as life vests. Extra caution shall be exercised when performing site inspection in winter months due to ice and colder water temperatures. Employees conducting inspections in winter months should wear a survival suit.

RECORDS

- Pronto Form: KCS Surface Inspection (NS)
- Pronto Form: Daily Checklist (ME)

ASSOCIATED MATERIALS

- BMP WI 1.A – Net Repair

3. Mooring and anchor inspection, grid system inspection and recording and reporting procedures for these activities (Section 6.3.5).

6.3.4 Moorings and anchors

Moorings and anchors will be inspected biannually (in the fall and spring of each year) according to the below-water inspection schedule described in 6.4.3.

Any issues identified, either during biannual inspections, dives conducted for other reasons, or based on surface-noted irregularities, will be corrected as soon as possible and records kept regarding location of repair, date, and person who performed repair. The reason for the issues will be determined and fixed as soon as possible.

Moorings and anchors will be inspected prior to the stocking of a new production cycle. This may include removing them from the water and visually inspecting prior to redeployment.

Once installed, the mooring and anchors will be inspected biannually (every 6 months), unless otherwise required. If required, as the result in the change of tension, a shift in the array or after a significant storm event, the moorings and anchors will be visually inspected at depth using divers or ROV. Any issues identified, and the cause of the issue will be determined and corrected as soon as possible.

Records – KCS SW – Below Water Inspection, KCS Grid Plate Inspection, KCS SW Dive Log

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirements: <ul style="list-style-type: none"> • <i>Biannual mooring and anchor inspection</i> • <i>Up to date inspection and repair records. (For inspection, refer to 6.4.3, 6.4.4)</i>

6.3.5 Grid system

The grid system will be inspected biannually (in the Fall and Spring of each year) as indicated in 6.4.3.

Any issues identified, either during biannual inspections, dives conducted for other reasons, or based on surface noted irregularities, will be corrected as soon as possible and records kept regarding location of repair, date, person who performed repair. The reason for the issues will be determined and fixed as soon as possible.

The grid system will be inspected biannual (every 6 months), unless otherwise required.

If required, as the result in the change of tension, a shift in the array or after a significant storm event, the moorings and anchors will be visually inspected at depth using divers or ROV. Any issues identified, and the cause of the issue will be determined and corrected as soon as possible.

[Records – KCS SW – Below Water Inspection, KCS Grid Plate Inspection, KCS SW Dive Log](#)

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirements: <ul style="list-style-type: none">• <i>Biannual grid system inspection</i>• <i>Inspection and repair records. (For inspection, refer to 6.4.3, 6.4.4)</i>

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4. Engineer approved minimum infrastructure requirements, and minimum infrastructure maintenance and inspection requirements in place for containment management.

Kelly Cove Salmon have professional engineers within the company who are completing the stamped engineer drawings. The sites will be modeled using guidance from the following engineering standards:

- NS 9415:2009 – “Marine fish farms: Requirements for site survey, risk analyses, design, dimensioning, production, installation and operation”
- “Marine Scotland: A Technical Standard for Scottish Finfish Aquaculture”
- ISO16488 – “International Standard: Marine fish farms – open net cage – design and operation”
- API RP 2SK – “Design and Analysis of Stationkeeping Systems for Floating Structures”
- DNV-OS-E301 – “Position Mooring”

The analysis determined loading on mooring components (ropes, chains, anchors) in response to expected extreme 10-year and 50-year current, wind, and wave conditions. Materials were checked by comparing breaking strengths with expected loads for simulations.

All new sites will have approved drawings, engineers currently working on existing sites.

6.4 Equipment inspection

6.4.1 Above water nets and infrastructure

Any irregularities, damage, or points of wear must be investigated as soon as possible and recorded on the surface inspection record. Above water inspections will be continuous as staff work on the site on a daily basis. In addition, formal inspections must occur on a weekly basis for surface components. This inspection will examine compensator buoys, visible portions of the grid, shackles, thimbles, cages, support, jump net rails, above water nets (containment, bird), attachment of nets, and site markers, at a minimum. A record of inspection will be taken.

Any weaknesses in the above water structure will be repaired as soon as possible and any observations that would suggest an underwater problem must be investigated as soon as possible.

Above water inspections will be continuous as staff work on the site daily – any net repairs will be recorded on the Net Repair On-Site Record. In addition, formal inspections will occur on a weekly basis for surface components and recorded on the Surface Inspection Record. This inspection examines compensator buoys, visible portions of the grid, shackles, thimbles, cages, support, jump net rails, above water nets (containment, bird), attachment of nets, and site markers.

Reference - BMP WI 1-A On-Site Net Repair (SOP in question #2).

Records – Net repair On-Site, KCS SW Surface Inspection (Pronto), KCS SW Below Water Inspection (Pronto), KCS grid Inspection, KCS Dive log,

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirements: <ul style="list-style-type: none">• <i>Weekly surface inspections</i>• <i>Up to date surface inspection records (to include enclosure nets, bird nets, predator nets, moorings and anchors, and grid)</i>

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6.4.2 Below-water nets

Suspected underwater irregularities, damage, or points of wear noted on any dive or via surface observations must be investigated and repaired as soon as possible and recorded on the inspection record. Furthermore, below-water net inspections will be formally completed every 60 days. A checklist is to be completed by the diver in charge of the inspection.

Any weaknesses in the containment structure will be repaired as soon as possible.

Suspected underwater irregularities, damage, or points of wear noted on any dive or via surface observations will be investigated and repaired as soon as possible and recorded on Net Repair On-Site Record. Furthermore, below-water net inspections will be formally completed every 60 days. A Below Surface Inspection checklist is to be completed.

Reference - BMP WI 1-A On-Site Net Repair, KCS SOP 1 Net Install/Removal – Bird Net/Predator Lid – Barges, KCS SOP 2 Net Install/Removal – Predator Net – Barge, (SOP's were provided in question #2).

Records - KCS Below Water Inspection (Pronto). Net Repair – On Site record, KCS Dive Log.

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirements: <ul style="list-style-type: none"> • <i>Below-water net inspection (every 60 days)</i> • <i>Up to date below-water net inspection records (to include enclosure nets, predator nets)</i>

6.4.3 Below-water infrastructure

Suspected underwater irregularities, damage, or points of wear noted on any dive or via surface observations must be investigated and repaired as soon as possible and recorded on the inspection record. Furthermore, below-water infrastructure inspections will be formally completed twice a year – in spring and in fall.

If site conditions do not enable all infrastructure to be inspected bi-annually by diver, then an acceptable alternative plan must be described to ensure all infrastructure is being monitored and maintained through an alternate means.

Will you be conducting inspections of below water infrastructure using a diver or ROV?

YES NO

[Records - KCS SW Below Water Inspection Report \(Pronto\), KCS Dive Log, KCS Grid Inspection Form](#)

If no, why not?

And, what alternative means will you use to ensure all below water infrastructure is being monitored and maintained?

[Underwater inspections will be conducted biannually using divers and/or a ROV. As necessary, cameras that are placed in each of the cages on site can be used in addition to divers and ROVs to ensure that all below water infrastructure is being monitored and maintained. Additionally, maintenance barges will be used to lift the components to the surface for visual inspection at the end of each production cycle when the site is fallowed. Any weaknesses in the containment structure will be repaired as soon as possible and recorded on either the Dive Log for repairs that can be completed by divers and/or on the grid Inspection Form and emailed to the Marine Site Maintenance Manager.](#)

Any weaknesses in the containment structure will be repaired as soon as possible.

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirements: <ul style="list-style-type: none"> • Biannual below-water infrastructure inspection • Up to date below-water infrastructure inspection records (to include moorings and anchors, and grid)

6.4.4 Additional inspection triggers

Any event(s) that result(s) in concerns regarding containment will result in an above and below-water inspection as soon as possible.

The following events will also trigger below water inspections:

- a severe weather event (described in 6.6.2),
- vessel collision,
- human error that could reasonably have resulted in or may result in a weakness with below water structures,
- an unexplainable drop in feeding level,
- evidence of malicious damage,
- presence of suspected cultured fish outside cages, or
- other reasonable cause for concern.

A checklist will be completed by the diver in charge of the below water inspection.

Any weaknesses in the containment structure will be repaired as soon as possible.

[Records](#) - [KCS SW Below Water Inspection Report \(Pronto\)](#), [KCS Dive Log](#), [KCS Grid Plate Inspection Form](#)

5. **Corrective actions related to the above procedures.** Attached is Appendix D – risk control plan for containment management.
6. **Procedures for site management in the event of severe weather.**

6.6.2 Severe weather

Severe weather can greatly impact the structures in place for containment management. Cage location relative to wind direction and land, as well as other variables can affect the level of impact so that each site must determine their specific responses to severe weather events. Means for managing ice and ice loading on cage structures must be discussed within this section, if applicable.

Do you have a documented strategy in place for dealing with severe weather? (This must include names of responsible individuals, actions, and thresholds for actions.)

YES NO

If yes, attach and indicate the name of the relevant documentation:

If no, complete the following questions:

Describe the severe weather conditions or expected conditions that will trigger the severe weather management measure(s) indicated below (e.g. wind speed, direction, ice build-up, other):

Severe weather can greatly impact the structures in place for containment management. Cage location relative to wind direction and land, as well as other variables can affect the level of impact. Severe weather conditions or expected conditions that will trigger the severe weather management measures at Coffin Island include high winds more than 40 knots from a southerly direction; cold water temperatures around the site below one degree Celsius (<1°C); and, low oxygen levels at the site below 6 mg/L.

What severe weather management measures will be undertaken? (Please check those that apply and describe.)

- A designated employee will track severe weather events so that reasonable preparations can be made.

Describe:

The Site and Area Manager will track forecasts to predict if a weather event will impact the site. The Site Manager will ensure that reasonable preparations are made by all Site Workers in response to an impending severe weather events. Site Workers will monitor

oxygen and water temperature daily to track environmental data and if a situation arises on site we will follow the guideline set out in section 6.11 of the FMP.

Time permitting, impending bad weather will trigger inspection of the net pens above water.

Describe:

Time permitting, extra inspection of the net pens *above water* will take place (in addition to daily, routine inspections) leading up to the predicted event and any appropriate-steps (potential reinforcement) will be taken by all parties to ensure the system is ready for the impending weather event.

Time permitting, impending bad weather will trigger inspection of net pens below water.

Describe:

Time permitting, extra inspection of the net pens *below water* will be requested (in addition to weekly, routine inspections) if the Site Manager believes it to be necessary due to impending weather event.

Time permitting, impending bad weather will trigger reinforcement of appropriate structures above and below water.

Describe:

After the severe weather, inspection of the net pens above water will occur.

Describe, include timelines:

Net pens inspection above water will occur on site after a severe weather event by the on-site staff. These inspections will take place either the day after a severe weather event or as soon it is safe enough for the onsite crews to return to work on the site following the weather event.

After the severe weather, inspection of the net pens below water will occur.

Describe, include timelines:

Inspection of the net pens below water will occur at the next schedule routine mortality dive on site following the serve weather event; however, if the site manager believes that their underwater net pens need inspection earlier than the next schedule mortality dive they can schedule it with the divers. This extra inspection will either occur the day after the severe weather event or as soon as it safe for staff to return to work on the site.

After the severe weather, repair or replacement of compromised structures will occur.

Describe, include timelines:

Immediately after a severe weather event, a detailed evaluation of damage(s) will be conducted. A complete list of repairs will be created. Repairs will then be prioritized and tracked until completed. In some instances, temporary repairs may take place until permanent repairs can be completed.

Record: Unusual Event/Severe Weather Repair Log

Other.

Describe:

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirement: <i>Strategy for responding to severe weather described</i>

7.Procedures for response to breaches or suspected breaches, including mandatory reporting.

6.5 Response to a breach of containment

The main goal of the Containment Management aspects of this FMP and its associated documents is to promote measures to minimize the chance of a breach* in containment. However, in the event that a breach occurs despite all the precautions taken, there must be a plan in place to respond so that required actions are clear and can be conducted in a timely manner.

** A breach is defined as any escaping of fish from an aquaculture site.*

6.5.1 Areas of potential impact if a breach occurs

In order to determine the appropriate response to a breach, operators must be aware of the areas that may be impacted by a release of fish. These areas will be site and species dependant, and may also depend on the life stage of the released fish (size), stock origin (river and hatchery), season, as well as other factors.

Do you have a document in place that describes areas of potential impact if a breach occurs?

YES NO

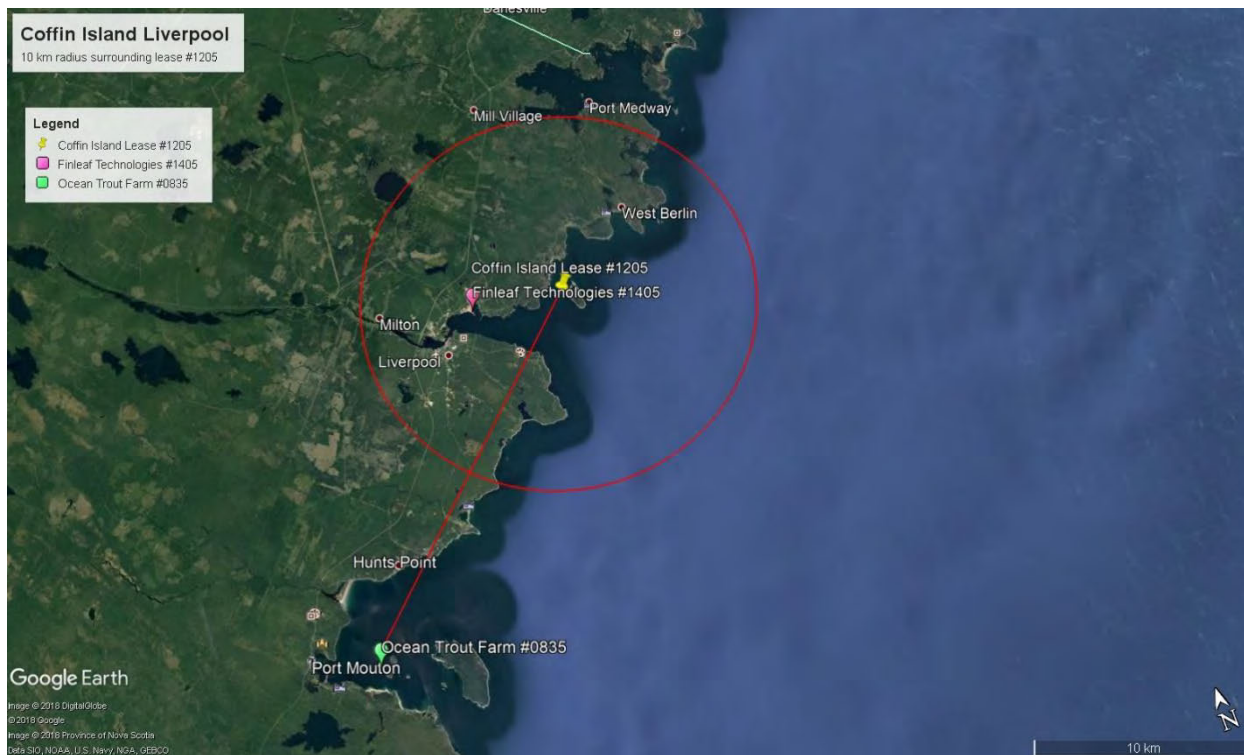
If yes, attach and indicate the name of the relevant documentation:

If no, provide the following information:

Describe the area(s) of potential impact if a breach occurs and include the reasoning behind the area(s) included in the description. These areas should include, but are not limited to: adjacent aquaculture sites (within 5 km); any rivers or lakes that are accessible from the marine environment, that are within the DFA Recreational Fishing Area (<http://novascotia.ca/fish/sportfishing/our-lakes/lake-inventory/>) in which the site is located, and that are stocked with the same species being farmed; and designated salmon rivers (if the site is farming Atlantic salmon) within the Aquaculture Management Area (if one exists) and the DFO Designatable Unit. Salmon rivers and Designatable Units are to be defined based on the latest DFO Canadian Science Advisory Secretariat Science Response for the Maritimes Region, Stock Status Update of Atlantic salmon in salmon fishing areas (SFAs) 19-21 and 23. (2016 report found at http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ScR-RS/2016/2016_029-eng.pdf):

To determine the appropriate response to a breach, the site must be aware of the areas that may be impacted by a release of fish. Below is a map depicting the five (5) kilometer area around the site. The nearest salmon river is the Gold River and is more than five (5) kilometers from the site, it falls within a 59.90 km radius. The salmon rivers around the site are generally considered extirpated due to acid rain and stream pH being too low.

The site is located in the Southern Uplands DFO Designatable Unit, Fishing Area 21 . LaHave River is the DFO Index River.



COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species ☒	Specific Requirement: <i>Areas of potential impact of a breach described</i>

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6.5.2 Emergency response to a breach

All sites must have a documented emergency response to address a breach. This plan of action must consider the areas of potential impact described in Section 6.5.1 and must respect all federal and provincial regulations and licencing requirements.

It must include:

- Means for immediate correction of the procedure, or repair of the failed equipment or infrastructure that allowed the breach to occur, including:
 - contact details for qualified persons required to assist with properly assessing and correcting the failure (e.g. divers, maintenance personnel, vessel operators, etc.),
 - access to materials for repair, and
 - any other resources required to correct the failure;
- The process for reporting of the breach within the company and to authorities (see Section 6.5.3), including:
 - contact details for all parties,
 - breach reporting form;
- If stock recovery has been identified as a possible response, the process for determining when/if stock recovery should be attempted;
- The stock recovery process (if applicable), including:
 - description of the method of stock recovery efforts,
 - description of the location of recovery efforts, vessels and personnel involved in recovery efforts, and recapture gear to be utilized, and
 - means for disposal of recaptured stock;
 - application to DFO will be required to get the permission to implement the stock recovery actions.
- Reporting required after recovery efforts have been completed (if applicable),
- Other mitigation procedures, if applicable.

All sites have a documented emergency response to address a breach. This plan of action considers the areas of potential impact and respects all federal and provincial regulations and licencing requirements.

Reference - Fish Containment Plan Section 4, BMP D EPRP Escape Prevention and Response.

Records – IMS Incident Report, Site Incident Report for Insurance (Pronto), Breach of Containment Notification to NSDFA

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirement: <i>Procedures to respond to a breach described</i>

6.5.3 Reporting of a breach event

An aquaculture licence holder for marine finfish or any personnel of their aquacultural operation who know or suspect a breach must **immediately*** notify NSDFA by contacting the veterinarian on call: (902) 893-5359.

*The term “immediately” means as soon as it is safe, or it is possible to do so. This is expected to be within an hour.

This notification must provide the following information, at a minimum:

- (a) name and contact information of the individual who is making the report;
- (b) suspected date of the breach;
- (c) all of the following information about the aquacultural operation:
 - (i) name of the aquaculture licence holder,
 - (ii) licence or lease number,
 - (iii) address of the site,
 - (iv) holding unit number where the suspected or confirmed breach occurred;
- (d) species and approximate age, size, and weight of the fish that escaped;
- (e) approximate number of fish in the holding unit where the suspected or confirmed breach occurred;
- (f) freshwater place of origin of the fish that escaped;
- (g) level of the suspected or confirmed breach;
- (h) suspected or confirmed cause of the breach;
- (i) any mitigation efforts that have been undertaken, are in progress or are proposed.

A template for a Breach of Containment Notification is in Appendix A.

[Reference](#) - BMP EPRP D – Fish Escape and Response;

[Records](#) - IMS Incident Report, Site Incident Report for Insurance (Pronto), Breach of Containment Notification to NSDFA

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirement: <i>Immediate notification of knowledge or suspicion of a breach</i>

BMP EPRP	D	Escape Prevention and Response	
Created or Revised by:	Version:	Replaces Version:	Reason for Revision:
R – Jennifer Wiper	28-Apr-20	May 2, 2019	Include reporting requirements for NL.

SCOPE

This procedure details the regulatory requirements with regards to fish containment for sea sites located in New Brunswick, Nova Scotia, Newfoundland and Maine. This procedure also addresses the objectives of the Best Aquaculture Practices Salmon Farms standard, section 6 – Environment: Control of Escapes.

OBJECTIVE

To ensure that the regulatory requirements are being met, that escapes are mitigated against and to define procedures that may reduce the number of fish that have the potential to escape.

EQUIPMENT

- Net Repair Kit

RESPONSIBILITIES

- **SITE CREW** – perform daily inspections of the nets to ensure nets are secured; debris removed and check for visible holes.
- **SITE MANAGER** – ensure that daily checks are being completed, alert divers to any concerns such as increased predator activity, direct crew in case of an escape event and communicate with Management.
- **AREA MANAGER** – provides support to site and ensure adequate resources are available.
- **SALTWATER MANAGEMENT** – responsible for any necessary communication with Government, Standard Holders, Certification Bodies and public reporting (as required).

PROCEDURE

The definition of an escape or breach event depends upon the Regulations of the Operating Region. In New Brunswick a breach of containment is “the escape of 100 or more salmonids from an aquaculture site”. In Nova Scotia a breach is defined as “any escaping of fish from an aquaculture site”. In Newfoundland, farms must report a significant escapement or when it is reasonable to suspect that any escape incident has occurred, though no defined limits are set, a recapture trigger is set at 100 fish or more. Companies must also publicly report any scape events within 24 hours of confirming the escape. Maine defines an escape as “25% or more of a cage population and/or more than 50 fish with an average weight of 2kg each or more”.

PREVENTION

Escape prevention begins with proper construction. All sites will have containment nets surrounded by a predator net below the water and bird nets above the water. Due to seasonal variations in water quality and predator presence, the predator nets may be removed for short periods if necessary.

Net inspections occur daily above surface during routine maintenance, daily observations and during feeding. Below surface inspections are conducted in general each time a diver enters a cage to collect mortos. Inspections can also occur upon request from the Site Manager if fish are behaving abnormally, if a predator is seen in the cage or repeatedly in the vicinity of the farm or after fish handling events. Each region is also required to conduct inspections as per the respective codes and regulations, refer to **Table 1**. In addition to regular inspections, systems must be inspected following a breach, a storm event, or evidence of system component failure or tampering.

Table 1. Regular schedule of site inspections regarding containment and regulatory inspection schedule.

	New Brunswick	Nova Scotia	Newfoundland	Maine
Reference Code	2008. Code of Containment for Culture of Atlantic Salmon in Marine Net Pens in New Brunswick	2015. Aquaculture Management Regulations made under Section 64 of the Fisheries and Coastal Resources Act	2014. Code of Containment for the Culture of Salmonids in Newfoundland and Labrador 2019. Aquaculture Policy and Procedures Manual	2002. Code of Containment for the Responsible Containment of Farmed Atlantic Salmon in Maine Waters
Site Inspections	Initial Inspection: all elements of the net pen, mooring, structures and site markings will be inspected to ensure correct installation, materials and placement. Semi-annual Inspection: surface components and underwater inspections of mooring and other below water structures. Biannual or Prior to Restocking: repeat initial.	Each site is required to have a Farm Management Plan (FMP). Under the FMP, sites are required to perform <u>weekly</u> surface inspections recorded on the Surface Inspection Form (Pronto Forms) and below water inspections every 60 days with inspections recorded on the Below Water Inspection Form (Pronto Forms).	Each site is required to monitor and inspect surface components of mooring systems, cages, nets and ropes <u>once per week</u> and record the inspection on the NL Code of Containment Site Surface Inspection Checklist .	Each site is required to have a Containment Management System (CMS) which contains mitigation and response plans. As part of the CMS, the sites are required to report <u>daily</u> on the site activity, including system inspections, this is recorded on the Daily Checklist (Pronto Form) – which is specific for Maine.

Regulatory and/or Third-Party Inspections		The containment management section of the FMP must be audited; before the initial stocking of a site; at least once per year for stocked sites; within 30 days of a breach of 50 or more fish is reported; when 1 or more farmed salmon are found in a river that is identified in the FMP as potentially affected by a breach; by a third-party.	The NL Department of Fisheries and Aquaculture or the Department of Fisheries and Oceans inspect cage and mooring systems a minimum of twice yearly.	The CMS is audited at least once per year in any year with fish on site and within 30 days of a reportable escape by a third-party.
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Employees should review applicable Standard Operating Procedures prior to beginning any task that may result in a fish escape.

DRILL PROCEDURE

CAF facilities will conduct periodic testing of the Escape Response Plan in drill situation. Drills shall be conducted **annually** – ensuring all employees participate. The drill procedure must be reviewed prior to performing the drill. Once the drill is completed, the Drill Performance Form must be submitted.

1. Drill Coordinator will blow whistle 4 times
2. Drill Coordinator will describe scenario – responsibilities will be appointed
3. Drill Coordinator will place stand next to area where “hole” is and indicate size
 - a. Practice should be done above water or with holes just below the surface of the water.
4. Person(s) will retrieve necessary supplies from **Net Repair Kit** and DEPLOY equipment to correctly prevent MOCK ESCAPE
5. Drill Coordinator to search for appropriate contact information and ensure it is accessible.
6. Drill Coordinator will determine that all proper procedures have been followed and END DRILL.
7. Repack Net Repair Kit and check inventory – replace supplies as needed.

RESPONSE

Sites should have a Net Repair Kit available on at a minimum, one site vessel which contains materials that may be used if a hole is discovered. Netting can be draped over holes and strapped or tied to the main containment net to block fish from exiting or predators from entering. If the hole is close to the water line, the net can be lifted out of the water to make repairs. Holes due to predators, storm

damage or other interference below the waterline should be repaired by divers. Divers should be called immediately upon discovery of the hole.

1. Upon discovery of a hole, the area should be inspected for signs of fish loss – activity around the site, fish scales, etc. If fish escape is suspected, IMMEDIATELY notify the Site Manager.
2. Employees shall use Net Repair Kit contents (cable ties, twine, net needles, netting) or any other materials to cover the hole (seine net) or synch the hole (rope).
3. CONTINUE TO FEED the cage to keep fish within the containment area. If feeding has stopped, resume a LIGHT/SLOW feeding.
4. Non-feeding crew members shall determine the suspected cause of the potential escape and inspect other cages to determine if they are affected.
5. The Site Manager shall contact divers to inspect/repair any potential underwater damage.

If there are no obvious signs of a breach however fish are seen outside of containment or if during routine dives, divers report differences in population size, a through inspection of the net is to be conducted immediately and the incident reported to the Area Manager immediately.

REPORTING

The Site Manager is to immediately contact his/her Area Manager and provide details of the suspected event. Details the **Site Manager** is responsible for providing include:

- Suspected date and time of the breach
- Cage(s) where suspected or confirmed breach occurred
- Cause of the suspected or confirmed breach
- And mitigation efforts that are in process or proposed

The Area Manager will immediately notify Saltwater Management. Upon confirmation of level of breach, **Saltwater Management, or designate (Compliance Officer/Manager) will contact relevant government authorities (Table 2)**, completing the necessary paperwork and will advise the Area Manager of the decision regarding implementing a recovery plan. The Area Manager will advise the Site Manager on the recovery plan, investigations, repairs and maintenance.

Details the **Saltwater Management, or designate** are responsible for providing (**in addition to what was provided by the Site Manager**) include:

- Name and contact information of the individual who is making the report
- Name of aquaculture licence holder
- Licence or lease number
- Address of the site
- Species and approximate age and average weight of the population of cage(s)
- Approximate number of fish in the cage(s) prior to event
- Hatchery of origin for the relevant cage(s)
- Level of the suspected or confirmed breach

Table 2. Provincial and State escape reporting thresholds and regulatory reporting requirements.

	New Brunswick	Nova Scotia	Newfoundland	Maine
Reporting Threshold	Loss is Estimated to be \geq 100 Salmonids	Suspected or Known Breach	Significant Escapement or Suspect an Escape Has Occurred	\geq 25% of Cage Population and/or \geq 50 Fish @ \geq 2kg Avg. Wt.
Initial Reporting Requirements	Immediately verbally report to Department of Agriculture, Aquaculture and Fisheries (DAAF) by contacting the Regional Office at (506) 755-4000 .	Immediately notify NSDFA by contacting the Veterinarian on call at (902) 893-5359 . The term "immediately" means as soon as it is safe, or it is possible to do so. <u>This is expected to be within one (1) hour upon suspicion of a breach or known loss of fish.</u>	Immediately verbally report or via email to DFO by contacting Aquaculture Management at (709) 772-183 or (709) 772-3265 and to Department of Fisheries and Aquaculture (DFA) by contacting the Regional Aquaculture Manager at (709) 538-3725 . Public reporting via company or association website within 24 hours of confirming escape.	Notify Department of Marine Resources (DMR) within 24-hours at (207) 624-6554 (or 1-800-432-7381 after hours) . Other smaller escape events (<u>non-reportable</u>) must be logged according to the CMS and provided to the Department and the Services upon request.
Follow-Up Reporting Requirements	Initial reporting is followed by 24-hour, 48-hour and 72-hour formal report requirements.		Initial reporting is followed by a 72-hour formal report requirement.	An escape report form should be submitted to the US Fish and Wildlife Service, the National Marine Fisheries Service and the DMR.

RECOVERY

The allowance for recovery and/or the plan of action must consider the areas of potential impact and must respect all federal and provincial/state regulations and licencing requirements. If stock recovery has been identified as a possible response, the process for determining when/how stock recovery should be attempted.

1. Application to the appropriate Regulatory Body is required to get the permission to implement the stock recovery actions.
 - a. In Canada, discussions with the Department of Fisheries and Oceans (DFO) and the respective Province will depict the response methods.

- b. In Maine, the company may apply to Department of Marine Resources (DMR) for a temporary salmon-gillnetting permit.
2. Assemble required staff, vessels and gear as per licences and permits.
3. Deploy gear as per licenses and permits.
4. Complete recapture activities as per licences and permits.
5. Report recapture efforts as per licences and permits.
6. Dispose of mortalities as per Waste Management Plan.
7. Follow up report if required as per licences and permits.

SAFETY

Care should be taken when attempting to repair damage do that persons do not become entangled in loose netting or other materials.

RECORDS

- Pronto Form: Drill Performance Form
- Pronto Form: IMS Incident Report Form
- New Brunswick:
 - Breach of Containment Reporting Form (due within 24 hours)
 - Containment Management Plan (due within 48 hours)
 - Breach of Containment Final Report (due within 72 hours)
- Newfoundland:
 - NL Code of Containment Site Surface Inspection Checklist
 - Escapement Report (due within 72 hours)
- Nova Scotia:
 - Pronto Form: Surface Inspection
 - Pronto Form: Below Surface Inspection
 - Breach of Containment Notification to NSDFA (within 1 hour)
- Maine:
 - Pronto Form: Daily Checklist
 - Escape Reporting Form (Form Approved by the Department or Services)

ASSOCIATED MATERIALS

- Fish Containment Plan
- FHMP SW SOP 1 – Predator and Pest Deterrence

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: May 14, 2021 2:42 PM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>; FitzGerald, Jennifer L <Jennifer.FitzGerald@dfo-mpo.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Liverpool Bay Aquaculture Site Proposals

Good afternoon Ed and Jennifer,

We have received a response from KCS for the requested information regarding mitigation measures related to containment management (see below). Please see attached. I have indicated what page the information can be found in red below.

This should now satisfy all information requested by your department regarding the applications for the Liverpool sites.

If you have any further questions or comments, please let us know.

Cheers,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

Requested by DFO Jan 29, 2020:

Area of the seabed impacted by each 2000 kg shovel anchor, as well as a description of plans, if any, to uninstall and reinstall anchors and weights (or any equipment physically attached to the benthic substrate) in different locations.

The area of seabed impacted is between 5-10m. This was determined by pull tests of shovel anchors on a beach a few years back. Assuming the bottom is sand, mud or clay (soft bottom), the anchors will usually take anywhere from 5-10 m to dig on initial set. Once they have dug in there is very little of the anchor sticking out above the seabed as its mostly impacted into the sand.

Will there be any use of acoustic predator deterrents?

We will not be using predator deterrents at this site.

Will there be introduced artificial light? If so, please provide details of equipment used, timing, and procedures, etc.

Artificial lighting will be used on the site between November 15-April 15th. LED lights from the blue

spectrum are used, all lights will be pointed downward towards the bottom of the cage there will be no glow as was observed when using halogen lights.. The lights will be powered from the on site feed barge. KCS uses 4 lights per cage and 5 meters deep.

Requested by DFO Aug 24, 2020. Responded to DFO with updated values on September 18, 2020

1. Are the depths in the provided current meter data files measured from the seabed or from the transducer face?
2. What is the distance between the seabed and the transducer face? The excel sheets have the bin size and the 1st bin range (which we understand is the distance from the transducer face to the first bin). The requested information is to calculate the distance from the seabed to the first bin.

Requested by DFO Oct 27, 2020. Responded to DFO with information on December 4, 2020

1. Historical stocking events from 2011 onwards
2. Reported breaches of containment to NSDFA (i.e. escapes) – no records of escapes on <https://www.dfo-mpo.gc.ca/aquaculture/protect-protege/escape-prevention-evasions-eng.html>, please confirm.
3. Reported entanglements at the site.

Requested by DFO April 8, 2021

Please provide all mitigation measures related to fish containment, including but not limited to the following:

1. Operating procedures that limit the risk of a breach, including the identification of critical control points, critical control limits, monitoring and corrective actions. **PAGE 1**
2. Operating procedures for net maintenance (surface and below surface) such as inspection procedures, cleaning, disinfection, testing, repair, changing procedures, biofouling strategies as well as recording and reporting procedures for these activities. **PAGE 18**
3. Mooring and anchor inspection, grid system inspection and recording and reporting procedures for these activities. **PAGE 72**
4. Engineer approved minimum infrastructure requirements, and minimum infrastructure maintenance and inspection requirements in place for containment management. **PAGE 74**
5. Corrective actions related to the above procedures.
6. Procedures for site management in the event of severe weather. **PAGE 78**
7. Procedures for response to breaches or suspected breaches, including mandatory reporting. **PAGE 81**

All questions raised are a part of their Farm Management Plan (FMP). KCS took out the relevant sections. KCS is in the process of having all their sites approved by an engineer. Any new sites will follow the below standards.

The Future sites will be modeled using guidance from the following engineering standards:

- NS 9415:2009 – “Marine fish farms: Requirements for site survey, risk analyses, design, dimensioning, production, installation and operation”
- “Marine Scotland: A Technical Standard for Scottish Finfish Aquaculture”
- ISO16488 – “International Standard: Marine fish farms – open net cage – design and operation”
- API RP 2SK – “Design and Analysis of Station keeping Systems for Floating Structures”
- DNV-OS-E301 – “Position Mooring”

We can discuss further tomorrow.

Thank you,
Melinda

Melinda Watts
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KCS Response to
DFO_Containment M

NOTE: REFERRING TO RESPONSE FROM THE APPLICANT ON MAY 13, 2021.

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: May 14, 2021 3:23 PM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: KCS response to DFO

Thank you Jen for this.

I went ahead and inserted the information you provided earlier for question #1, regarding operating procedures that limit the risk of a breach, including the identification of critical control points, critical control limits, monitoring and corrective actions.

I sent it to DFO as a pdf this afternoon. See attached for your records.

Just a reminder there are still comments to be address for Environment Canada, as noted in the excel spreadsheet attached. Please provide these at your earliest convenience and we will respond to them on your behalf.

Thank you and have a great weekend.

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KCS Response to DFO_Containment



KCS Response to NDFO_Containment



Network Comments
Re. KCS Liverpool Ba

NOTE: THESE DOCUMENTS HAVE BEEN INCLUDED EARLIER AND NOTED HERE FOR REFERENCE.

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: June 24, 2021 11:47 AM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: Liverpool Bay Aquaculture proposals

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

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Hi Melinda and Lynn,

Can you please answer some questions I have on Kelly Cove Salmon Ltd.'s aquaculture site proposals in Liverpool Bay?

- I note that 1205 is currently licensed for Rainbow Trout and Atlantic Salmon, is the application to have it be licensed for both, or just salmon?
- Are the applications for the 2 new sites requesting to be licensed for Atlantic Salmon only?
- Which of you are the leads for the file so that I address my advice to the correct person?

Thanks,
Ed

Edward Parker
 Regional Senior Aquaculture Management Officer
 Telephone | Téléphone 902-402-0298
 Facsimile | Télécopieur 902-426-7967
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Si vous avez reçu cette communication par erreur, veuillez en aviser l'expéditeur immédiatement et la supprimer sans l'imprimer, la copier, ou la faire suivre. Merci.

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: Thursday, June 24, 2021 1:19 PM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Liverpool Bay Aquaculture proposals

Good afternoon Ed,

Please see my responses in blue below to your questions regarding the Liverpool Bay proposals.

I note that 1205 is currently licensed for Rainbow Trout and Atlantic Salmon, is the application to have it be licensed for both, or just salmon?

[Atlantic salmon only](#)

Are the applications for the 2 new sites requesting to be licensed for Atlantic Salmon only?

[Atlantic salmon only](#)

Which of you are the leads for the file so that I address my advice to the correct person?

[Melinda Watts is the lead aquaculture advisor for all three files. Lynn Winfield is the licensing coordinator for all three files.](#)

Any questions, please let me know.

Cheers,
Melinda

Melinda Watts
Aquaculture Advisor

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From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>

Sent: August 20, 2021 1:43 PM

To: Watts, Melinda <Melinda.Watts@novascotia.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>; Buchan, Carla M <Carla.Buchan@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>

Cc: Dobson, Suzanne <Suzanne.Dobson@dfo-mpo.gc.ca>

Subject: CSAS Report for KCS Apps 1205X, 1432, 1433

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Hi Everyone,

Please find attached the version of the CSAS Report for Kelly Cove Salmon Ltd.'s Liverpool Bay proposals that has been approved by the DFO Maritimes Region's Regional Director of Science. As we did for Kelly Cove Salmon Ltd., we are providing you this so that you may please identify any factual errors or possible misunderstandings by DFO of the proposals. If you would please respond by end of day August 30, 2021, we'd really appreciate it.

Thanks,
Ed

Edward Parker
Regional Senior Aquaculture Management Officer

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SR_Liverpool Siting
Review_rds approve



DFO MARITIMES REGION SCIENCE REVIEW OF THE PROPOSED MARINE FINFISH AQUACULTURE BOUNDARY AMENDMENT AND NEW SITES, LIVERPOOL BAY, QUEENS COUNTY, NOVA SCOTIA

Context

Kelly Cove Salmon Ltd. has submitted applications to the Province of Nova Scotia to amend their existing Liverpool site (#1205) and to construct and operate two new sites, Mersey Point (#1433) and Brooklyn (#1432), in Liverpool Bay, Queens County, Nova Scotia.

As per the Canada-Nova Scotia Memorandum of Understanding on Aquaculture Development, the Nova Scotia Department of Fisheries and Aquaculture (NSDFA) has forwarded these application to Fisheries and Oceans Canada (DFO) for review and advice in relation to DFO's legislative mandate. The applications were supplemented by information collected by the proponent as required by the *Aquaculture Activities Regulations (AAR)*.

To help inform DFO's review of these applications, the Regional Aquaculture Management Office has asked for DFO Science advice on the Predicted Exposure Zones (PEZs) associated with the range of aquaculture activities, and the predicted impacts on susceptible fish and fish habitat, including sensitive *Species at Risk Act* listed species, susceptible fishery species, and the habitats that support them.

Specifically, the following questions are addressed for each application:

Question 1. Based on available data for the site and scientific information, what is the predicted exposure zone from the use of approved fish health treatment products in the marine environment, and the potential consequences to susceptible species?

Question 2. Based on available information, what are the Ecologically and Biologically Significant Areas (EBSAs), SAR, fishery species, ecologically significant species (ESS), and their associated habitats that are within the predicted benthic exposure zone and vulnerable to exposure from the deposition of organic matter? How does this compare to the extent of these species and habitats in the surrounding area (i.e., are they common or rare)? What are the anticipated impacts to these sensitive species and habitats from the proposed aquaculture activity?

Question 3. How do the impacts on these species from the proposed aquaculture site compare to impacts from other anthropogenic sources (including existing finfish farms)? Do the zones of influence overlap with these activities and if so, what are the potential consequences?

Question 4. To support the analysis of risk of entanglement with the proposed aquaculture infrastructure, which pelagic aquatic species at risk make use of the area, and for what duration and when?

Question 5. Which populations of conspecifics are within a geographic range that escapes are likely to migrate to? What is the size and status trends of those conspecific populations in the escape exposure zone for the proposed site? Are any of these populations listed under Schedule 1 of the *Species at Risk Act* (SARA)?

This Science Response Report results from the Science Response Process of February 24–25, 2021, on DFO Maritimes Region Review of the Proposed Marine Finfish Aquaculture Sites and Boundary Amendment, Liverpool Bay, Queens County, Nova Scotia.

Background

Kelly Cove Salmon Ltd. is requesting an amendment to expand the boundaries and increase the production level at their existing Liverpool #1205 site, and to construct and operate two new sites, Mersey Point (#1433) and Brooklyn (#1432), in Liverpool Bay, Queens County, Nova Scotia. The proposed actions will increase the total leased area and production of Atlantic Salmon within the bay. The only other aquaculture activity in the vicinity of the sites is a land-based facility. The location of the sites are shown in Figure 1.

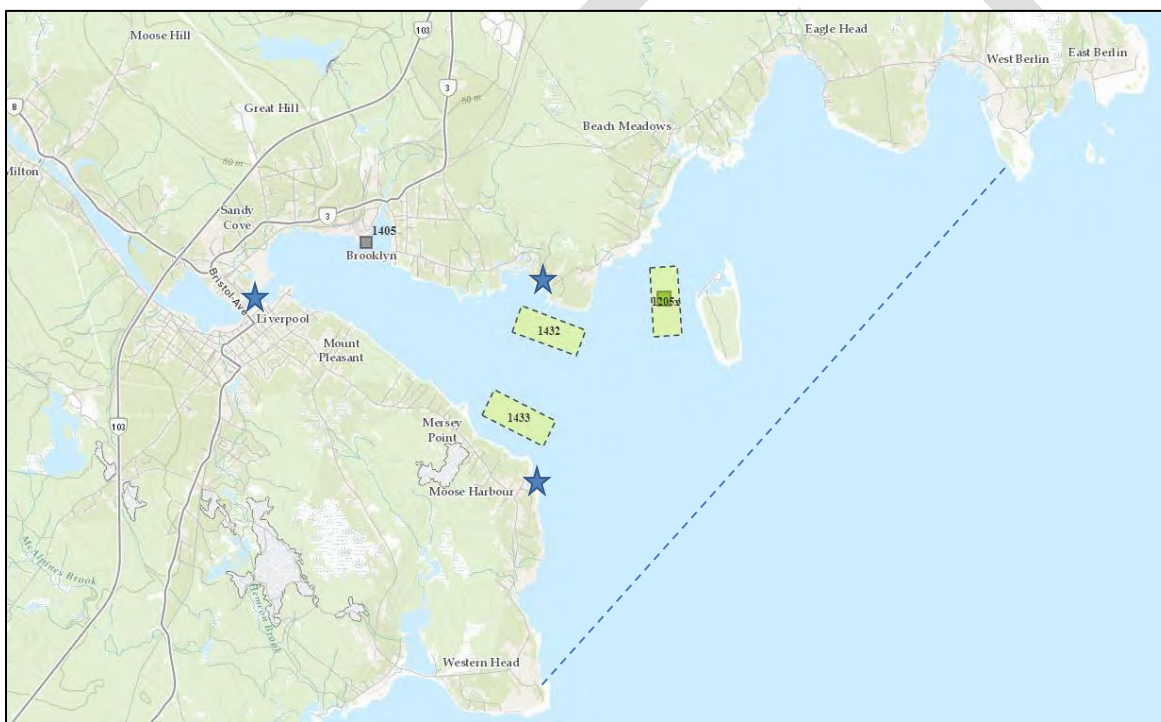


Figure 1. Map of finfish aquaculture site leases in Liverpool Bay, Queens County, Nova Scotia. Light green polygons represent proposed finfish leases requested by Kelly Cove Salmon Ltd. The darker green box denotes the existing #1205 Liverpool site lease. The grey square represents the location of a land-based aquaculture facility. Maps were retrieved from the NSDFA Site Mapping Tool website on August 17, 2020 (NSDFAa). Stars show approximate locations of seasonal lobster holding facilities. The dotted blue line is the approximate 'open boundary' used by Gregory et al. 1993 for Liverpool Bay.

The existing site (#1205) has been in operation since 2002, and was acquired by Kelly Cove Salmon Ltd. in 2011. The current area under lease by site #1205 is approximately 4 hectares (ha) with 14 cages in a 2x7 grid configuration. The proposed amendment would increase the area of the site to a total of 40.7 ha. This increase allows for the incorporation of all aquaculture-related gear, above and below the water line, and the addition of six cages to the

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment

Maritimes Region

south of the current grid for a total of 20 cages in a 2x10 configuration. The same lease sizes and cage configurations are proposed for the additional sites at Mersey Point and Brooklyn. Liverpool Bay has previously been estimated to have an area of 3590 ha within the 'open boundary' shown in Figure 1 (Gregory et al. 1993). Therefore, approximately 3.4% of Liverpool Bay would be occupied by finfish leases with the proposed expansion. The approved production at the existing site 420,000 Atlantic Salmon. The maximum production plan at the proposed sites is 660,000 Atlantic Salmon per site, with a grow-out period of approximately 22 months from stocking. This represents an approximate 370% increase in the number of farmed fish in Liverpool Bay. The site development plan for the bay, with bathymetry, is presented in Figure 2.

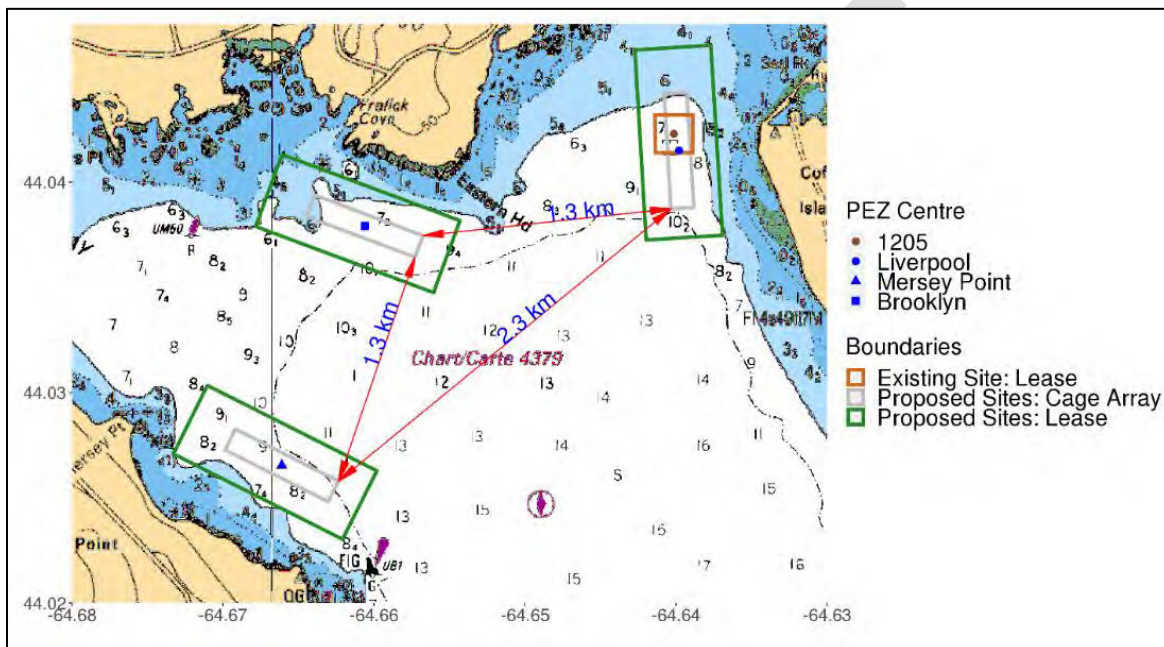


Figure 2. Current (brown) and proposed (green) lease boundaries overlaid on CHS chart #4379 (depths shown in fathoms). Distance between each proposed cage array (grey) is shown. The centers of each lease for predicted exposure zone calculations are also shown.

The sites are located in an area with variable bottom type and ecosystem characteristics (i.e., sand, mud, cobble, boulder, bedrock, shell debris). Proponent-submitted baseline data indicates the seabed beneath the proposed Mersey Point site is characterized by mixed substrates (hard-packed sand, pebbles, cobble, rubble and boulders), while the proposed Brooklyn site is characterized by harder and coarser sediment types only such as bedrock, boulders, and cobble. Baseline data collected at Liverpool while the existing #1205 site was stocked indicated mostly hard-packed sand and shell debris. Prevalent waste feed was also noted at the site center. Sediment sulfide concentration ranges based on Environmental Monitoring Program (EMP) data collected at the existing #1205 site from 2011–2019 are shown in Table 1.

**Science Response: Proposed Liverpool
Bay Sites and Boundary Amendment**

Maritimes Region

Table 1. Station mean sediment sulfide concentration ranges (measured according to the Environmental Monitoring Program (EMP) Framework for Marine Aquaculture in Nova Scotia, NSDFAb). Records are shown from when the proponent acquired the site. The EMP data was retrieved from Nova Scotia's Open Data Portal on August 17, 2020 (NSDFAb).

Date	Sulfide Concentration Range (μM)	Sample Size (n)*	Production Stage
July 2011	77–3677	3 stations	Year 1 fish
July 2012	51–5477	4 stations	Year 2 fish
June 2013	78–551	3 stations	Harvest and fallow
July 2014	53–470	5 stations	Year 1 fish
July 2015	74–11030	3 stations	Year 2 fish
July 2016	0	1 station	Harvest and fallow
October 2017	220–540	6 stations	Year 1 fish
July 2018	120–2327	4 stations	Year 2 fish
July 2019	38–110	4 stations	Harvest and fallow

**each station consisted of 3 replicate samples*

Linkages between sediment sulfide concentrations and overall sediment conditions such as oxic state and macrofauna diversity at aquaculture sites are well documented (Pearson and Rosenberg 1978, Hansen et al. 2001, Wildish et al. 2001, Hargrave et al. 2008). The sediments beneath the existing site have demonstrated elevated sediment sulfides in the past with concentrations at some stations reaching Hypoxic B ($> 3000 \mu\text{M}$) levels in 2011 and 2012, and an Anoxic ($> 6000 \mu\text{M}$) level in 2015 based on Hargrave 2010 oxic categories (Appendix A). The location of these stations are shown in Figure 3. Some of the highest sulfide concentrations were observed during production stages of larger fish (i.e., year 2).

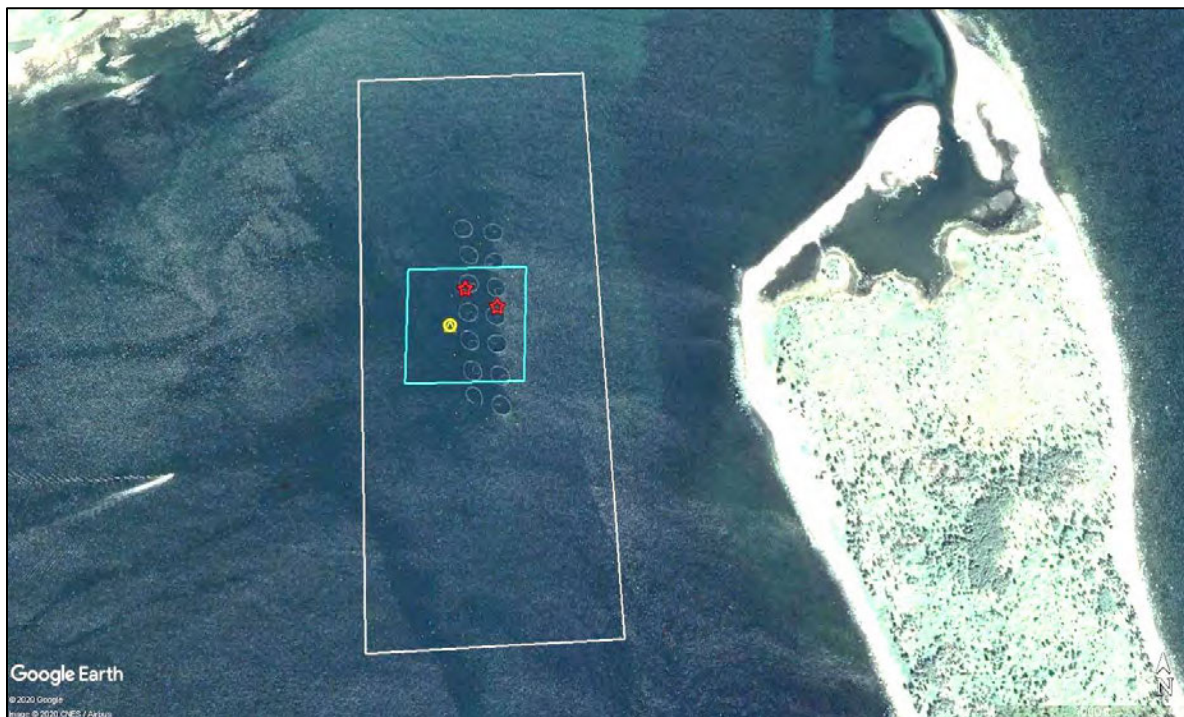


Figure 3. Environmental Monitoring Program stations at site #1205 that have exceeded mean sediment sulfide concentrations of $3000 \mu\text{M}$ (yellow) and $6000 \mu\text{M}$ (red), respectively, overlaid on a Google Earth image of the existing cages. Exceedances occurred in 2011 (triangles), 2012 (circles), and 2015 (stars). The existing #1205 lease boundary is shown in cyan and proposed lease boundary in white.

The Google Earth imagery (Figure 3) depicts net-pens are anchored outside of the currently issued lease but within the proposed #1205 expanded lease boundaries. Available AAR data from 2015-2018 indicate that no pest control products (i.e., azamethiphos, hydrogen peroxide, emamectin benzoate) have been used at the existing site. This is consistent with other finfish sites in Nova Scotia. Available information on reported escapes since 2010 indicate there have been no reports of escapes at the existing site (DFO 2020a). Additionally, there have been no reports of entanglements of marine mammals, sea turtles, or other species of concern to this review at the existing site.

Fishing vessel traffic from DFO's Vessel Monitoring System (VMS) database shows that all three sites, including site #1205, are located in an area with active fisheries. Lobster is the predominant commercial benthic invertebrate fishery occurring from late November through May each year. These sites are located within Lobster Fishing Area (LFA) 33, where the stock is considered to be healthy based on determined stock reference points (DFO 2020b), and more specifically within reporting grid 310. Catch and effort data reported by fishermen show that within LFA 33, 5.4% of licenses annually report landings from this grid, which represents 2.4% of total landings for the LFA, on average. Three licensed lobster holding facilities exist within 1 km of the proposed sites at Moose Harbour wharf, Mersey Seafoods wharf, and Fralick Cove (as shown on Figure 1; DFO Resource Management). These facilities consists of holding cages placed in the water adjacent to the wharves and are used by lobster fishers to store catch while waiting for the appropriate market conditions to sell their product. These facilities are only used during the commercial lobster season and are removed from the water during the off-season. The sites are also located within Scallop Fishing Area 29; however, the commercial fishery for scallop is typically further offshore.

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment**Maritimes Region**

Commercial groundfish and pelagic species in the area include Haddock, Atlantic Cod, Hake, Atlantic Halibut, Atlantic Herring, and mackerel. Cod and Haddock in Liverpool Bay are within the 4X5Y Northwest Atlantic Fisheries Organization (NAFO) management unit for these fisheries. The exact stock structure of Cod inshore is unknown; however, 4X5Y Cod is considered in the Critical zone. A review of tagging studies by Fowler (2011) concluded that there may have been several discrete Haddock reproductive populations in the past, many of which were inshore, but currently the remaining populations are offshore. The remaining populations are thought to be highly migratory and may come inshore during warmer months. The 4X5Y Haddock stock was considered in the Healthy zone in 2019 (DFO 2019a). All three proposed sites overlap with identified gillnet fishing activities within the Little Hope Herring fishing area, an area that is > 100,000 ha in size off SWNS from LaHave Islands down to Western Head. Herring spawning is also known to occur within the Little Hope fishing area from September – November based on the spawning condition of Herring landed from the area. The actual locations of Herring spawn on substrate within the Little Hope area is currently undocumented. The area is also noted to be used by juvenile Herring since they typically feed close to shore and fishermen have reported schools near shore (e.g., wharves). Gaspereau were also noted as a commercial fishery in the area (DFO Resource Management). Marine plants such as rockweed and wrack seaweed are also harvested for commercial purposes in the area.

There are Food, Social, and Ceremonial (FSC) fisheries for Lobster and Eel in Liverpool Bay (DFO Resource Management). All three proposed sites were noted to overlap with identified glass eel (pre-elver) fishing and nursery areas through DFO's Coastal Fisheries Mapping Project (DFO Oceans and Coastal Management Division). Additional information on the size of the area or how specifically juveniles use the coastal habitat around the sites is lacking. Glass eels likely pass through these areas when migrating to streams further into bay and estuary such as the Mersey River, Herring Cove Brook, and Beach Meadows Brook. American Eel populations have been assessed as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) since 2012 and are under consideration for listing under the SARA. Recreational fisheries for groundfish species and mackerel also occur in the area.

DFO database searches also indicated presence of Cusk and Bluefin Tuna in the area (both assessed by COSEWIC as Endangered), crab, and more sessile species such as clam, sea urchin, and whelk. Proponent-submitted baseline data also commonly identified the presence of mussel shells.

The existing and proposed sites are both within the migration pathways and range of the Nova Scotia Southern Upland (SU) wild Atlantic Salmon population. The nearby Mersey and Medway rivers are known Atlantic Salmon rivers. The SU Salmon run in the Medway River in Port Medway Harbour, which is approximately 10–12 km from Liverpool Bay, while the Mersey River is thought to be extirpated. Aquaculture escapees have been found in rivers at distances of up to 200–300 km from the nearest aquaculture site (Morris et al. 2008) and, although the Mersey and Medway rivers are closest in proximity, the majority of salmon rivers in the SU region are within that range. The SU Salmon have been assessed as Endangered by COSEWIC since 2010 and are under consideration for SARA-listing. Beginning in 2010, all rivers within Salmon Fishing Area (SFA) 21 were closed to recreational fishing for Atlantic Salmon and there have been no FSC allocations.

Species at risk that may be present in the area according to DFO's Aquatic Species at Risk Map include White Shark, Northern Wolffish, Spotted Wolffish, Leatherback Sea Turtle, North Atlantic Right Whale, Blue Whale, and Fin Whale. No overlaps between the proposed aquaculture sites and Critical Habitat for these species were identified (DFO 2019b).

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment

Maritimes Region

Additionally, no DFO Ecologically and Biologically Significant Areas (EBSA) or Ecologically Significant Species (ESS) have been identified as having the potential to overlap with the proposed aquaculture activities. There is anecdotal information that suggests eelgrass (an ESS) could be present in Liverpool Bay, including documented eelgrass presence in neighbouring bays and along the south shore of Nova Scotia; however, satellite images from 2012 and 2016 and drone images from 2017 of Liverpool Bay does not indicate the presence of eelgrass. Furthermore, proponent-submitted baseline data collected at each site in 2019 did not indicate the presence of eelgrass. While this does not preclude the possibility of small patches existing in sheltered areas with suitable habitat, eelgrass is unlikely to occur in significant aggregations within the vicinity of the sites based on available data.

A provincially-designated nature reserve is located on Coffin Island, approximately 250 m from the proposed #1205 site and within 5 km of all three proposed sites. Other human activities, that represent a combination of land- and marine-based sources that have the potential to influence the Liverpool Bay marine ecosystem, also occur within 5 km of the existing and proposed sites. These include other industrial activities, the presence of land-based contaminated sites near the coastline, boat traffic, commercial fishing activities, and nutrient loading.

Key oceanographic, farm infrastructure and grow-out characteristics of the existing sites and proposed expansion considered in the following analyses are summarized in Table 2.

Table 2. Key oceanographic, farm infrastructure and grow-out characteristics of the existing and proposed site. Information sources are the proponent's development plan and baseline data reports, as well as the wind and wave conditions report for Liverpool Bay (CMAR 2020). Information not available for the existing site at the time of this review is indicated by n/a.

Characteristic	Liverpool	Mersey Point	Brooklyn	Additional Information
Tidal range (m)	2.1	2.1	2.1	<ul style="list-style-type: none"> Same at existing site. Range does not include surges in sea level.
Depth of tenure (m)	7.0–20.0	8.0–21.0	4.0–20.0	<ul style="list-style-type: none"> 7.0–14.0 m at existing site. Relative to vertical chart datum (lowest normal tide).
Current speed (cm/s)				<ul style="list-style-type: none"> Same at existing site. Surface currents measured at 14–16 m from bottom. Midwater currents measured at 8–9 m from bottom. Bottom currents measured at 3–4 m from bottom. Current speeds measured at the Liverpool site include a storm event.
<ul style="list-style-type: none"> Surface 	0.1–52.5	0.1–29.7	0.1–37.3	
<ul style="list-style-type: none"> Midwater 	0.2–53.7	0.1–21.6	0.0–20.2	
<ul style="list-style-type: none"> Bottom 	0.0–43.3	0.0–23.4	0.1–18.2	
	Dominant flow directionality to N-NW.	Dominant flow directionality to SE-NW.	Dominant flow directionality to NW.	

**Science Response: Proposed Liverpool
Bay Sites and Boundary Amendment**
Maritimes Region

Characteristic	Liverpool	Mersey Point	Brooklyn	Additional Information
Maximum 10-year significant wave height (m)	3.24 (S)	2.95 (ESE)	3.42 (SSE)	<ul style="list-style-type: none"> • Same at existing site.
Salinity (PSU)	30–32	30–32	30–32	<ul style="list-style-type: none"> • Same at existing site. • Length of measurement unknown.
Temperature (°C)	-0.4–19.9	-0.4–19.9	-0.4–19.9	<ul style="list-style-type: none"> • Same at existing site. • Measured from May 2014–November 2018.
Dissolved oxygen (mg/L)	4.35–14.3	4.35–14.3	4.35–14.3	<ul style="list-style-type: none"> • Same at existing site. • Typically above 6 mg/L. • Measured from June 2014–June 2018.
Substrate type	Mainly hard-packed sand and shell debris	Mix of hard-packed sand, pebbles, cobble, rubble, boulders	Mainly bedrock, cobble, boulders	<ul style="list-style-type: none"> • Same at existing site.
Net-pen array configuration	2 x 10	2 x 10	2 x 10	<ul style="list-style-type: none"> • 2 x 7 at existing site.
Individual net-pen circumference (m)	100	100	100	<ul style="list-style-type: none"> • Same at existing site.
Net-pen depth (m)	9	8	8	<ul style="list-style-type: none"> • Same at existing site. • Predator nets to 9–10 m.
Grow-out period (months)	< 22 months	< 22 months	< 22 months	<ul style="list-style-type: none"> • Same at existing site.
Maximum number of fish on site	660,000	660,000	660,000	<ul style="list-style-type: none"> • 420,000 at existing site.
Initial stocking number (fish/pen)	33,000	33,000	33,000	<ul style="list-style-type: none"> • 30,000 at existing site.

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment

Maritimes Region

Characteristic	Liverpool	Mersey Point	Brooklyn	Additional Information
Average harvest weight (kg)	5.5	5.5	5.5	<ul style="list-style-type: none"> • Same at existing site.
Expected maximum biomass (kg)	3,630,000	3,630,000	3,630,000	<ul style="list-style-type: none"> • 2,310,000 at existing site. • Assumes fish grown to 5.5 kg.
Maximum stocking density (kg/m³)	25.0	25.0	25.0	<ul style="list-style-type: none"> • n/a for existing site.

Sources of Data

Information to support this analysis includes data and information from the proponent, data holdings within DFO, publically available literature, and registry information from the SARA database. Additionally, supporting information files submitted to DFO for consideration and used in its review are shown in Table 3.

Table 3. Summary table of information files submitted to DFO.

Description	Filename
Proposed development plan package	1) Liverpool Bay Package_FINAL_4Mar19.pdf
Baseline survey data submission	
Proponent-collected raw current meter data	1) Liverpool 2010 Raw Direction & Speed Data.xlsx 2) Mersey Point 2012 Raw Direction & Speed Data.xlsx 3) Brooklyn 2019 Raw Direction & Speed Data.xlsx

The following DFO databases were searched for species records within the Predicted Exposure Zones (PEZs) of the proposed sites and records are in Appendix B:

- Ecosystem Research Vessel (RV) Survey
- Industry Survey Database (ISDB)
- Maritime Fishery Information System (MARFIS)
- Whale Sightings Database

Site Description

The physical characteristics of the existing and proposed sites are reasonably expected to be similar given the close proximity to one another (Figure 2). The water temperature and salinity at the proposed sites are expected to have some variation on tidal time scales, but larger variations on wind-driven and seasonal time scales. Values are expected to fall within the

Maritimes Region

ranges indicated above (Table 2). Temperature records provided in the baseline submission report a maximum low temperature that is above the required -0.7°C for “superchill” events; however, a die-off event that occurred in March 2019 at the existing #1205 site was suspected to have been related to cold ocean temperatures.

Near-shore bathymetry information in the vicinity of the proposed sites to supplement information submitted by the proponent is lacking in Departmental and public data holdings. Proponent collected bathymetry data shows a depth range between 4 and 21 m within the proposed leases, with the most shallow depths at the Brooklyn site. In comparison to the existing #1205 lease, the proposed expansion will shift the northern and southern portions of the lease closer to slightly shallower and deeper waters, respectively.

The wave information provided in the proponent’s report is from an open ocean buoy located 215 km south-southwest of Liverpool Bay, and is not considered representative of the waves experienced at the proposed sites. A wind and wave conditions report for the proposed sites indicate that the sites are particularly vulnerable to waves from the east and southeast that will travel directly into the bay (CMAR 2020). Wave modelling for Liverpool Bay (CMAR 2020) predicts reasonably large maximum significant wave heights (Table 2), although more typical wave heights are likely to be less.

Current meter deployments occurred in September–October 2010 and 2012 at the Liverpool and Mersey Point sites, respectively, and January–February 2019 at the Brooklyn site. The difference in timing likely accounts for the differences in maximum observed current speeds (Table 2), particularly at the Liverpool site where the highest maximum current speed was observed between the three sites. It was confirmed that Hurricane Earl passed through during that deployment on September 4, 2010. This presents a unique opportunity to consider the potential spatial extent of exposure in both ‘typical’ and ‘storm’ conditions, and demonstrates that current speeds vary with complexities of seasonal, wind, and storm influences that may or may not be captured in the records. Based on proximity of the sites, it is reasonable to assume that, at any given time, current speeds at all three sites would be similar.

Over the 32–37 day period that current speeds were measured at the proposed sites, average current speeds did not vary significantly with depth. Depth-averaged current speeds were consistent between sites with a range between 5.05 and 5.34 cm/s, and 52–71% of observed current speeds were from 2–8 cm/s at all depths and all sites. Current speeds > 16 cm/s were only observed approximately 2% of the time. Therefore, current dynamics at these sites are considered to be “low energy” with respect to marine finfish farming, with the periodic occurrence of large waves and storm events.

Based on the depth profiles of current speed data, temperature, and salinity at the site, stratification is expected to be weak. Therefore, exposure predictions do not need to consider stratification influences.

Benthic Predicted Exposure Zones and Interactions

Benthic Predicted Exposure Zone

The benthic-PEZ is an early screening step in a triage-based approach. A precautionary first-order estimate is used to determine the size and location of areas that may be exposed to a substance introduced into or released from a site. It is used to broadly assess the potential for impacts on the benthic community and seafloor from the deposit of waste feed and feces, which can result in organic loading and direct habitat and infaunal species impacts. Additionally, it is assumed that the PEZ associated with the release of in-feed drugs is dominated by the

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment

Maritimes Region

deposition of medicated feed waste and feces. These predicted exposure zones are precautionary overestimates and are considered sufficient for identifying, albeit at a larger spatial scale, the potential for impacts from the proposed activity.

The dominant factors that will affect estimations of benthic exposure are farm layout, feeding practices, and oceanographic conditions such as the bathymetry and water currents. Benthic exposure can also occur in relation to the use of bath pesticides, particularly at sites over or near shallow depths such as all three proposed sites; however, this will be considered in the Pelagic-PEZ and Interactions section of this review.

First-order estimates of the spatial extent of the benthic-PEZ related to organic effluent and in-feed drugs from the proposed Liverpool, Mersey Point, and Brooklyn sites were calculated. Sinking rates of different particulate materials released from farmed fish (i.e., waste feed and feces) vary, although the distribution of the sinking speeds amongst the released particles is poorly characterized. Therefore, the minimum sinking rate for each category of particle (Table 4), along with the maximum site depth and maximum observed mid-water current speed in the proponent's record were used. The fish, and therefore the release of waste feed and feces, are within the surface layer. Since these particles sink from the net-pens to the seabed, a mid-water current speed was selected as representative.

Table 4. First order benthic-Predicted Exposure Zone (PEZ) estimates of the potential horizontal distances travelled by sinking particles such as waste feed pellets, fish feces and in-feed drugs released from the fish farm (settling rates obtained from literature; Findlay and Watling 1994, Chen et al. 1999, Chen et al. 2003, Cromey et al. 2002, Sutherland et al. 2006, Law et al. 2014, Bannister et al. 2016, Law et al. 2016, Skoien et al. 2016).

Particle Type	Min. Sinking Rate (cm/s)	Max. Observed Current (cm/s)	Horizontal Distance Travelled (m)	PEZ Radius
LIVERPOOL				
Feed	5.3	53.7 <i>No storm - 20.3</i>	203 <i>No storm - 77</i>	515 <i>No storm - 389</i>
Feces	0.3	53.7 <i>No storm - 20.3</i>	3,580 <i>No storm - 1353</i>	3,892 <i>No storm - 1665</i>
Fines and Floccs	0.1	53.7 <i>No storm - 20.3</i>	10,740 <i>No storm - 4060</i>	11,052 <i>No storm - 4372</i>
MERSEY POINT				
Feed	5.3	21.6	86	398
Feces	0.3	21.6	1,512	1,825
Fines and Floccs	0.1	21.6	4,536	4,849
BROOKLYN				
Feed	5.3	20.2	76	389
Feces	0.3	20.2	1,347	1,659
Fines and Floccs	0.1	20.2	4,040	4,353

A PEZ is a circular zone centered on the middle of the proposed cage array and represent the outer limit for potential exposure; however, the benthic footprint is more likely a curved ellipse with a major axis length scale due to current directionality. The zones for each site were estimated by adding the horizontal transport distance to the longest length scale of the proposed net-pen array.

The benthic-PEZ does not provide an estimate of the intensity of organic loading within the site, and the zones do not imply that everywhere within the zone has the same exposure risk. The intensity of exposure is expected to be highest near the net-pen arrays and decrease as distance from the net-pens increases. The waste feed-PEZ is anticipated to have the greatest

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment

Maritimes Region

intensity of exposure, and is conservatively a circle centered on the net-pen array. The spatial extent of exposure has been estimated for the Liverpool site using the maximum observed current speed both including and excluding the storm event on September 4, 2010 (Figure 4).

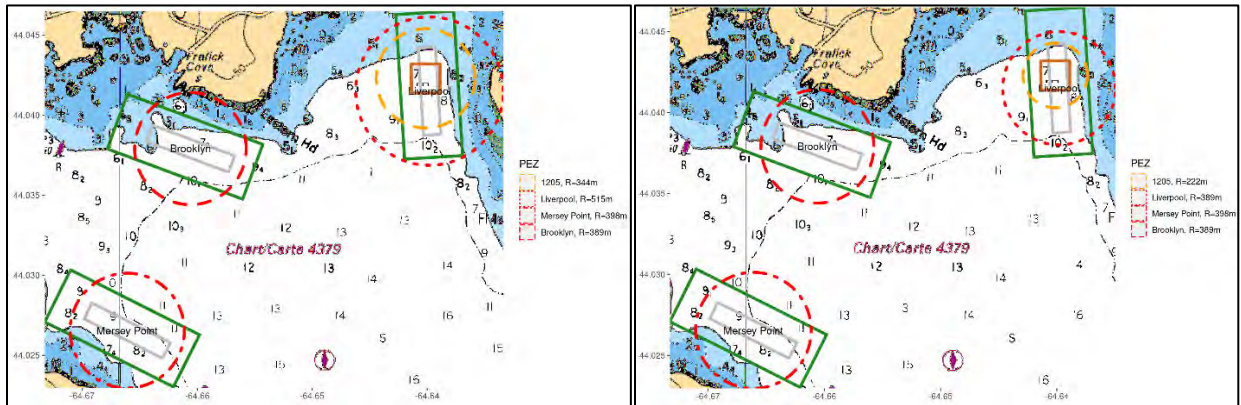


Figure 4. Benthic-Predicted Exposure Zones (PEZs) for the Liverpool (left: including storm event, right: excluding storm event), Mersey Point and Brooklyn proposed sites using the waste feed minimum sinking rate are shown in red overlaid on CHS chart #4379 (depths shown in fathoms). Net-pen arrays (grey) and lease boundaries (green) are shown. The existing #1205 Liverpool lease boundary and estimated benthic-PEZ are also indicated in brown and orange, respectively.

Based on the waste feed-PEZs, there are no overlaps between the benthic deposition zones where smothering and oxic-state changes are anticipated to occur due to organic loading (Figure 4). The spatial extent of the PEZs based on feces provides a better indication of the full area that could be exposed to any in-feed drugs used (Figure 5).

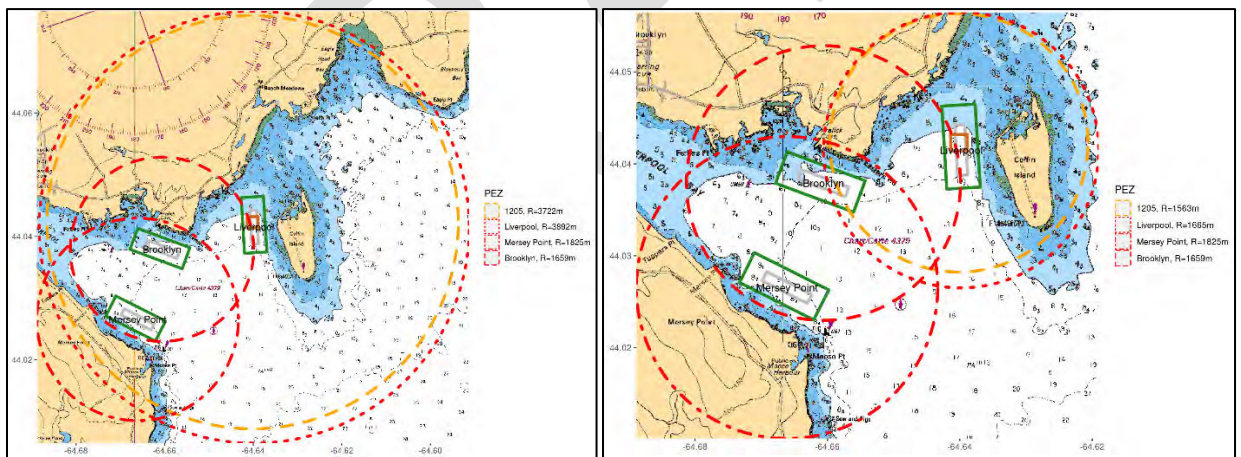


Figure 5. Benthic-Predicted Exposure Zones (PEZs) for the Liverpool (left: including storm event, right: excluding storm event), Mersey Point and Brooklyn proposed sites using the feces minimum sinking rate are shown in red overlaid on CHS chart #4379 (depths shown in fathoms). Cage arrays (grey) and lease boundaries (green) are shown. The existing #1205 Liverpool lease boundary and estimated benthic-PEZ are also indicated in brown and orange, respectively.

Overlaps in areas of feces deposition are predicted when the maximum current speed, both including and excluding the storm event captured in the Liverpool current meter record, is used (Figure 5). It is important to note that, although not done for the purposes of this review, using the maximum observed current speed during the storm event from the Liverpool current meter

Maritimes Region

record to estimate PEZs for the Mersey Point and Brooklyn sites would result in much larger PEZs for those sites and encompass some areas that are not covered in Figures 4 and 5.

Current- and wave-induced bottom resuspension is not explicitly considered for these first-order estimates of exposure. The large maximum significant wave heights predicted by modelled wave dynamics at the proposed sites and the shallow water depths suggest that material deposited on the seabed will be resuspended and shifted around by these extreme waves during storm events. Studies in nearby Jordan Bay have shown that waves do generate sediment resuspension and greater dispersal of particulates (Law and Hill, 2019); hence, it is not unreasonable to assume similar results from wave action in Liverpool Bay. Waste particles are unlikely to extend beyond the benthic-PEZs estimated for fines and flocs, particularly when considering the spatial extent of particulates predicted from the Liverpool site which captures the full extent of transport during these storm events. The overall potential impacts of redistribution and flocculant deposition is unknown, but are not anticipated to occur at levels where significant exposures are predicted.

Sediment sulfide concentrations in certain locations at the existing site have reached Hypoxic B and Anoxic oxic categories under current levels of production (Table 1, Figure 3), and these levels may increase as the total benthic footprint within the bay increases with the proposed expansion and addition of two new sites. The resuspension and transport of accumulated material on the bottom due to the periodic occurrence of large waves and storm events in Liverpool Bay likely contribute to the seabed beneath the proposed sites being periodically reset, and predicted exposures and interactions may therefore be transient.

Susceptible Species Interactions

Species are considered to be susceptible within the benthic-PEZ if they are sessile at any life stage and are sensitive to either low oxygen levels, smothering, loss of access to the site, or exposure to in-feed drugs, if used. This includes species such as crustaceans and bivalves. Specific consideration was also given to the presence of certain sensitive sessile species, such as sponges, corals and eelgrass, and Critical Habitat for SARA-listed species in the baseline survey data, scientific literature, and Departmental biological data holdings. When the available data are limited, consideration as to whether the benthic substrate type is suitable for the growth of these species was considered.

Although industry and internal holdings are limited in their abilities to observe all susceptible species in the coastal zone, available data indicate that Lobster, crab, clam, mussels, sea urchin, and whelk are present within the benthic-PEZ.

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment

Maritimes Region

Studies have demonstrated the correlation of Lobster presence points (as indicated by Lobster traps) with the presence of rock and gravel substrate within Liverpool Bay. The most suitable habitat within Liverpool Bay appears to be closer to the shoreline and in proximity to the Liverpool, Mersey Point, and Brooklyn proposed sites, with a slightly higher probability of presence near the Liverpool and Brooklyn as compared to the Mersey Point site (McKee et al. 2020). However, preliminary results from a DFO Lobster tagging study in Liverpool Bay show that Lobster travel throughout most areas of the bay (Figure 6).

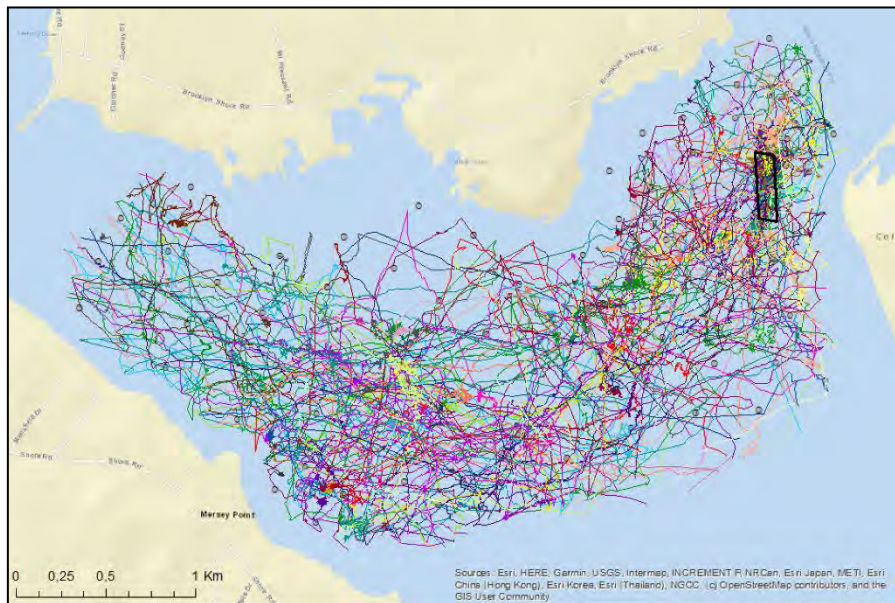


Figure 6. Movement of 50 lobsters tagged in Liverpool Bay in 2019. The black polygon represents the existing lease.

Areas of bottom habitat at the proposed aquaculture sites may also be highly suitable for settlement of larval lobster given the preferential selection for hard-bottom substrates. Increased sedimentation associated with the proposed aquaculture activities may preclude the settlement of larval lobster. Bivalves such as clams and mussels are also sensitive to siltation and the potential for smothering due to excess deposition that exists within the benthic-PEZ, particularly given their sessile nature. The potential for smothering also exists for the other sessile species in the area such as sea urchin and whelk. Given the periodic occurrence of large waves and storm events that contribute to the seabed being periodically reset, the accumulation of depositional material on the seabed may not be sufficient to result in smothering.

In-feed anti-sea lice drugs, such as Emamectin Benzoate (EB), have been shown in lab studies to have lethal toxic effects to crustaceans and can induce sub-lethal effects, including premature moulting (Burrige et al. 2000, Waddy et al. 2002, Burrige et al. 2008). If sea lice becomes an issue and anti-sea lice drugs are used, this may be of particular concern given the presence of Lobster within the benthic-PEZs. Bivalves in the vicinity of net pens have also been shown to have measurable quantities of in-feed drugs such as EB. Currently, hazard information is primarily based on acute exposures; however, it does not indicate a high level of risk (Burrige et al. 2011).

While the potential for exposures to organic matter and in-feed drugs (if used) already exist at the current #1205 Liverpool site, it is anticipated to increase as the individual and cumulative benthic-PEZs increase with the proposed expansion.

Pelagic Predicted Exposure Zones and Interactions

Pelagic Predicted Exposure Zones for Pesticides

The pelagic-PEZ is an early screening step in a triage-based approach. A precautionary first-order estimate is used to determine the size and location of areas that may be exposed to a substance introduced into or released from a site. It is used to broadly assess the potential for impacts on susceptible species from the use of registered pesticides used in finfish aquaculture, if required. These predicted exposure zones are precautionary overestimates and are considered sufficient for identifying, albeit at a larger spatial scale, the potential for impacts from the proposed activity.

The two pesticides available for use in bath treatments (e.g., tarp bath and well-boat) are azamethiphos and hydrogen peroxide. The size of the pelagic-PEZ depends on the decay and/or dilution rate of the pesticide, a chosen concentration threshold, and choice of horizontal water current speed. The PEZ is estimated using toxicity information of azamethiphos, the most toxic of the pesticides registered for use in Canada. Health Canada's Pest Management Regulatory Agency (PMRA) has assessed that neither of the two registered pesticides (hydrogen peroxide and azamethiphos), nor their breakdown products, are expected to remain in suspension since they do not bind with organics or sediments and do not accumulate in organisms' tissues. Their half-lives are days to weeks, suggesting they will not persist in the environment at concentrations considered to be toxic (PMRA 2014, 2016a,b, 2017).

The pelagic-PEZ for azamethiphos was calculated assuming the maximum near-surface current speed persists throughout the dilution or decay scale (Figure 7). The spatial extent of exposure has been estimated for the Liverpool site using the maximum observed current speed both including and excluding the storm event on September 4, 2010. A 3-hour duration was used to estimate the time required for the maximum azamethiphos target treatment concentration of 100 µg/L to dilute to the PMRA environmental effects threshold of 1 µg/L (DFO 2013a).

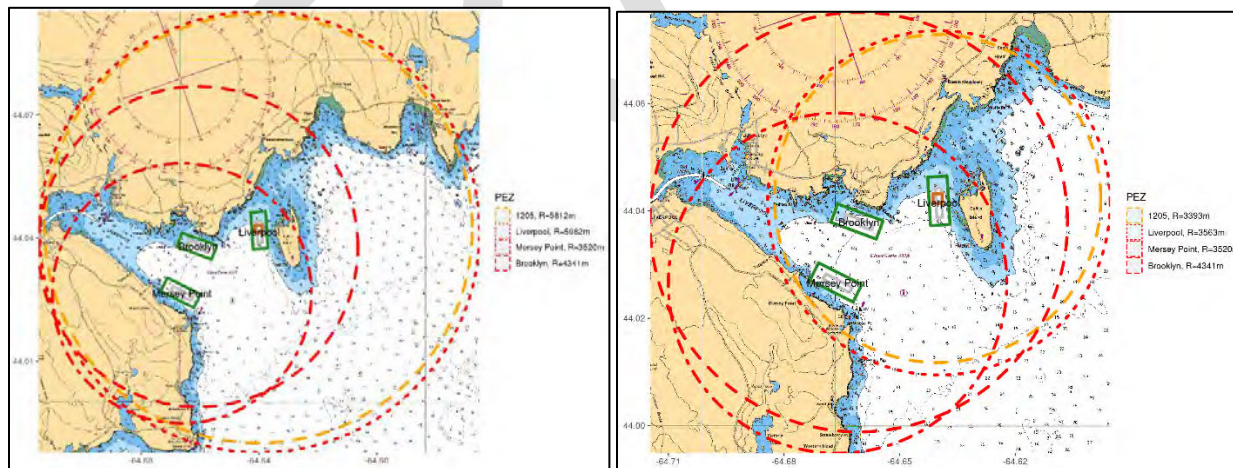


Figure 7. Pelagic-PEZs for the Liverpool (left: including storm event, right: excluding storm event), Mersey Point and Brooklyn proposed sites are shown in red overlaid on CHS chart #4379 (depths shown in fathoms). Net-pen arrays (grey) and lease boundaries (green) are shown. The existing #1205 Liverpool lease boundary and estimated benthic-PEZ are also indicated in brown and orange, respectively.

The near-surface current speed was used since the application of tarp bath treatments occurs in the surface waters. The pelagic-PEZ was calculated assuming the use of tarp bath treatments,

Maritimes Region

regardless of whether all cages would meet the PMRA treatment conditions for application, given the larger exposure zone anticipated to result from a tarp treatment versus a well boat.

The pelagic-PEZ was estimated by adding the horizontal transport distance to the longest length scale of the proposed net-pen array. The pelagic-PEZ does not quantify the intensity or duration of exposure, nor include a frequency of exposure. The zones do not imply that areas within the pelagic-PEZ have the same exposure risk. The intensity of exposure is expected to be highest near the net-pen arrays and decrease as the distance from the net-pens increases, except for in areas of anticipated overlaps where cumulative exposures may occur.

The exposure is expected to primarily occur in the pelagic zone; however, areas within the pelagic-PEZ where the bathymetry is less than 10 m may also be at risk of exposure to toxic pesticide concentrations. The PMRA restriction on the use of azamethiphos at shallow sites (i.e., no application to tarped net pens in water depths ≤ 10 m) may be applicable to some net-pens.

If treatment is used at more than one site simultaneously, exposure overlaps associated with pesticide releases from the proposed sites are predicted when the maximum current speed, both including and excluding the storm event captured in the Liverpool current meter record, is used (Figure 7). However, it is recognized that estimates of exposure associated with storm scenarios would be a large overestimate since it is unlikely tarp applications would be used during a storm event.

The proposed addition of 6 net pens at the existing site may increase exposure time to azamethiphos within the pelagic-PEZ if the entire site requires treatment. This is based on the number of tarped net pens that can be treated simultaneously (no more than two) according to PMRA restrictions. This potential increase in exposure time is further amplified if sea lice were to become an issue within the bay at all three sites by the overall proposed addition of 46 net pens within the bay.

Since 2015, AAR reporting regarding the application of pesticides indicates that the existing #1205 Liverpool site has not required the use of pesticides such as azamethiphos.

Susceptible Species Interactions

Species were considered to be susceptible within the pelagic-PEZ if they are known to have sensitivities to pesticide exposures, should treatment be required. Specific consideration was given to the potential for interactions with crustaceans due to their higher relative susceptibility to the pesticides used in aquaculture.

Although industry and internal holdings are limited in their ability to observe all susceptible species in the coastal zone, available data indicate that Lobster and crab are present within the pelagic-PEZs for azamethiphos.

Azamethiphos tarp bath treatments are reported to pose risk levels that are below the established Level of Concern (LOC) for marine fish, marine mammals, and algae, but they are above the LOC for pelagic and benthic invertebrates. While in the environment, azamethiphos is toxic to non-target crustaceans, including all life stages of Lobster (PMRA 2016b, 2017, Burrige 2013).

Little is known about the larval Lobster dispersal or retention along the South shore of Nova Scotia. Miller (1997) examined larval distribution along the south shore of Nova Scotia from Sambro to Jordan Bay. Lower abundances of larval Lobster were found at study locations to the east of Port l'Hebert, including Liverpool Bay, as compared to western study areas. When

Maritimes Region

present, Lobster larvae are likely in the water column from July through September, with the highest abundances from mid-July to mid-August (Tremblay and Sharp 1987, Miller 1997). A seasonal movement is also likely for adult lobster, with Lobster moving to the deeper offshore waters during the coldest months to maintain ideal temperatures and returning in proximity to the proposed sites as inshore bottom waters warm during the summer months. When they are present, they appear to travel throughout most areas of the bay (Figure 6).

The presence of Lobster holding facilities within 1 km of the proposed sites (Figure 1) means that the PMRA restriction concerning the use of pesticides within 1 km of any active licensed Lobster holding facilities may be applicable at certain times. These facilities are active during the commercial Lobster fishing season, which occurs from late November through May.

Should anti-sea lice pesticides be used at any of these three sites, overlaps with shallow hard-bottom areas that are suitable settlement habitat for post-larval juvenile and adult Lobsters are predicted, with higher probability of interaction from July through September. Additionally, the PMRA restriction is expected to be applicable from late November through May during the commercial Lobster season based on overlaps with these facilities. Timing and method of treatment is an important consideration that can reduce the potential for impacts on non-target crustaceans.

Genetic Interactions

The proposed leases are within the range of the SU wild Atlantic Salmon population and SFA 21. The SU Atlantic Salmon population levels remain critically low and have been assessed as Endangered by COSEWIC since 2010. The SU population of Atlantic Salmon is considered to be biologically unique, and its extirpation would constitute an irreplaceable loss of Atlantic Salmon biodiversity (Gibson et al. 2011).

Escapes have been identified as an ongoing threat to the genetic integrity and persistence of wild Atlantic Salmon populations (Forseth et al. 2017, Bradbury et al. 2020b, Glover et al. 2020). Escapes of Atlantic Salmon from finfish aquaculture sites occur regularly, including in Atlantic Canada (Glover et al. 2017, Keyser et al. 2018, Diserud et al. 2019), and the true number of escapees are estimated to significantly exceed the number reported (Skilbrei et al. 2015, Mahlum et al. 2021, Føre and Thorvaldsen 2021). Escaped Atlantic Salmon have been found in rivers at distances of up to 200–300 km from the nearest aquaculture site (Morris et al. 2008), and escapees may continue to pose a threat to wild salmon for several years after escape (Aronsen et al. 2020). Recent genetic studies have documented widespread hybridization between wild Atlantic Salmon and aquaculture escapees across the natural range of wild Atlantic Salmon, notably in Norway (Karlsson et al. 2016) and Newfoundland (Sylvester et al. 2019, Wringe et al. 2018). These interactions can occur over large areas, and escapees can represent a significant portion of a population's annual production (Glover et al. 2013, Glover et al. 2017, Heino et al. 2015, Sylvester et al. 2018, Wringe et al. 2018). Across the North Atlantic, the magnitude of genetic impacts on wild populations due to escaped farmed Atlantic Salmon has been correlated with the biomass of farmed salmon in net-pens and the distance between net-pens and rivers, as well as the size of wild populations (Keyser et al. 2018).

Direct genetic (i.e., reproductive) interactions between escapees and wild Atlantic Salmon can have negative impacts on the wild population (Glover et al. 2012). Both experimental and field studies have demonstrated decreased survival of hybrids in the wild (Fleming et al. 2000, McGinnity et al. 2003, Sylvester et al. 2019), and recent modeling indicates that population declines and loss of genetic diversity are likely when the percentage of escapees in a river relative to wild population size exceeds 10% annually (Castellani et al. 2015, 2018, Sylvester et

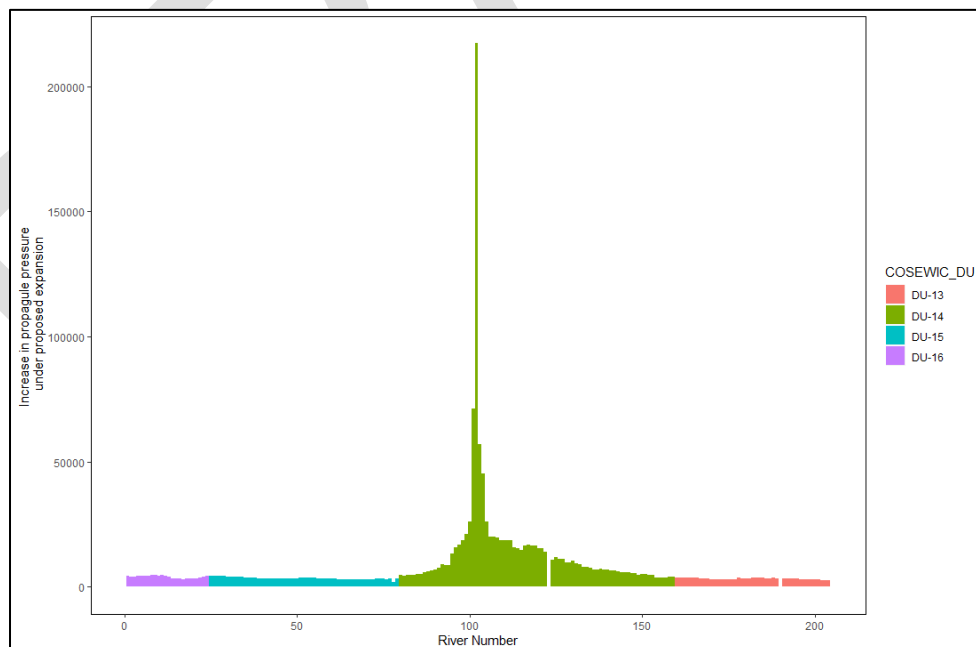
Maritimes Region

al. 2019, Bradbury et al. 2020b). Recently, several modelling approaches have been used to estimate the impact of aquaculture production and escapees on wild Atlantic Salmon populations:

1. Propagule pressure
2. Individual-Based Salmon Eco-Genetic Model
3. Spatial dispersal of escapees

Propagule Pressure

Propagule pressure has been adapted from invasive species research where it represents the intensity of human-mediated species introductions. Propagule pressure has been used previously (e.g., Keyser et al. 2018) to quantify the intensity of aquaculture production on a river-by-river level assessment, where it was found to correlate with both numbers of escapees and levels of hybridization. Propagule pressure is calculated separately for each river, and uses geographical coordinates of all farms and river mouths, farm-level production (i.e., number of fish stocked) and a distance function for each farm to each river (Keyser et al. 2018). This model makes no assumptions about salmon behaviour or mortality, and therefore represents a geographical relationship between all farms and rivers. Propagule pressure was calculated for both the current stocking levels as well as the proposed expansion scenario (Keyser et al. 2018, see methods in Appendix C). With the proposed expansion, rivers in proximity to the expansion site will see the greatest increase; however, the propagule pressure experienced by nearly all rivers in the Maritimes Region will rise (Figure 8). Propagule pressure for rivers within 100 km of the proposed sites will increase by an average of approximately 17%, those within 50 km by an average of approximately 55%, and the largest increase will be approximately 107% for the Mersey River (Figure 8). Although, the Atlantic Salmon population in the Mersey River is considered extirpated, increases in escapees may hinder any future recovery efforts.



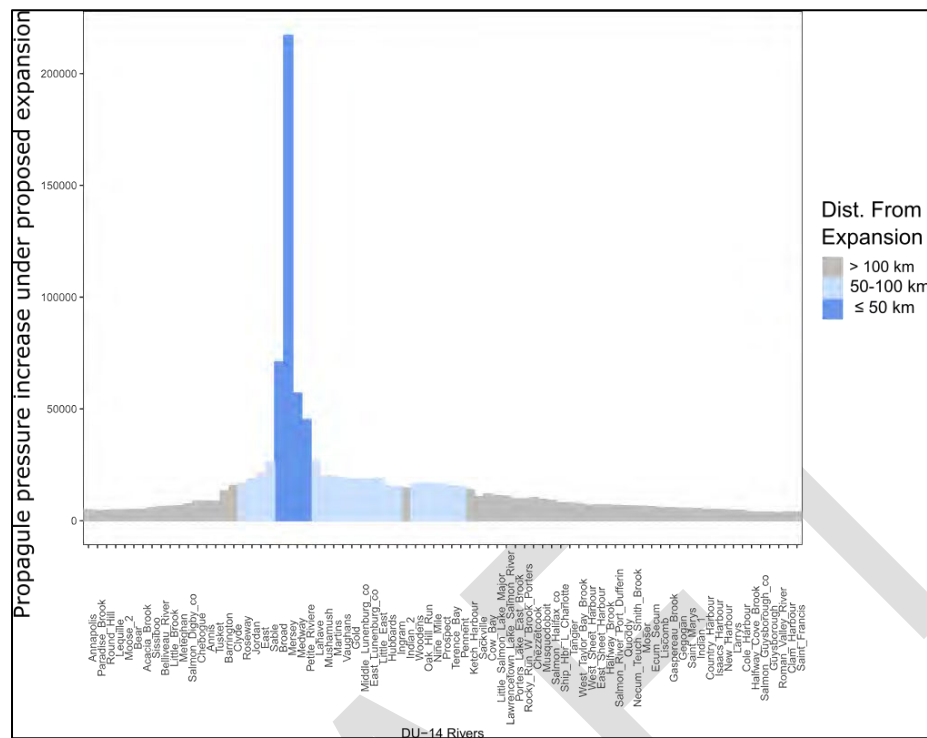


Figure 8. Top: Increase in propagule pressure for select rivers within the Maritimes Region. Propagule pressure was calculated as per Keyser et al. (2018). The proposed expansion is located approximately 10 km from the mouth of the Mersey River, number 102. Rivers are plotted west to east around the coast from the St. Croix River in Charlotte County (River 1), NB to the Salmon River in Victoria County in NS (River 204). Rivers are coloured by Designateable Unit. Bottom: Increase in propagule pressure under the proposed expansion for select rivers within the Southern Uplands DU (DU-14). Rivers plotted are a subset of those in the top panel and correspond to river numbers 80 to 159. Colours indicate distance from the proposed expansion.

Individual-Based Salmon Eco-Genetic Model

To assess demographic and genetic impacts of aquaculture escapees on wild salmon populations, the Individual-Based Salmon Eco-Genetic Model (IBSEM, Castellani et al. (2015) used by Bradbury et al. (2020b) was adapted for this review. The IBSEM models changes in abundance, genotype, and individual size in response to the introduction of domesticated individuals (Castellani et al. 2015, 2018, Sylvester et al. 2019; Bradbury et al. 2020b). It considers the duration of invasion by farm escapees, wild population size, number of invaders, environmental conditions, individual size, genotypic and phenotypic and fitness differences between individuals of farm and wild origin. Simulations show the impact on abundance and genetic change during the invasion period as well as after the invasion has been “turned off” to assess the potential for recovery in these two measures. The IBSEM was re-parameterized to simulate the Tobique River for environmental and life-history data since it has the most parameters available for the IBSEM. Other values to parameterize the model were taken from across the global range of Atlantic Salmon. Invasions of 1–100% of the wild population per year were modelled, and the results were compared to a zero-percent invasion baseline.

Maritimes Region

As in Bradbury et al. (2020b), the number of returning spawners declined during the invasion period, but returned to the zero-percent invasion baseline relatively quickly during the recovery period at proportions of escapees between 2.5 and 10% of the wild population per year (see Figure C1, Appendix C). Above 10% escapees per year, the number of returning spawners declined during the invasion period, and were either slow to return, or did not fully return to the zero-invasion baseline during the 100 year recovery period (see Figures C1 and C2, Appendix C). The magnitude of decline in abundance was found to increase with the proportion of escapees entering rivers, and declines were continuous while invasions were occurring.

Within the model, wild individuals have genetic values approaching 1, and farmed individuals values approaching 0. Therefore, if the population genetic average declines, this indicates the population is becoming genetically more “farm-like”. As with abundance, if the average genetic value falls below the 95% confidence interval of the zero-percent invasion baseline, a genetic impact has been observed (Bradbury et al. 2020b). Compared to demographic impacts, genetic impacts were found to occur at a lower proportion of escapees, and require a longer time to recover (if at all). Genetic impacts were detected during the invasion period when the level of escapees were 2.5% or greater compared to the wild population (see Figure C3 and C4, Appendix C). At levels of 7.5% and above, genetic impacts never fully recovered back to levels observed in the zero-percent invasion baseline during the 100 year recovery period (Figure C3 and C4, Appendix C). Like demographic impacts, genetic impacts were also shown to increase with the proportion of escapees entering rivers, and the genetic impacts increased while invasions were occurring.

A lower and higher impact threshold of 4% and 10%, respectively, was chosen for the proportion of escapees. The IBSEM simulations suggest that at invasion percentages of 5% or less demographic and genetic recovery was likely within 100 years of escapes stopping, while lasting demographic and genetic impacts are likely in populations experiencing influx levels at or above 10% even if escapes stopped (see Figures C1-C4, Appendix C). Between these two thresholds, the IBSEM results suggested that during the simulated 100 year recovery period following the cessation of escapes, demographic recovery was likely, but genetic recovery may not fully occur (Figures C1 and C3, Appendix C). The lower and upper threshold have both been used in previous siting reviews (DFO unpublished manuscript)¹.

Spatial Dispersal of Escapees

Dispersal of escapees from aquaculture facilities was modelled using Johannsson et al. (2017), as described in Bradbury et al. (2020b). This model incorporates information on local levels of aquaculture production, rates of escape, survival, behaviour, environment, and size of wild populations. The model output is the proportion of escapees (as a function of wild population size estimates) within a given river. Previous estimates from this model have been shown to be consistent with observed levels of hybridization (Bradbury et al. 2020b). Salmon populations in all rivers are assumed to be at 5% of the conservation egg requirement (Gibson and Claytor 2012), a value that is consistent with the best available estimates (DFO 2020c), and percentages of escapees are calculated relative to these values. At current production levels, the dispersal model predicts that a large number of rivers in the Maritimes Region are expected to be above both thresholds (Figure 9). Within the Southern Uplands DU, except for the Annis and Tusket rivers, all rivers to the west of Liverpool Bay are currently predicted to be above the

¹ DFO. In prep. Review Of The Marine Harvest Atlantic Canada Inc. Aquaculture Siting Baseline Assessments For The South Coast Of Newfoundland. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2021/nnn

Maritimes Region

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment

upper 10% threshold, while all rivers to the east as far as Pennant River, near Halifax, are above the 4% threshold (Figure 9).

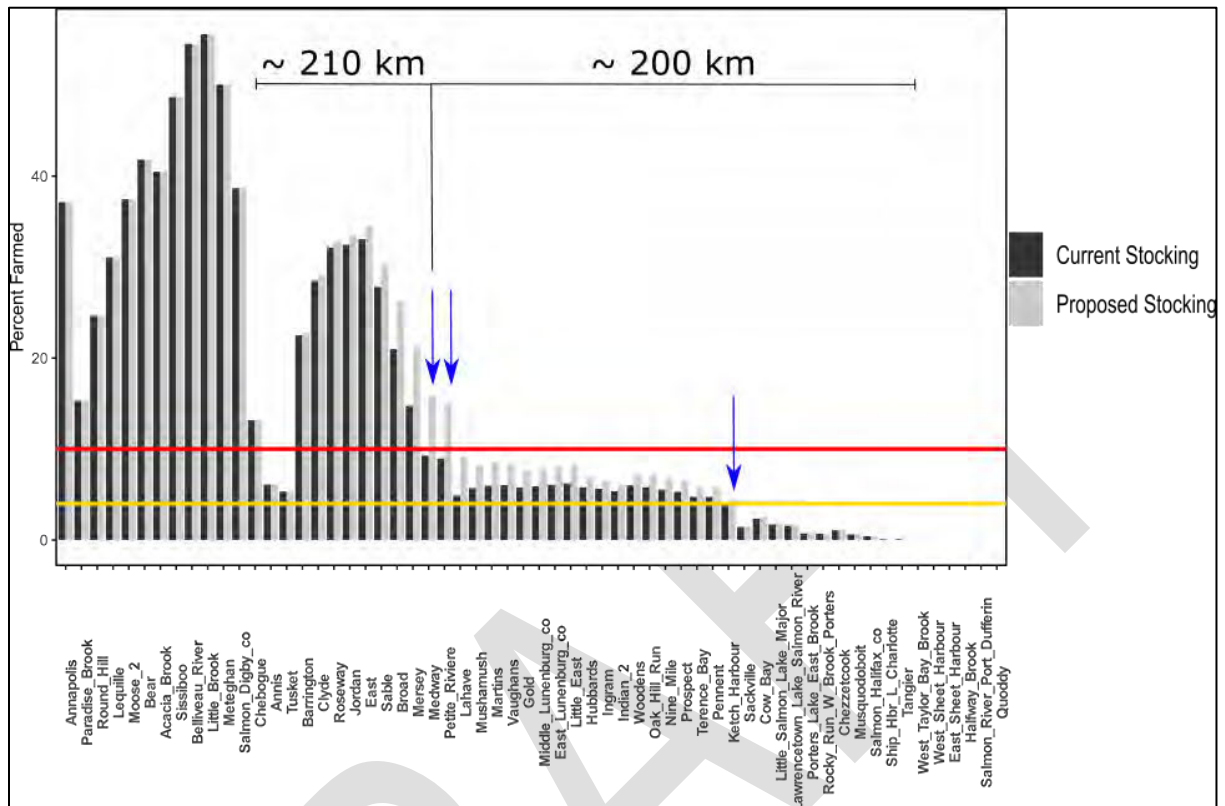


Figure 9. Predicted percent farmed salmon in selected rivers, arranged west to east, within the Southern Uplands DU. Rivers from the border of with the Inner Bay of Fundy DU in the east, to the Quoddy River to the west are shown (Numbers 80-40 in Figure 8). Expected proportions under current stocking numbers are shown in black. Expected proportions with the proposed expansion in Liverpool Bay operational are shown in grey. The horizontal yellow and red lines are the 4% and 10% thresholds, respectively. The proposed expansion is located approximately 10 km from the mouth of the Mersey River and is predicted to result in the Mersey, Medway and Ketch Harbour rivers (blue arrows) moving into higher risk thresholds. Distances from the proposed expansion site are shown by scale bars.

Compared to current production, the dispersal model predicts that the proposed expansion would result in an increase in the proportion of escapees in most rivers within 200 km on either side of the proposed Liverpool Bay expansion sites (Figure 9). Based on wild populations at 5% of the CER, the proportion of escapees in Mersey and Medway Rivers would increase beyond the 10% threshold, while the proportion in Ketch Harbour River would increase from being below the lower risk threshold to above the 4% threshold (Figures 9). Given the IBSEM model suggests that demographic and genetic impacts will increase with the proportion of escapees entering rivers, greater impacts to wild populations are expected in rivers where the dispersal model predicted increases in the percentage of escapees. Furthermore, increases in escapees may hinder future recovery efforts in rivers, such as Mersey River, where Atlantic Salmon are considered extirpated.

Summary of Genetic Results

Keyser et al. (2018) found that the number of aquaculture escapees and their genetic impact was positively correlated with propagule pressure, while the IBSEM results shown here, and in

Maritimes Region

Bradbury et al. (2020b), indicate that both the genetic and demographic impact of aquaculture escapees increases with their proportion in rivers. Given that both propagule pressure and proportion of escapees in rivers will increase with the proposed Liverpool Bay expansion, it is likely the genetic and demographic impact from escapees impact will also increase as a result of the expansion.

Additionally, impacts on wild Atlantic Salmon population are possible in the absence of direct genetic impacts of hybridization or introgression between wild and escapee salmon. Bradbury et al. (2020a) highlighted the potential for ecological interactions, including competition, predation, and introduction of disease or parasites, to change the selective landscape, resulting in changes to fitness-related allele frequencies. Ecological interactions can also lead to reduced wild Atlantic Salmon population size and consequently reduce their genetic diversity. Reduced population size and genetic diversity would in turn lead to increased susceptibility to genetic drift and impact of stochastic events.

The closest rivers to the proposed sites are the Mersey and Medway. Southern Upland Atlantic Salmon were present in the Medway River during electrofishing surveys conducted by DFO in 2008. Salmon were not detected in the Mersey River during the survey, and the population is considered to be extirpated. Increases in escapees may hinder future recovery efforts in the Mersey and other SU rivers. In SFA 21, the index population for Atlantic Salmon assessment activities is the LaHave River, which is located approximately 40 km from the existing and proposed sites. The LaHave River watershed is one of the largest in SFA 21, and annual adult counts have occurred since 1970 at the Morgan Falls fishway (representing 51% of the total salmon rearing habitat of LaHave River). In 2019, monitoring efforts indicated that adult salmon returns to Morgan Falls were among the lowest returns on record, at 4% of the conservation egg requirement (DFO 2020c). The total counts at the Morgan Falls fishway have been below 250 individuals since 2012, with fewer than 100 returning salmon in 4 of those years (DFO 2020c). Recreational angling data from 1984–2008 indicate similar if not more severe declines in other SU rivers (Gibson et al. 2009a), prior to the complete closure of Atlantic Salmon angling for all rivers in SFAs 20 and 21 in 2010. For the LaHave River the proposed expansion would be expected to increase the propagule pressure by about 19% and the dispersal model predicts the proportion escapees would nearly double from 4.87 to 9.11%. While the LaHave River would remain below the 10% upper threshold, the IBSEM model indicated demographic and genetic impacts generally increased with proportion of escapees.

Given the low levels of SU Atlantic Salmon and the proximity of the proposed sites to salmon rivers, impacts to wild salmon should be minimized to the lowest possible level. Mitigation measures that decrease the likelihood of a containment breach (e.g., physical and containment and biocontainment measures) should be considered (DFO 2013, Benfey 2015, Bridger et al. 2015).

While the risks to SU Atlantic Salmon already exist at the current lease, these risks are expected to be at least proportional to the intensity of the activities themselves. Therefore, the risks to the wild Salmon population will be greater with the proposed increases in the number of farmed Salmon within Liverpool Bay between the Liverpool, Mersey Point, and Brooklyn sites.

Pest and Pathogen Interactions

Cultured fish may acquire endemic diseases and/or sea lice infestations from wild fish or from other farmed fish in the area (DFO 2014). Given density-dependent transmission is observed in many host-pathogen systems, including sea lice on salmonid farms (Kristoffersen et al. 2013,

Maritimes Region

Frazer et al. 2012), this can pose a significant health risk to farmed and wild fish when present at certain host density threshold levels (Krkošek 2010).

Since 2015, available AAR data confirm that no pest control products have been used at the existing site in Liverpool Bay. However, the sea lice abundance at the sites is unknown and the historical use of approved drugs and pesticides may not be a predictor of future disease outbreaks as production within the bay increases or as other influencing factors change. The addition of farmed fish to an area can reasonably be expected to amplify both endemic pathogens and pests in that area, due to the increase in the number of host fish. The impact on wild susceptible fish species will depend on the duration and extent of their exposure to the farm, the increased concentration of pathogens and parasites, and their relative susceptibility to infection and disease within the environmental conditions found in Liverpool Bay.

Physical Interactions

Bycatch or entanglement of wild species (e.g., wild fish, marine mammals, turtles, sharks) associated with the placement of infrastructure are also potential interactions associated with aquaculture sites.

The proposed increase in total leased area within Liverpool Bay may result in a loss of access to habitat used by wild populations during various life history stages. Overlaps between the proposed sites and herring spawning grounds were identified; however, the spawning area was defined using the spawning condition of landed herring rather than the presence of non-motile spawn on the substrate. Additionally, this habitat is not unique to the proposed lease areas or to Liverpool Bay given the size of the Little Hope fishing area and related spawning area.

Overlaps between the proposed sites and nursery habitat for juvenile American Eel were also identified. The size and uniqueness of the nursery habitat, as well as habitat use is unknown.

All near-shore areas along the North American coast with suitable surface temperatures and high prey densities are likely to be the primary feeding and staging grounds for immature wild salmon destined to return as spawners to rivers in the SU region (Thorstad et al. 2011). Additionally, limited data from a post-spawn adults (kelts) tracking study on LaHave River suggest that coastal habitats in the vicinity of their natal river are important for consecutive spawning adult Atlantic Salmon while reconditioning between spawning events (Hubley et al. 2008).

The proposed increase in total leased area may result in Lobster being inaccessible to the traditional Lobster fishery in Liverpool Bay. Preliminary results from a DFO Lobster tagging study in Liverpool Bay have found that individuals tagged under the existing Liverpool #1205 site did not stay beneath the site and individuals tagged at reference locations did not go under the site (Figure 6; McKindsey and Robinson, pers. comm.). While the site was fallowed during the first year of sampling in Liverpool Bay, data were collected in 2020 when the site was stocked and are currently being analyzed. The results of this study will provide information on the behavior of Lobster beneath fish cages.

Potential SARA-listed marine mammal and sea turtle species within the area include North Atlantic Right Whale, Blue Whale, Fin Whale, and Leatherback Sea Turtle (DFO 2019b). North Atlantic Right Whale, Blue Whale, and Fin Whale frequent both offshore and coastal waters, particularly to feed and mate. The likelihood of these species being in close proximity to the site infrastructure is considered low given the relatively shallow water depths within the proposed lease areas. Leatherback Sea Turtle is the most common sea turtle recorded in Nova Scotian

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment

Maritimes Region

coastal waters; they inhabit both offshore and coastal waters, but have a median sightings water depth of over 100 m.

White Shark, Spotted Wolffish, and Northern Wolffish are also SAR identified in the area. Tracking data from August–October 2019 detected the presence of at least 15 distinct White Shark in Liverpool Bay directly around the proposed aquaculture sites (Trudel and McKindsey, pers. comm). To date, there have been no reports of White Shark entanglements in marine finfish aquaculture gear in Atlantic Canada. Additionally, both wolffish species are unlikely to be near the proposed sites, as their preferred habitat is in much deeper waters and trenches.

There have been no entanglement reports of wild species at the existing #1205 Liverpool site. The magnitude of exposure and physical interactions between fish and infrastructure at the proposed Liverpool, Mersey Point, and Brooklyn sites are unknown; however, if present, the increase in total leased area and infrastructure from the proposed expansion suggests a greater potential for interactions between these species and the infrastructure associated with the footprint of the existing site.

Potential Cumulative Interactions

The entire area of interest surrounding the three proposed finfish aquaculture sites in Liverpool Bay is influenced by human activity (Figure 11, Table 5).

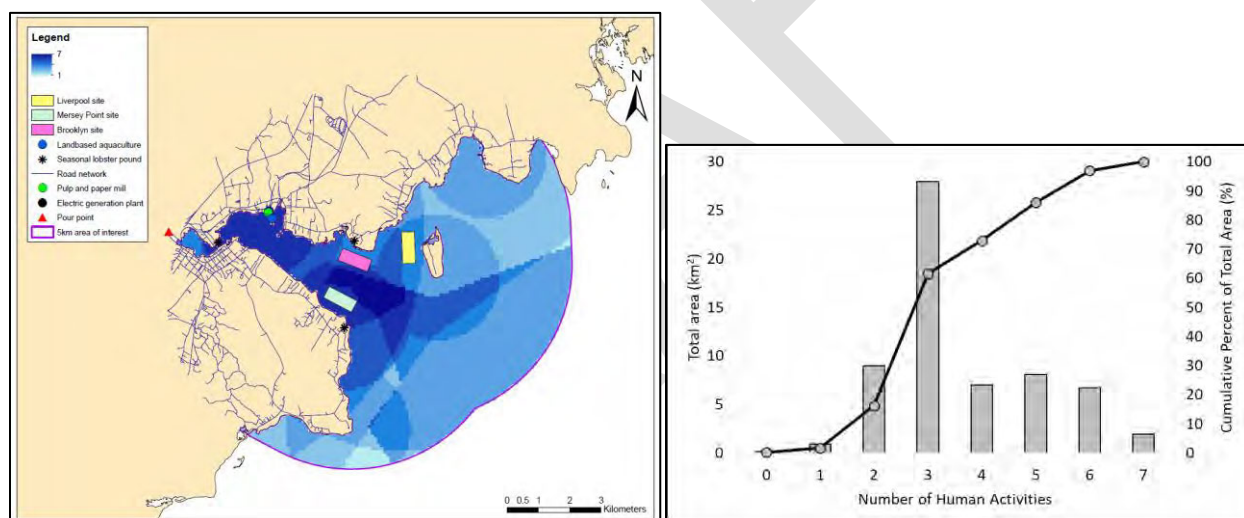


Figure 11. Left: Number of overlapping human activities in each 0.01 km² grid cell within the 5 km area of interest. The existing Liverpool Bay lease boundary amendment is represented by the yellow rectangle. The red triangle is the pour point location (i.e., the location where the Mersey River drains into Liverpool Bay). Locations of seasonal lobster holding facilities are presented for interest, but were not included in the analysis. Right: Total area (km²; grey bars), and the cumulative percent of the total area (%; black line, grey circles), in all grid cells with the corresponding number of human activities.

The larger, widespread estimated PEZ (pelagic-PEZ) associated with marine aquaculture activities results in significant spatial overlap among the existing and proposed lease areas, as well as with all other human activities occurring in the area of interest. The number of overlapping activities is high, with approximately 84% of the area of interest being influenced by three or more co-occurring human activities in any given grid cell (Figure 11).

The greatest degree of overlap and heaviest area of use occurs in the corridor between the proposed Mersey and Brooklyn sites towards the outer bay, followed by the inner bay close to

Maritimes Region

the community of Liverpool (Figure 11). The overlap in human activities also extends to the outer bay and to the limit of the area of interest (i.e., overlap of multiple human activities still occur at 5 km away from the lease areas). Appendix C provides methodology details of this analysis.

The stressors linked to human activities in the marine environment can be grouped into three main categories: physical (direct alteration to habitats), chemical (effects on water and sediment quality), and biological (changes to non-target species). All human activities considered within this analysis that have been identified as occurring within Liverpool Bay have been linked to > 1 stressor impact, and five of these activities have influences across all three categories (Table 5).

Finfish aquaculture, boat traffic, Lobster fishing, and nutrient loading activities generate the greatest number of different types of chemical stressors that can affect water and sediment quality (Table 5). Boat traffic is also associated with causing the greatest number of different physical stressors, while finfish aquaculture activities are linked to the greatest proportion of different biological stressors (Table 5). Overall, finfish aquaculture activities and recreational boating may be responsible for the largest proportion of different stressor effects, while contaminated sites and marine plant harvesting may generate the smallest proportion of different stresses on species and habitats in Liverpool Bay (Table 5). The most common stressors linked to the seven human activities are benthic disturbance (physical stressor; 6 of 7 activities), contamination (chemical stressor; 6 of 7 activities), and biomass removal through incidental mortality (biological stressor; all 7 activities) (Table 5).

At present, there is little scientific evidence to be able to weigh the relative magnitude of each stressor effect listed in Table 5. Many of these impacts will vary spatially and temporally (e.g., increased boating traffic related to seasonal fishing or recreational activities, increased influx of nutrient loading or urban runoff in spring due to snow melt; etc.), and may be of concern at particular times of year. Further, little information is available on the acute and chronic effects of these stressors (e.g., noise, light, marine debris, changes in currents/circulation).

**Science Response: Proposed Liverpool Bay Sites and
Boundary Amendment**

Maritimes Region

Table 5. Comparison of stressors associated with human activities identified in this analysis.

Stressors		Activities						
		Finfish aquaculture	Lobster fishing	Marine plant harvesting	Boat traffic ^a	Nutrient loading ^b	Commercial and industrial ^c	Contaminated sites ^d
Physical (direct alteration to habitats)	Benthic disturbance	X	X	X	X	X	X	
	Change in temperature					X		
	Collisions		X		X			
	Change in currents/circulation	X			X			
	Light	X			X		X	
	Marine debris		X		X	X		
	Noise	X	X		X	X	X	
Chemical (water and sediment quality)	Bacteria	X	X		X	X	X	
	Contaminants	X	X		X	X	X	X
	Nutrients	X	X		X	X		
	Oil/waste	X	X		X	X	X	
	Organic waste	X	X		X	X	X	
	Sediment transport (turbidity)	X	X		X	X	X	
Biological (changes to non-target species)	Changes in behaviour (predator or prey)	X		X	X			X
	Biomass removal (incidental mortality)	X	X	X	X	X	X	X
	Diseases and parasites	X						X
	Genetic interaction	X						X
	Invasive species	X			X	X	X	

^a combined stressors from small docks, ramps, wharves, fishing vessel, pleasure boating, and kayaking activity categories of Ban et al. (2010)

^b combined stressors from human settlements and agriculture categories of Ban et al. (2010)

^c combined stressors from pulp and paper, industryland-based activity categories of Ban et al. (2010)

^d combined known effects of the majority of contaminants found at the Liverpool Bay contaminated sites (e.g., PCBs, PAHs, PCDD/Fs, and organometalloids) (CCME 1999a, b, 2001a, b, 2010)

Maritimes Region

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment

Weighing the relative impact of each human activity on a broad spatial scale (e.g., the whole of Liverpool Bay), can be considered by examining the spatial distribution of the activity multiplied by a specific vulnerability score, which estimates the vulnerability to human activities of different habitats known to be present in Liverpool Bay (Kappel et al. 2012; see Appendix D for further explanation). The use of habitats also indirectly captures impacts on associated species. Contaminated sites, followed closely by boating traffic and marine aquaculture, have the greatest (potential) relative impact scores (Figure 12, Table D2 in Appendix D).

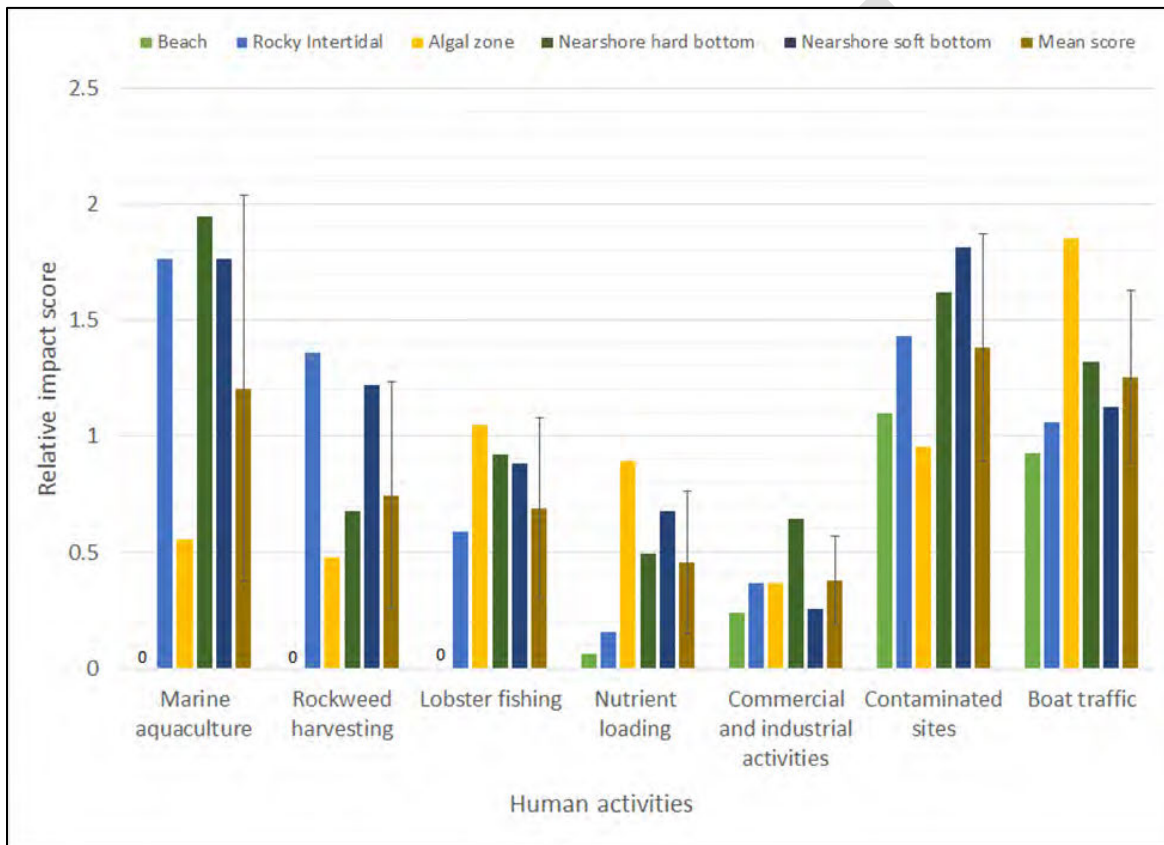


Figure 12. Relative impact score of human activities occurring in Liverpool Bay in 5 different habitat types (beach, rocky intertidal, algal zone, nearshore soft benthic, nearshore hard benthic) plus their mean value. Relative impact score in the vulnerability score multiplied by the proportion of total area in which the human activities occur within the 5 km area of interest. Larger values indicate the potential for more widespread impacts on habitats in Liverpool Bay. Wider error bars indicate more variable vulnerabilities to activities across the 5 different habitat types. See also Table D2 in Appendix D.

High impacts from land-based contaminated sites near the coastline and boating traffic are a result of the high average vulnerability of different marine habitats to these activities, due to the potential of these activities to impact a wide range of trophic levels and a large proportion of biomass. In contrast, high impacts from marine aquaculture are a result of the wide spatial distribution of this activity throughout the area of interest (e.g., highest intensity) despite having a relatively lower mean vulnerability score. This analysis suggests that boating traffic, marine aquaculture, and contaminated sites have the largest potential impacts, and that the cumulative

Maritimes Region

effect of these three activities may have the most significant anthropogenic footprint on the Liverpool Bay ecosystem.

Cumulative impacts on coastal water and sediment quality may result from the overlap in marine aquaculture, boating traffic, and contaminated sites, and to a lesser extent commercial and industrial activities and nutrient loading. While the magnitude of recreational boating traffic is currently unknown, it is likely highly seasonal, following the typical tourist season for Nova Scotia (May–October, with peaks in June–August). Further, as lobster fishing season occurs between November through May, the overlap with fishing vessels suggests a constant, year-round pressure from vessel traffic. While individually the impacts of boating are considered minor, their cumulative impact may result in detrimental effects on species and/or habitats. Small vessels contribute to reduced water quality through pollution due to leakage of fuels and oils, antifouling paints (containing copper), and human waste (sewage effluents) (Leon and Warnken 2008).

The majority of the reported pollutants at the contaminated sites include PCBs, PAHs, PCDD/Fs, and organometalloids. Pelagic species may take up some of these contaminants directly from the water column, while benthic organisms may absorb these substances through contact with the sediments as well as the overlying water (CCME 1999b, 2010). While the ultimate fate for these types of contaminants is the benthos, how much may leach from nearby contaminated soils and groundwater into the water column and marine sediments is unknown (included in this analysis in order to be precautionary). Further, legacy impacts from pollution attributed to land-based industrial activities could also contribute to impacts on water and sediment quality, particularly for localized areas immediately adjacent to the aquaculture leases. Data collected in Liverpool Bay through DFO's Aquaculture Monitoring and Modelling Program (AMMP) in 2019 showed a clear example of contributions from another industrial source, in which organic matter, sulfides, and trace metals were locally high near the now defunct Bowater Mersey pulp and paper plant further up in the bay in Brooklyn, NS. The plant was closed in 2012 but is still in use for other industrial purposes. The addition of increased feed and waste products from the proposed increase in the production of fish in nearby marine aquaculture facilities, in combination with land- and marine-based pollutant sources, boating traffic, and contaminated sites, suggests a high potential for cumulative effects on water and sediment quality, particularly impacting benthic habitats and associated species.

Boating also contributes to the secondary spread of non-native species (Clarke Murray et al. 2011, Burgin and Hardiman 2011). Aquaculture activity adds or removes physical structures (e.g., ropes, buoys, anchors) that can be colonized by diverse biological assemblages, which can affect the local ecosystem (DFO 2010). The invasive tunicates *Botryllus schlosseri*, *Botryllus schlosseri* and *Ciona intestinalis* are already present in Liverpool Bay (Sephton et al. 2017); the combined effect of high boating traffic and aquaculture structures may contribute to the spread and subsequent establishment of other non-native species already present elsewhere along the NS coastline (e.g., *Botrylloides violaceus*).

The spatial overlap of boat traffic, marine aquaculture sites, and rockweed harvesting, suggests increased benthic disturbance in areas where they may overlap. The presence of finfish aquaculture has been associated with decreased macro-infaunal biomass, and shifts in benthic community structure (Cullain et al. 2018). Marine plant harvesting can directly influence the availability of fish habitat and herbivore driven and detrital food webs through the biomass removal of the plants themselves, but may also indirectly increase the by-catch of plant-associated invertebrates, and alter the behaviours of predators and prey (Vandermeulen 2013 Sharp et al. 2006, Kay 2015). The movement of vessels in shallow waters causes turbulence through propeller action, benthic disturbance and destruction due to anchoring and dragging,

which are a particular threat to submerged macrophytes (Bishop 2008, Lewin et al. 2019). Little information was available on the specific areas in which rockweed is harvested in Liverpool Bay (its spatial distribution could only be estimated from the larger lease area); however, if plant harvesting areas occur within or adjacent to aquaculture sites alongside or within the heavy boat use corridors, an increased cumulative impact on algal species and their associated fauna is a likely outcome.

Conclusions

Question 1: *Based on available data for the site and scientific information, what is the predicted exposure zone from the use of approved fish health treatment products in the marine environment, and the potential consequences to susceptible species?*

- The seabed up to approximately 3.8 km from the proposed sites may be exposed to in-feed drugs present in feces, if used.
- Pesticide levels that are toxic to susceptible species may travel up to approximately 4.3 km from the proposed sites, if used.
- Overlaps in the predicted exposure zones from fish health treatment products (both in-feed drugs and bath pesticides) are anticipated, if used at more than one site.
- The intensity of exposure is expected to be highest near the net-pen arrays and decrease as distance from the net-pens increases, except for in areas of anticipated overlaps where cumulative exposures may occur.
- The proposed site locations are likely to result in the benthic environment in shallower areas around the site being exposed to concentrations of pesticides that are toxic to sensitive benthic life stages and species, if present.
- Lobster and crab have been identified within the PEZs of fish health treatment products used at the proposed sites. Adult Lobsters may be exposed to in-feed drugs and toxic concentrations of pesticides in shallower areas around the site. Larval Lobster may also be exposed to toxic concentrations of pesticides.
- The PMRA conditions on use of azamethiphos may apply from November–May, when commercial Lobster holding facilities less than 1 km from the proposed sites are operational.

Question 2: *Based on available information, what are the Ecologically and Biologically Significant Areas (EBSAs), SAR, fishery species, Ecologically Significant Species (ESS), and their associated habitats that are within the predicted benthic exposure zone and vulnerable to exposure from the deposition of organic matter? How does this compare to the extent of these species and habitats in the surrounding area (i.e., are they common or rare)? What are the anticipated impacts to these sensitive species and habitats from the proposed aquaculture activity?*

- The total benthic footprint within Liverpool Bay is anticipated to increase, but overlaps in the areas of organic matter exposure due to waste feed are not predicted.

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment

Maritimes Region

- Lobster, crab, clams, mussels, sea urchin, and whelk have been identified within the benthic-PEZ and are susceptible to deposition of organic matter.
- Bivalves and other sessile species are susceptible to smothering and the potential for oxic state changes. Additionally, increased sedimentation may preclude the settlement of larval Lobster given their preferential selection for harder-bottom substrates.
- Available information suggests these species are not unique to Liverpool Bay.
- Predicted exposures and interactions may be transient as the seabed is periodically reset due to large waves and storm events.

Question 3: *How do the impacts on these species from the proposed aquaculture site compare to impacts from other anthropogenic sources (including existing finfish farms)? Do the zones of influence overlap with these activities and if so, what are the potential consequences?*

- The entire area of interest around the proposed sites is influenced by human activities with significant overlap.
- Human activities include commercial and industrial activities, nutrient loading, presence of land-based contaminated sites near the coastline, boat traffic, Lobster fishing, rockweed harvesting, and marine aquaculture.
- Contaminated sites, boating traffic, and marine aquaculture have the largest potential impacts, and the interactions of these three activities may have the most significant anthropogenic footprint on the Liverpool Bay ecosystem.

Question 4: *To support the analysis of risk of entanglement with the proposed aquaculture infrastructure, which pelagic aquatic species at risk make use of the area, and for what duration and when?*

- SAR identified with the potential for being in the vicinity are North Atlantic Right Whale, Blue Whale, Fin Whale, Leatherback Sea Turtle, White Shark, Spotted Wolffish and Northern Wolffish.
- Preferred bathymetric ranges suggest these species are unlikely to be present near the site infrastructure, with the exception of White Shark, which has been observed in the vicinity of the proposed sites.

Question 5: *Which populations of salmonids are within a geographic range that escapes are likely to migrate to? What is the size and status trends of those conspecific populations in the escape exposure zone for the proposed site? Are any of these populations listed under Schedule 1 of SARA?*

- The proposed leases are within the Nova Scotia Southern Upland (SU) region of wild Atlantic Salmon and SFA 21.
- SU Atlantic Salmon population levels remain critically low and have been assessed as Endangered by COSEWIC since 2010.
- The majority of identified watersheds in the Southern Upland region that have historically contained Atlantic Salmon are within the range (200-300 km) that escaped farmed fish could travel.

Maritimes Region

- There will be increased genetic risks to wild Salmon with the proposed increases in the number of farmed Salmon within Liverpool Bay between the Liverpool, Mersey Point, and Brooklyn sites.

Sources of Uncertainty

Predicted Exposure Zones

Results of calculations based on the proponent's data are a subset of the full range of potential calculation outputs. The predicted exposure zones are based on current meter data provided by the proponent and is from a single location over a 30-day time window. The first-order estimates assume the current is spatially homogenous and seasonally consistent, and the current data are unlikely to represent the temporal and spatial variability needed to estimate exposure and deposition zones. Since the state of knowledge concerning the assessment of potential in-feed drugs and pesticides impacts is evolving, a more detailed assessment of potential pesticide and drug impacts was not conducted.

Species and Habitat Distributions

Coastal areas are generally not adequately sampled on spatial and temporal scales of most relevance to aquaculture (i.e., tens to hundreds of meters and hours to months). Information on these space and time scales is typically not contained within the various data sources available to DFO to evaluate presence/use of species and habitats in those areas. Data based on surveys do not fully sample the area spatially or temporally and additional information on presence and habitat use (i.e., spawning, migration, feeding) must be drawn from larger-scale studies. Therefore, there is uncertainty as to the exact spatial and temporal distribution of species in the area of the proposed activities, which leads to uncertainty in the full scale of potential interactions of wild species with the proposed activities.

Farmed-Wild Interactions

Information is generally lacking on the size and distribution of wild Atlantic salmon populations. Improved estimates of wild Atlantic salmon population size and the presence of escapees in salmon-bearing rivers within Maritimes region would improve the assessment of genetic and demographic risk. Significant knowledge gaps also exist regarding disease and sea lice infestation levels in wild and farmed Atlantic salmon, and monitoring and reporting of these levels would be informative.

Potential Cumulative Interactions

Many regional and global-scale human activities, that may overlap with local-scale activities, were excluded from this analysis, due to limits on data availability and/or spatial resolution. Historical activities that may have legacy effects (e.g., sedimentary contamination), impacts from natural disturbances (e.g., storms, marine heat wave), or episodic activities that can create infrequent but intense disturbances (e.g., oil spill) were not included in the current analysis. The geographic extent of human activities is likely a minimum estimate. Buffer distances used in the analysis may be a conservative estimate, as the original studies on which the estimates were based were not designed to measure maximum detectable distances of human impacts. Also, the influence of human activities was assumed to diffuse equally in all directions, although it is more likely that alongshore currents and river plumes influence the diffusion of impacts, particularly close to the coastline. Overall, the human activity map should be considered a

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment

Maritimes Region

preliminary and conservative estimate of human uses within the area of interest. Despite the limitations outlined above, this mapping exercise can identify areas of particular concern where a high degree of cumulative impacts from multiple overlapping human activities are to be expected.

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Appendix A: Organic Enrichment Interactions

Table A1. Nomenclature for gradients in benthic organic enrichment from Hargrave (2010).

Benthic condition ^a	Geochemical status ^b	Oxygen stress ^c	Sediment condition ^d	Geochemical category ^e	Macrofauna diversity ^f	Oxic category ^g	'Free' S (μM)	Eh _{NHE} (mV)
Normal	Oxic	Pre-hypoxic	Very good	Normal	High	Oxic A	100	225
							150	200
							250	175
							400	150
							625	125
						Oxic A/B threshold	750	100
Normal	Post-oxic	Aperiodic	Good	Oxic	Good	Oxic B	875	75
							1250	25
							Oxic B/ hypoxic A threshold	1500
Transitory	Sulfidic	Moderate	Less good	Hypoxic	Moderate	Hypoxic A	1750	-25
							2500	-75
						Hypoxic A/B threshold	3000	-100
Polluted	Sulfidic	Severe	Bad	Hypoxic	Poor	Hypoxic B	4000	-150
							5000	-175
							Anoxic threshold	6000	-185
Grossly polluted	Methanic	Persistent anoxia	Very bad	Anoxic	Bad	Anoxic	7000	-195
							8500	-200
							10000	-210

^aPearson & Rosenberg (1978), ^bBerner (1981), ^cDiaz & Rosenberg (1995), ^dHansen et al. (2001), ^eWildish et al. (2001), ^fRosenberg et al. (2004), ^gHargrave et al. (2008a)

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Appendix B: Species Database Searches within the Region of Interest

Regional databases with records from 2002-2018 were queried for information on observed species within the PEZs of the proposed sites and associated aquaculture activities. Databases searched include the Ecosystem Research Vessel (RV) Survey, Industry Survey Database (ISDB), Maritime Fishery Information System (MARFIS), and the Whale Sightings Database. Recorded species are listed in Table B1. Sighting effort has not been quantified (i.e., the numbers cannot be used to estimate true species density or abundance for an area). Lack of sightings do not represent species absence in a particular area.

Table B1. Species records presented as combined numbers from all databases queried. Species names are written as returned from database.

Species	Records (databases combined)		
	Liverpool	Mersey	Brooklyn
American Lobster	20	21	20
Sea Raven	3	2	2
Longhorn Sculpin	2	4	3
Toad Crab	2	2	2
Atlantic Cod		1	1
Mackerel	1461	2018	1443
Herring	125	161	101
Ocean Quahaug	72	206	75
Cusk	16		
Halibut	16		
Catfish	8		
Cod (Atlantic)	8	1	
Haddock	8		
Monkfish	8		
Pollock	8		
White Hake	8		
Clam, Propellor	7	8	7
Tuna, Bluefin	6	4	2
Strongylocentrotus droebachiensis		2	1
Whelk		2	1

Appendix C: Genetic Interactions

Propagule Pressure Details

$$\text{Propagule pressure for a given river } (R) = \sum_{i=1}^S \frac{F_i}{LCD(S_i \text{ to } R)}$$

Where F_i is the number of fish in the i th aquaculture site, S_i , and LCD represents the least-cost distance function between the river R and S_i . For the purposes of risk assessment, the number of fish at each site was set to the greater of the number of fish for which the site was licensed, or the number of fish for which an introduction and transfer permit had been authorized.

IBSEM Details

Gibson et al. (2009b) state that the wild population size required to meet the conservation egg requirement (Elson 1967) is 5,600 returning adults; however, to reduce the time required for each simulation to complete, this number was reduced by a factor of 10. The results for a simulated returning spawner population sizes of 5,600 and 560 were compared and the results were found to be qualitatively the same and differed only in scale. The model was allowed to run for 100 years to stabilize, at which point escapees were introduced for 50 years. After the 50 years period of introgression, escapes were ceased, and the population was allowed to recover for 100 years. The proportion of escapees entering the river was simulated between 0 and 100% of the initial wild population, and each scenario was replicated 10 times (Bradbury et al. 2020b). In accordance with (Bradbury et al. 2020b), this analysis focused on the number of returning spawners, as well as the population allele frequency. Hybridization and introgression from invading escapees was tracked through changes in allele frequency over time. Wild individuals are denoted by allele frequencies approaching 1, and conversely farmed individuals have allele frequencies approaching 0. Thus a shift in overall population allele frequencies away from 1 indicates a greater proportion of escapee, hybrid, and introgressed individuals in the population. Readers are directed to (Castellani et al. 2015) and (Bradbury et al. 2020b) for further information on the model.

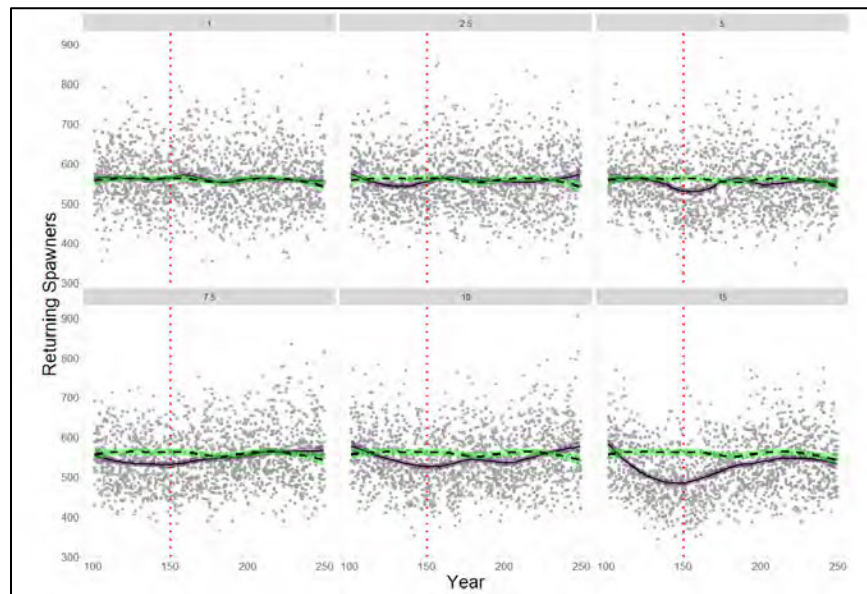


Figure C1. Model-predicted change in the number of returning spawners during and after a 50 year invasion period by escaped farmed salmon. The IBSEM model was allowed to stabilize for 100 years and the invasion begins at year 100. The invasion period is 50 years, and its end point at year 150 is marked by a dashed vertical red line. The results of 10 iterations of the IBSEM model with escapee proportions of 1, 2.5, 5, 7.5, 10, and 15% per year are shown, and numbers at the top of each panel indicate the percentage of escapees entering the river each year during the invasion period. Impacts are said to have occurred when the proportion of returning adults from the invasion scenario (solid horizontal black lines, purple 95% CIs) deviate from the results of the zero-invasion simulation (dashed horizontal black line, green 95% confidence interval CIs). The smoothed lines and associated 95% CI were calculated using a loess regression with span of 0.5 with the ggplot2 function geom_smooth.

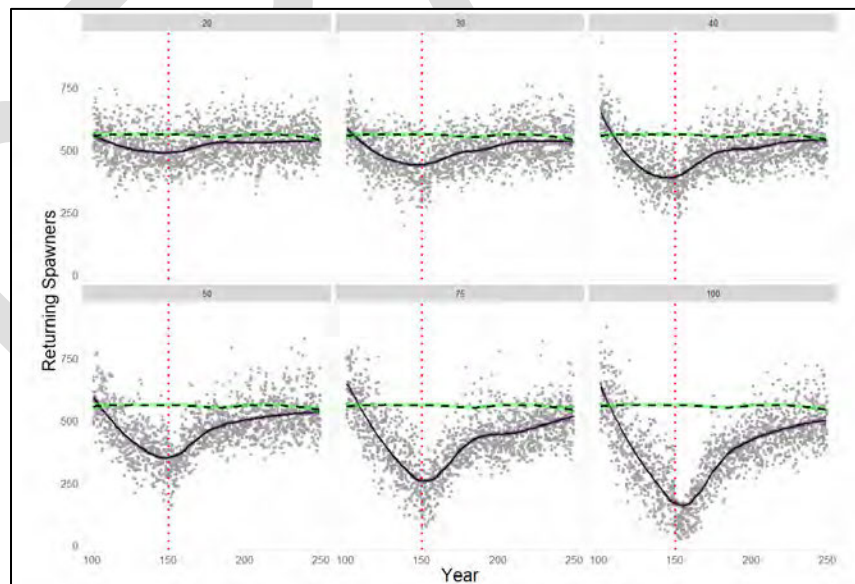


Figure C2. Model-predicted change in the number of returning spawners during and after a 50 year invasion period by escaped farmed salmon. The results of 10 iterations of the IBSEM model with escapee proportions of 20, 30, 40, 50, 75 and 100% per year are shown, and numbers at the top of each panel

Maritimes Region

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment

indicate the percentage of escapees entering the river each year during the invasion period. Refer to Supplementary Figure C3 for more information.

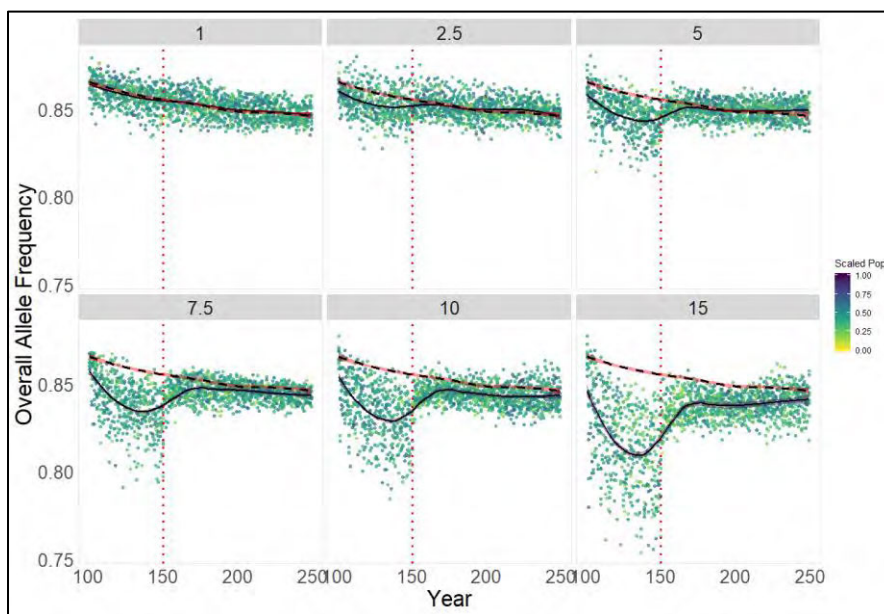


Figure C3. Model-predicted change in allele frequency during and after a 50 year invasion period by farmed salmon. Escapee proportions of 1, 2.5, 5, 7.5, 10 and 15% per year are shown and numbers at the top of each panel indicate the percentage of escapees entering the river each year during the invasion period. Wild populations are characterized by an allele frequency of 1, and farmed populations by an allele frequency of 0. Points are coloured relative to their scaled population size, with 1 being the largest population size observed during the simulation and 0 being the smallest; Refer to Figure C1. For the zero-invasion the 95% confidence interval (CI) is shown in red, but all other details are as described in Figure C1.

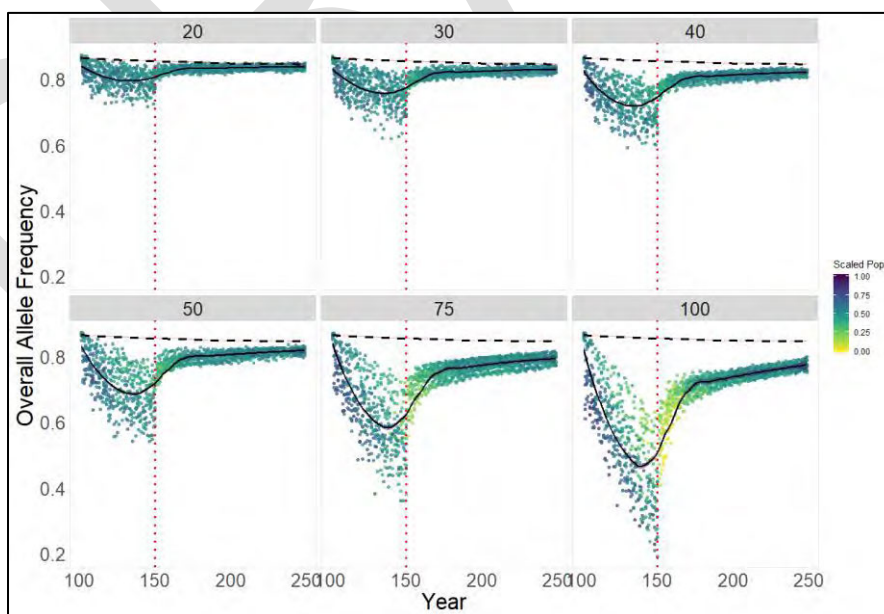


Figure C4. Model-predicted change in allele frequency during and after a 50 year invasion period by farmed salmon. Escapee proportions of 20, 30, 40, 50, 75, and 100% per year are shown and numbers at

Maritimes Region

the top of each panel indicate the percentage of escapees entering the river each year during the invasion period. Wild populations are characterized by an allele frequency of 1, and farmed populations by an allele frequency of 0. Points are coloured relative to their scaled population size, with 1 being the largest population size observed during the simulation and 0 being the smallest; Refer to Figure C2. For the zero-invasion the 95% confidence interval (CI) is shown in red, but all other details are as described in Figure C1 and C2.

Dispersal Model Details

Similarly to the calculation of propagule pressure, the number of fish at each site was set to the greater of the number of fish for which the site was licenced, or the number of fish for which an introduction and transfer permit had been authorized. Numbers of fish were converted to harvest biomass using an individual harvest weight of 5 kg, a 25% reduction to account for periods of fallowing, and then multiplying by 0.65, which is a ratio found to convert numbers stocked to numbers harvested in Newfoundland (Bradbury et al. 2020). A maximum dispersal distance of 200 km was used, and rates of escapees was set at 0.4 fish per tonne. This rate was calculated from the latest published figures from Norway (Føre and Thorvaldsen 2021; Skilbrei et al. 2015), and is within the lower range of rates tested by (Bradbury et al. 2020b). Using the most recent region-wide estimates (DFO 2020c), populations of wild salmon in every river were set at 5% of the number of spawners required to meet the CER. Numbers of spawners and CER values were taken from O'Connell et al. (1997), or estimated using the linear relationship between CER and river axial distance.

DRAFT

Appendix D: Cumulative Occurrence of Human Activities

Identification of Anthropogenic Sources

A visual representation of the pattern of human use can help illustrate the distribution of human activities in the ocean and identify overlaps among them. Spatial data for marine activities within a 5 km radius for the three sites (hereafter the “area of interest”) were collated from a larger inventory of human activities developed for the Maritimes region (Kelly, unpublished data). We selected human activities that occurred on a “local” scale, defined as those operating over small spatial scales (i.e., < 10 km) or from point-sources that could produce a localized zone of impact, such as marine recreation, aquaculture, or benthic structures. The most recent years of data or up-to-date information were included when possible.

Overlapping Occurrence of Human Activities

The impact of human activity in the marine environment often extends beyond its immediate occurrence. A “zone of influence” was used to estimate the actual footprint of the stressor(s) (assumed to be) caused by an activity. To estimate the geographical extent of each activity beyond its location of occurrence, we added a buffer that radiated from the point source of the activity. The furthest distance from the activity’s origin was determined for the same or most similar activity based on either available data or extensive reviews presented in Ban and Alder (2008), Ban et al. (2010), and/or Clarke Murray et al. (2015) (“buffer radius”; see Table D1).

A GIS approach (ESRI ArcGIS version 10.6.1) was used to map each activity and its associated buffer. The map was then converted to a raster (100 m x 100 m grid). Where activities (and their buffers) overlapped, the values in the grid cell were summed to estimate the total number of overlapping human activities per grid cell.

Table D1. Human activities occurring in the area of interest and buffer radius applied beyond location of activity occurrence. The buffer radius is the furthest extent an activity’s impact extends from its origin.

Category	Human activity layer	Layer description	Buffer radius (m)
Marine	Finfish aquaculture	Pelagic PEZ model for 3-hr pesticides, based on maximum current speeds.	Brooklyn: 4341
			Mersey Point: 3520
			Liverpool: 5982
Boat traffic	Small craft harbours and boat launches (point sources) captures activity from kayaking, recreational boating, fishing tours.	2000	
		Polygon containing the locations of all fishing vessel traffic in 2019 as reported in DFO’s Vessel Monitoring System (VMS) database.	0
Fishing	Lobster fishing	Potential locations of traps based on VMS fishing vessel traffic polygon, restricted to the outer bay only.	0
	Marine plant harvesting [‡]	Polygon of merged boundaries for two rockweed harvesting leases in the Bay.	0
Land-based	Commercial and industrial activities	Captures inputs from point sources (electrical generation plant, Bowater-Mersey pulp & paper mill, Port Mersey commercial park); outer buffer radius based on the furthest sediment sampling sites containing elevated chemical concentrations as measured by DFO’s Aquaculture Marine Monitoring Program (AMMP) in 2019.	1136

Science Response: Proposed Liverpool Bay Sites and Boundary Amendment

Maritimes Region

Category	Human activity layer	Layer description	Buffer radius (m)
	Contaminated sites [†]	Four sites within 50 m of coastline with impacts of organic pollutants (e.g., PAHs, PCBs, PCDD/Fs, organometalloids) to soil, sediment, and/or groundwater.	2000
	Nutrient loading	Captures activities within the watershed that input nitrogen into the bay, including on-shore aquaculture, agriculture, human settlements, wastewater inputs, runoff from roads, buildings, and other impervious surfaces. Layer is centered on the pour point of the Mersey River draining into Liverpool Bay, with a buffer radius based on the stream order of the river (after Clarke Murray et al. 2015).	8170

[†] Federal contaminated sites inventory (FCSI) [<https://www.tbs-sct.gc.ca/fcsi-rscf/home-accueil-eng.aspx>]

[‡] Province of Nova Scotia marine aquaculture site mapping tool [<https://novascotia.ca/fish/aquaculture/site-mapping-tool/>]

Estimating Relative Impact Among Human Activities

Human activities in the ocean are presumed to cause stress on marine ecosystems. A literature review was conducted to examine the stressors linked to the 7 different human activities occurring in the area of interest. Stressor effects linked to fin-fish aquaculture, lobster fishing, boat traffic, nutrient loading, and commercial and industrial activities were summarized from Ban et al. (2010; Table S4), contaminated sites summarized from CCME (1999a, b, 2001a, b, 2010), and marine plant harvesting were summarized from Vandermuelen (2013), Sharp et al (2006), and Kay (2015).

The relative impact of human activities on the marine environment depends on the spatial distribution of activities, the intensity of those activities in any particular place, and the vulnerability of the ecosystem component to a particular activity. To compare the relative impacts among human activities occurring in Liverpool Bay (e.g., at the bay scale), stressor-habitat vulnerability scores previously generated for the Cape Cod/Southern Gulf of Maine through an expert elicitation approach (Kappel et al. 2012) were matched to existing human activities and known habitat types occurring in Liverpool Bay. Habitat types in Liverpool Bay included beach, rocky intertidal, algal zone, nearshore hard bottom, and nearshore soft bottom. Human activities in Liverpool Bay were matched to the closest stressor category, based on the predominant stressor linked to that activity (Table D2). The mean (\pm SD) vulnerability score was then calculated across 5 habitats for each of 7 human activities (Table D2). The proportion of total area over which each activity occurs within the area of interest was used as a measure of intensity for each activity. The proportional area value was then multiplied by the mean vulnerability score to generate an overall relative impact score (\pm propagated SD error) for each human activity (Table D2; Figure 12).

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Bay Sites and Boundary Amendment**

Maritimes Region

Table D2. Mean (\pm SD) relative impact score for seven human activities occurring in Liverpool Bay. Relative impact score calculated as the product of the mean vulnerability score (\pm SD) and the proportion of total area over which each activity occurs within the area of interest. Mean vulnerability scores are calculated using individual activity-habitat vulnerability scores (from Kappel et al. 2012) for 5 different habitat types in Liverpool Bay (beach, rocky intertidal, eelgrass, algal habitat, nearshore soft benthic, nearshore hard benthic).

Human activity category	Matching activity category from Kappel et al. (2012)	Mean vulnerability score (\pm SD)	Proportion of total area	Relative impact score (\pm SD)
Marine aquaculture	Aquaculture: finfish (predators)	1.30 (0.89)	0.93	1.21 (0.83)
Rockweed harvesting	Aquaculture: marine plants	1.10 (0.72)	0.68	0.75 (0.49)
Lobster fishing	Fishing: demersal, non-destructive, low bycatch	1.64 (0.93)	0.42	0.69 (0.39)
Nutrient loading	Nutrient input: into oligotrophic waters	1.48 (1.01)	0.31	0.46 (0.31)
Commercial and industrial activities	Pollution input: inorganic	2.04 (1.07)	0.18	0.38 (0.19)
Contaminated sites	Pollution input: organic	2.90 (1.02)	0.48	1.38 (0.49)
Boat traffic	Tourism: recreational boating	1.90 (0.56)	0.66	1.26 (0.37)

This Report is Available from the:

Center for Science Advice (CSA)
Maritimes Region
Fisheries and Oceans Canada
1 Challenger Drive, P.O. Box 1006
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Aussi disponible en français :

MPO. 2021. << insérez le titre ici – il doit correspondre exactement à celui de la page couverture, mais en lettres minuscules >>. Secr. can. de consult. sci. du MPO, Rép. des Sci. 2021/nnn.

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: January 17, 2022 1:13 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>; Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Cc: Dobson, Suzanne <Suzanne.Dobson@dfo-mpo.gc.ca>; FitzGerald, Jennifer L <Jennifer.FitzGerald@dfo-mpo.gc.ca>; Brager, Lindsay <Lindsay.Brager@dfo-mpo.gc.ca>; Dunn, Andy <Andy.Dunn@dfo-mpo.gc.ca>
Subject: Liverpool Bay site proposals - sea lice management and pesticide usage

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Hi Lynn and Robert,

You'll recall that during our December 10, 2021 meeting on the Liverpool Bay proposals, we had updated you on the status of our reviews. For each site, DFO made a precautionary overestimate, called pelagic predicted exposure zone, of the area at risk of impact from deposit of azamethiphos, the most toxic pest control product. Concentrations of azamethiphos that may be toxic to susceptible species may travel up to 4.3, 3.5 and 3.5 kilometers from the center of the cages at sites 1205, 1432 and 1433, respectively. The intensity of exposure is expected to be highest near the site and decrease as distance from the site increases, except in areas where overlaps in the pelagic predicted exposure zones are anticipated. Overlaps could occur if azamethiphos was to be deposited the same time at more than one site. Pelagic larval lifestages of American Lobster within the area at risk of impact may be exposed to toxic concentrations of azamethiphos. At shallower depths within the area at risk of impact, all lifestages of American Lobster may be exposed. The risk to American Lobster is highest during times of high larvae abundances, typically July through September.

In order for DFO to continue its assessment of risk, we informed you in the meeting of the need for additional information particularly in regards to timing of pesticide use during the sensitive time for American Lobster, and timing of use at more than one site. Also, we said we would benefit greatly from learning more about sea lice management from your department.

Please let me know if you need clarification or further explanation of what DFO is looking for or if you have any updates.

Thanks,
Ed

Edward Parker
Regional Senior Aquaculture Management Officer
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From: Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Sent: January 17, 2022 2:11 PM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>; Feindel, Jessica A <Jessica.Feindel@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; Cusack, Roland R <Roland.Cusack@novascotia.ca>
Cc: Dobson, Suzanne <Suzanne.Dobson@dfo-mpo.gc.ca>; FitzGerald, Jennifer L <Jennifer.FitzGerald@dfo-mpo.gc.ca>; Brager, Lindsay <Lindsay.Brager@dfo-mpo.gc.ca>; Dunn, Andy <Andy.Dunn@dfo-mpo.gc.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: RE: Liverpool Bay site proposals - sea lice management and pesticide usage

Good afternoon Ed, thank you for your reminder regarding outstanding information related to Adjudicative aquaculture applications AQ1205, 1432 and 1433. I'm copying the other Managers of the Aquaculture team to help with providing a response for you.

Regards,
Robert Ceschiutti
Manager, Licensing and Leasing
NS Department of Fisheries and Aquaculture
1575 Lake Road
Shelburne, Nova Scotia
B0T 1W0
Phone: 902-875-7430
Robert.Ceschiutti@novascotia.ca

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: January 31, 2022 2:52 PM
To: Jennifer.Hewitt@cookeaqua.com; 'jnickerson@cookeaqua.com' <jnickerson@cookeaqua.com>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: Liverpool Bay site proposals - sea lice management and pesticide usage

Hi Jennifer and Jeff,

Firstly, congratulations on the Aquaculture Review Board's decision on Rattling Beach!

Our group met with DFO back in December on the status of their review of the Liverpool applications and they have followed up with a request for additional information related to sea lice management and pesticide use.

For each site, DFO has made a precautionary overestimate, called pelagic predicted exposure zone, of the area at risk of impact from deposit of azamethiphos, the most toxic pest control product. From their estimate, concentrations of azamethiphos that may be toxic to susceptible species may travel up to 4.3, 3.5 and 3.5 kilometers from the center of the cages at sites 1205, 1432 and 1433, respectively. They also indicated that the intensity of exposure is expected to be highest near the site and decrease as distance from the site increases, except in areas where overlaps in the pelagic predicted exposure zones are

anticipated. Overlaps could occur if azamethiphos was to be deposited the same time at more than one site. Pelagic larval life stages of American Lobster within the area at risk of impact may be exposed to toxic concentrations of azamethiphos. At shallower depths within the area at risk of impact, all life stages of American Lobster may be exposed.

In order for DFO to continue their assessment of risk, they are requesting for additional information particularly in regards to timing of pesticide use during the sensitive time for American Lobster, and timing of use at more than one site. The risk to American Lobster is highest during times of high larvae abundances, typically July through September.

Can you please provide additional details on your sea lice strategy, including the timing and types of therapeutants, if required at the Liverpool sites, as requested by DFO.

If you have any questions, please let me know.

Thank you,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

From: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Sent: February 8, 2022 11:47 AM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Cc: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>; Jeff Nickerson <jnickerson@cookeaqua.com>
Subject: KCS Sea Lice Management Plan

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Hi Melinda,

Please see our Sea Lice Management plan for Liverpool Bay application.

If anything else is needed please let me know,

Best Regards Jennifer

Jennifer Hewitt
Kelly Cove Salmon Ltd.
Division of Cooke Aquaculture INC

Compliance Manager, NS

Cell (902) 521-8604

134 North Street

Bridgewater, NS

B4V 2V6



Kelly Cove Salmon
NS Sea Lice Manage



Kelly Cove Salmon, NS

Sea Lice Management and
Treatment Plan for AQ1205,
AQ1432, and AQ1433



Background

Kelly Cove Salmon (KCS) has been successfully operating in Nova Scotia for approximately 22 years. During this time, there has never been a sea lice treatment in southern Nova Scotia. Kelly Cove Salmon performs weekly sea lice monitoring as per the Farm Management Plan (FMP) by trained and qualified technicians. Monitoring is weekly from April 1st – January 15th and results have observed practically nonexistent levels of *Lepeophtherius salmonids* (species of concern). All data collected through the weekly monitoring program is submitted to the iTrends decision support system databased which is managed by the Atlantic Veterinary Collage and shared between industry and Atlantic provincial veterinarians.

There have only ever been four treatments for sea lice in Nova Scotia since Kelly Cove Salmon started their operation, with all occurring in Western Nova Scotia (Annapolis Basin). This consisted of two infeed treatments and two mechanical treatments.

Even though sea lice have not been a significant issue in Nova Scotia, KCS has implemented numerous farm management practices that focus on preventative measures to avoid infestation by sea lice such as single year class separation, fallow periods, and weekly monitoring. Refer to the Appendix (FMP Excerpt) for the sea lice treatment component of the FMP which has been approved by Nova Scotia Department of Fisheries and Aquaculture (NSDFA).

Kelly Cove Salmon Innovation and Research

KCS is committed to continuous research and development and is always investigating new and alternative methods of sea lice mitigation and non-chemical treatment methods to add to the current suite of sea lice management and treatment tools. Beginning in 2019, a new, in-house designed, non-chemical treatment barge was launch which utilizes a warm seawater shower to detach sea lice. Since then, the fleet of non-chemical treatment vessels has expanded to includes various other non-chemical technologies which use some combination of warm or ambient water and either immersion, shower, or high volume/low pressure technology. Treatment vessels allow the removal of sea lice from the environment through the use of onboard screening systems where the lice are collected and transported to shore for disposal. The use of these alternative treatments has significantly decreased the use of both in-feed and other bath treatments in other regions where KCS operates.

In the province of NL, KCS has also been successfully using cleaner fish (Lumpfish) in combination with sea lice tarps at our marine farms for the past several years. The use of Lumpfish has been extremely successful in NL and had also led to a significant decrease in in-feed and bath treatments for sea lice.

Intregrated Pest Management plan for Liverpool Bay farms

As a precautionary approach KCS has initiated the process to add Lumpfish to farms located within the Annapolis Basin for the 2022 stocking season. Implementation of the use of cleaner fish on these farms may provide examples for success within other jurisdictions of NS for their use, should the need arise.

In addition to the Farm Management practices described above, the following options would be available for use in Liverpool Bay, depending upon fish lifecycle stage, season, environmental conditions, etc.:

- Use of KCS mechanical sea lice removal (preferred option).
- Use of cleaner fish and/or sea lice tarps (preventative measure).
- Harvesting of the affected stock (if fish are of marketable size).
- In-feed therapeutants approved by Health Canada

- In rare instances that it may be necessary to use enclosed bath treatments only products approved by Health Canada would be used.
 - Bath treatments would be administered under the direction of a veterinarian .
 - Notice would be given to NSDFA and Fisheries and Oceans Canada (DFO) 48 hours prior to a treatment.
 - Treatments will only occur at one Marine farm per day.
 - Only cages deemed necessary would receive treatments
 - The use of bath treatments is restricted by water temperatures. Due to elevated water temperatures in July through September within Liverpool Bay, bath treatments would likely not be used.

Appendix – FMP Excerpt

Treatment reporting

Kelly Cove Salmon NS Sea Lice Management & Treatment Plan for AQ1205, AQ1432 and AQ1433

The use of antibiotics and sea lice treatment products must be reported to the province at a time prescribed by the Minister.

COMPLIANCE REQUIREMENT:	
Species Applicable: All finfish species <input checked="" type="checkbox"/>	Specific Requirements: <ul style="list-style-type: none"> • Reporting of antibiotic use to the Province • Reporting of products to treat sea lice to the Province

Sea lice management (trout or salmon only)

Integrated Pest Management is a strategy where all producers in a region, under the direction of a site veterinarian, or Provincial Aquatic Animal Veterinarians, use a multifactorial approach to combatting finfish pests. These factors will include rotation of chemotherapeutants, coordinated treatments, biosecurity protocols, surveillance, siting locations, fallowing, site separation, optimum stocking densities, year-class separation, fish health management, and monitoring. The aquaculture licence holder for trout or salmon is responsible for following an approved sea lice management program. The program is outlined in section 6.18.1 to 6.18.4.

Sea lice monitoring

An aquaculture licence holder must monitor sea lice levels **weekly** from April 1 to January 15. Monitoring is conducted by counting and staging sea lice parasites on the skin of fish. Counts may be suspended if temperatures are below 4°C. If climatic conditions preclude a lice count, this omission from the weekly counts must be recorded in the Sea Lice Summary Record. This record must be made within seven days from the date that the scheduled lice count was to be conducted. A Sea Lice Summary Record can be found in Appendix A.

Sea lice monitoring procedures

The aquaculture licence holder must count sea lice on a **minimum of 5 fish per cage**. **Minimum of 6 cages of fish per site** must be sampled. If there are less than 6 cages of fish on site, then all cages must be sampled.

Two of the six cages sampled weekly must be repeatedly sampled from April 1 to January 15. These cages will be termed "*constantly sampled cages*". If one or both of the constantly sampled cages are harvested, or if the fish are removed, then two other cages will need to be sampled repeatedly from April 1 to January 15. The other 4 cages to be sampled will not be cages sampled in the previous week's sampling. These cages will be termed "*variably sampled cages*". The variably sampled cages will be alternated weekly until all cages on site are sampled. The process of sampling "*variably sampled cages*" is repeated for the entire sampling period from April 1 to January 15.

More than 6 cages may be sampled per week but no fewer than 6, unless the site total cage number is less than six.

Site staff collecting samples must be trained on the methods for identifying, counting and recording lice numbers and lice stages. Site management must keep a record of staff training.

Sea lice monitoring records

Records of lice counts must be kept and available for review, at any time, by the Chief Aquatic Animal Health Veterinarian or Veterinary Designate upon request.

Weekly sea lice **records** of *Lepeophtheirus salmonis* must include, for each cage of fish counted, the following:

- Date of lice count
- Cage identification (number/letter)
- Number of fish in the cage
- Average fish weight
- Biomass of fish in the cage
- Cage net volume
- Density of fish in the cage in kg/m³
- Subsurface water temperature at 4 meter depth at the time of sampling
- Name of counter
- Data collected for each fish including:
 - Number of chalimus sea lice (of both Caligus and Lepeophtheirus species)
 - Number of pre-adults and adult males (of both Caligus and Lepeophtheirus species)
 - Number of adult females (Gravid and non-gravid, *Lepeophtheirus salmonis*)
 - Caligus adult females with egg strings
 - Total number of parasites

An example of a Sea Lice Counting Form can be found in [Appendix A](#)

Sea lice records must be maintained and made available electronically for review by the Chief Aquatic Animal Health Veterinarian within **7 days** of data collection.

Sea lice monitoring audits

The purpose of auditing is to determine if sea lice counters are accurately collecting sea lice data, if sea lice numbers are consistent with submitted reports, and if treatments are carried out according to plans.

The Chief Aquatic Animal Health Veterinarian or Veterinary Designate may audit as required. Aquaculture licence holders are required to give access to the Provincial Audit team. Recommendations arising from the audit shall be implemented by the aquaculture license holder(s).

COMPLIANCE REQUIREMENT:	
Species Applicable: Trout or salmon	Specific Requirements: <ul style="list-style-type: none"> • At a minimum, weekly sea lice counts from April 1 to January 15 of each year • Personnel to perform sea lice counts must be trained and records of training kept • Sea lice counts records kept on file and made available for review within 7 days of count • If weekly sea lice count is not complete an explanation for the omission must be recorded in the sea lice count record • Site access for auditors during sea lice counting, if requested

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: February 9, 2022 6:49 AM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqu.com>
Cc: Jeff Nickerson <jnickerson@cookeaqu.com>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: RE: KCS Sea Lice Management Plan

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Thank you, Jennifer.

Edward Parker (he/him | il/lui)
Regional Senior Aquaculture Management Officer
Telephone | Téléphone 902-402-0298
Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca
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From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: March 18, 2022 1:41 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>; Dobson, Suzanne <Suzanne.Dobson@dfo-mpo.gc.ca>; Humphrey, Donald <Donald.Humphrey@dfo-mpo.gc.ca>; Williams, Wendy <Wendy.Williams@dfo-mpo.gc.ca>; McLean, Mark G <Mark.McLean@dfo-mpo.gc.ca>; FitzGerald, Jennifer L <Jennifer.FitzGerald@dfo-mpo.gc.ca>; Comley, Mark <Mark.Comley@dfo-mpo.gc.ca>; Stevens, Todd E <Todd.Stevens@dfo-mpo.gc.ca>; Berthier, Jacinta <Jacinta.Berthier@dfo-mpo.gc.ca>; Sullivan, Mike DJ <Mike.Sullivan@dfo-mpo.gc.ca>; Brager, Lindsay <Lindsay.Brager@dfo-mpo.gc.ca>; Herbert, Glen <Glen.Herbert@dfo-mpo.gc.ca>; Coffen-Smout, Scott <Scott.Coffen-Smout@dfo-mpo.gc.ca>; Hopper, Stephanie <Stephanie.Hopper@dfo-mpo.gc.ca>; Richard, Pauline M <Pauline.Richard@dfo-mpo.gc.ca>
Subject: DFO ADVICE: Liverpool Bay - Finfish Aquaculture Site - Boundary Amendment - AQ#1205

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Hi Lynn,

Please find attached to this email DFO's advice on Kelly Cove Salmon Ltd.'s application for an amendment to its aquaculture licence to expand the boundaries of their existing marine finfish cage aquaculture site 1205 in Liverpool Bay, Queens County, from 3.99 hectares to 40.7 hectares.

Thanks,
Ed

Edward Parker (he/him | il/lui)
Regional Senior Aquaculture Management Officer
Telephone | Téléphone 902-402-0298
Facsimile | Télécopieur 902-426-7967
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LOA_2019-MarAq-0
18_Kelly Cove Salmo

1 Challenger Drive, P600
Dartmouth, NS
B2Y 4A2

March 18, 2022

DFO File # 2019-MarAq-018

Lynn Winfield, Licensing Coordinator
1575 Lake Road
Shelburne, Nova Scotia
B0T 1W0

Dear Lynn Winfield:

Subject: Boundary Expansion of Marine Finfish Cage Aquaculture Site 1205 – Kelly Cove Salmon Ltd.

As requested, Fisheries and Oceans Canada (DFO) has completed its review of the application of Kelly Cove Salmon Ltd. (the proponent) for an amendment to its aquaculture licence under the provincial *Fisheries and Coastal Resources Act*. The proponent is requesting to expand the boundaries of their existing marine finfish cage aquaculture site 1205 in Liverpool Bay, Queens County, from 3.99 hectares to 40.7 hectares. The proponent is requesting to be licensed for and stock Atlantic Salmon (Saint John River strain).

DFO's review consisted of the following:

- Email from Lynn Winfield, Licensing Coordinator, Nova Scotia Department of Fisheries and Aquaculture (NSDFA), dated June 27, 2019, titled, "Kelly Cove Salmon - Boundary Amendment - AQ1205";
- Email from Melinda Watts, Aquaculture Advisor, NSDFA, dated August 26, 2020, titled, "FW: QUESTION: Liverpool aquaculture proposals";
- Email from Leah Lewis-McCrea, Sweeney International Marine Corp, dated October 24, 2019, titled, "Liverpool Bay Deployments Raw Data";
- Email from Melinda Watts, Aquaculture Advisor, NSDFA, dated December 4, 2020, titled, "FW: Request for Information on AQ1205 Boundary Amendment";
- Emails from Melinda Watts, Aquaculture Advisor, NSDFA, dated April 14, 2021, and May 14, 2021, titled, "RE: Liverpool Bay Aquaculture Site Proposals"; and
- Email from Jennifer Hewitt, Compliance Manager, Kelly Cove Salmon Ltd., dated February 8, 2022, titled, KCS Sea Lice Management Plan.

DFO's legislative mandate

In accordance with DFO's legislative mandate, which includes the *Fisheries Act*, *Species at Risk Act* (SARA), *Oceans Act* and applicable regulations, the application was reviewed to assess:

- the deposit of deleterious substances;
- the death of fish by means other than fishing;
- the harmful alteration, disruption or destruction of fish habitat;

- the killing, harming or harassing of SARA-listed species and the destruction of their critical habitat; and
- the introduction of aquatic species into regions or bodies of water frequented by fish where they are not indigenous.

The following DFO sectors/offices participated in the review:

- Small Craft Harbours;
- Ecosystem Management - Regulatory Review;
- Marine Planning and Conservation;
- Resource and Indigenous Fisheries Management;
- Southwest Nova Scotia Area Office; and
- Science.

The results of DFO Science's review will be published online by the DFO Canadian Science Advisory Secretariat in a Science Response titled, "DFO Maritimes Region Science Review of the Proposed Marine Finfish Aquaculture Boundary Amendment and New Sites, Liverpool Bay, Queens County, Nova Scotia". The publication can be searched for at the website <https://www.isdm-gdsi.gc.ca/csas-sccs/applications/Publications/search-recherche-eng.asp>.

DFO's risk-based approach for review of the application

DFO's review of the application used a risk-based approach with the objective of protecting fish and fish habitat, including SARA-listed species. DFO conducted a risk assessment using pathways of effects to establish cause-and-effect relationships by linking activities to stressors and stressors to effects on fish and fish habitat. Using the precautionary approach, the residual effects were evaluated after incorporating Kelly Cove Salmon Ltd.'s mitigation measures and the regulatory requirements of DFO and other federal and provincial regulators, to determine whether or not to recommend additional mitigation measures.

Fish and fish habitat, including SARA-listed species, at risk of impact from stressors

In addition to information provided by the proponent, DFO used its own databases and expert knowledge to identify which fish and fish habitat, including SARA-listed species, are at risk of impact by stressors as a result of the construction and operation of the expanded site 1205. Much of the data for the areas at risk of impact, however, are of low spatial and temporal resolution and too sparse to give a robust indication of the seasonality and spatial distribution of fish and fish habitat. Despite these limitations with the data, DFO focused on fish and fish habitat susceptible to aquaculture impacts, with particular focus on SARA-listed species and species assessed as endangered, threatened or of special concern by the Committee on the Status of Endangered Wildlife in Canada.

SARA-listed species likely to be found within the areas at risk of impact include: Fin Whale; Blue Whale; North Atlantic Right Whale; Leatherback Sea Turtle; White Shark; Spotted Wolffish; and Northern Wolffish. However, no critical habitat or residences of SARA-listed species are likely to be found within the areas at risk of impact. Species assessed by the Committee on the Status of Endangered Wildlife in Canada, and their habitat, that are likely to be found within the areas at risk of impact include: Southern Upland Atlantic Salmon (endangered); American Eel (threatened);

Cusk (endangered); Atlantic Cod (Southern population) (endangered); and Bluefin Tuna (endangered).

Other fish, and their habitat, that are likely to be found within the areas at risk of impact include: American Lobster; Sea Scallop; Haddock, White Hake, Atlantic Halibut, Atlantic Herring, Atlantic Mackerel; Gaspereau; American Oyster; crab; clam, Blue Mussel, Green Sea Urchin and Waved Whelk. There is no evidence of there being benthic macrophyte beds such as eelgrass beds or kelp beds within the areas at risk of impact.

DFO's risk assessment results

DFO assessed the risk of physical alteration of habitat structure of the water column and of the benthos due to the presence of the farmed fish and the site infrastructure, such as the mooring system, grid system and cages. Incidental death of slow moving or non-motile species that may occur due to the placement or movement of infrastructure is expected to be low relative to local population sizes. Bycatch or entanglement of fish is expected to be low relative to local population sizes. The likelihood of SARA-listed species being in close proximity to the site infrastructure is low given the relatively shallow water depth. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of alteration in light due to shading caused by the farmed fish and aquaculture site infrastructure, or due to increased light levels caused by artificial illumination. Although there is no evidence of there being benthic macrophyte beds within the area at risk of impact, shading of the beds, if present, should be avoided. Although the proponent plans to install four LED lights per cage at 5 meters depth, annually, from mid-November to mid-April, the illumination within the visible light spectrum is not likely to penetrate more than a few meters below the bottom of the cages. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of noise due to the use of acoustic deterrent devices, vessels, equipment and machinery for various day-to-day operations. The proponent does not plan to use acoustic deterrent devices, and other sounds have short-term localized effects that do not appear sufficient to cause injury or permanent displacement. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of the deposit of nutrients and organic material released through waste feed, feces, metabolic waste products and bio-fouling organisms. DFO made a precautionary overestimate, called benthic predicted exposure zone, of the area at risk of impact from the deposit of biochemical oxygen demanding matter. Waste feed is anticipated to have the greatest intensity of impact, and may extend up to 515 meters from the center of the cages, with the intensity of impacts decreasing with distance from cages.

The proponent submitted to DFO the predicted contours (i.e. spatial extent and intensity) of the footprint of the biochemical oxygen demanding matter that would be deposited as waste feed and feces during maximum daily quantity of feed usage. The prediction suggests a potential for elevated free sediment sulfide concentration, which is a measurement of the impact of biochemical oxygen demanding matter, under the cages. There is a risk that the mean concentration of free

sediment sulfide could exceed 3000 micro-molar, a threshold above which the *Aquaculture Activities Regulations* would prohibit restocking of the site. The proponent should be reminded that under subsection 7(2) of the *Aquaculture Activities Regulations*, the proponent must take reasonable measures to minimize the deposit of waste feed and feces, having regard to the factors set out in paragraphs 7(1)(a) to (c).

DFO assessed the risk of the release of aquatic invasive species. The site infrastructure, such as the mooring system, grid system and cages provides additional artificial habitat for colonization by aquatic invasive species such as tunicates. Excessive growth of bio-fouling organisms will be prevented, however, through routine infrastructure cleaning and maintenance. Vessel and equipment movements can be pathways for the introduction of aquatic invasive species through ballast water, bilge water or hull fouling. Inspection and cleaning of equipment, ballast tanks, bilges and hulls, however, should reduce the risk. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of accidental and intentional deposit of chemicals. The intentional deposit of pest control products that are registered, or whose use is authorized under the federal *Pest Control Products Act*, is regulated by the *Aquaculture Activities Regulations*. DFO made a precautionary overestimate, called pelagic predicted exposure zone, of the area at risk of impact from deposit of azamethiphos, the most toxic pest control product. Concentrations of azamethiphos that may be toxic to susceptible species may travel up to 4.3 kilometers from the center of the cages. The intensity of exposure is expected to be highest near the site and decrease as distance from the site increases, except for in areas where overlaps in the pelagic predicted exposure zones are anticipated. This could occur if azamethiphos was to be deposited the same time as at either of the other two proposed sites 1432 and 1433 in Liverpool Bay. Pelagic larval lifestages of American Lobster within the area at risk of impact may be exposed to toxic concentrations of azamethiphos. At shallower depths within the area at risk of impact, all lifestages of American Lobster may be exposed. Azamethiphos is unlikely to persist in the aquatic environment. The proponent should be reminded that under subsection 7(1) of the *Aquaculture Activities Regulations*, the proponent must, in depositing a pest control product referred to in paragraph 2(b), take reasonable measures to minimize detriment to fish and fish habitat outside the facility, having regard to paragraphs 7(1)(a) to (c). This is especially important during times of high larvae abundances, typically July through September. DFO recommends that the proponent implements their Sea Lice Management and Treatment Plan, received by email from Jennifer Hewitt on February 8, 2022, to mitigate this risk.

The intentional deposit of drugs whose sale is permitted or otherwise authorized, or whose importation is not prohibited under the federal *Food and Drugs Act*, is regulated by the *Aquaculture Activities Regulations*. DFO assumed that the deposit of in-feed drugs is dominated by the deposit of medicated waste feed and feces, therefore the area at risk of impact from the deposit of drugs is the same as the precautionary overestimate, called benthic predicted exposure zone, made for biochemical oxygen demanding matter. Waste feed and feces may extend up to 515 meters and 3892 meters beyond the center of the cages, respectively. The intensity of exposure is expected to be highest near the site and decrease as distance from the site increases, except for in areas where overlaps in the pelagic predicted exposure zones are anticipated. This could occur if in-feed drugs were to be deposited the same time as at either of the other two proposed sites 1432 and 1433 in Liverpool Bay. Adult lobsters may be exposed to in-feed drugs. Scientific uncertainties regarding the exposure and effects of drugs on non-target populations limits DFO's assessment of

the deposit of drugs. The proponent should be reminded that under subsection 7(1) of the *Aquaculture Activities Regulations*, the proponent must, in depositing a drug referred to in paragraph 2(a), take reasonable measures to minimize detriment to fish and fish habitat outside the facility, having regard to paragraphs 7(1)(a) to (c).

The accidental or intentional deposit of deleterious substances other than those regulated by the *Aquaculture Activities Regulations* into waters frequented by fish is subject to the general prohibition under section 36 of the *Fisheries Act*, irrespective of the amounts or inherent toxicity of the substance. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of the release of farmed fish, henceforth referred to as Atlantic Salmon escapees. Southern Upland Atlantic Salmon are at highest risk of impact from Atlantic Salmon escapees. If, despite containment measures, Atlantic Salmon escapees were to occur, they would be capable of swimming to most Southern Upland Atlantic Salmon rivers. Direct genetic impacts of hybridization and introgression, as well as ecological interactions that alter selection pressures such as the transfer of diseases, predation, or competition for space, food, or mates could result in the reduction of population size and genetic diversity of Southern Upland Atlantic Salmon. Because the risks are proportional to the number of Atlantic Salmon escapees, DFO recommends that the proponent prioritize preventing Atlantic Salmon escapees. DFO recognizes NSDFA's increasing regulatory requirements for preventing and responding to Atlantic Salmon escapees. DFO will continue collaborating with NSDFA, industry and others towards further improvements in mitigating the effects of Atlantic Salmon escapees through improved prevention, early detection, tracking and response.

DFO's assessment of the risk of the release of pathogens will occur via the review of the proponent's application to DFO to stock Atlantic Salmon pursuant to sections 55 and 56 of the *Fishery (General) Regulations* made under the federal *Fisheries Act*. DFO will not issue the Licence if the Atlantic Salmon have any disease or disease agent that may be harmful to the protection and conservation of wild fish. To apply for an Introductions and Transfers License, the proponent should email NSITC.XMAR@dfo-mpo.gc.ca.

Potential overlaps with fisheries

The continued presence and expansion of site 1205 will displace fisheries that might have otherwise occurred in the current lease or do occur within the expanded lease area. DFO has coarse inshore lobster catch and effort data at the statistical grid level, as mapped in this report: <https://waves-vagues.dfo-mpo.gc.ca/Library/40573230.pdf>. All other fisheries are mapped on a hexagon grid level at 10 square kilometres, available in this report: https://publications.gc.ca/collections/collection_2020/mpo-dfo/Fs97-6-3373-eng.pdf. The spatial and temporal resolution of fisheries data, however, are too low to precisely indicate which fisheries occur within the expanded lease area. Fisheries that occur in the general vicinity and could potentially be displaced include American Lobster, groundfish, Sea Scallop, Atlantic Mackerel and Atlantic Herring. The lease area of site 1205, however, is small relative to the fishing grounds for each of these fished species.

If you have any questions concerning this letter, or if DFO's understanding of the application is either incorrect, incomplete, or if there are changes to the application, please contact me either by telephone at 902-402-0298 or by email at Edward.Parker@dfo-mpo.gc.ca.

Sincerely,

Edward Parker
Senior Advisor, Aquaculture Management Office
Maritimes Region

cc: M. McLean, Ecosystem Management, DFO Maritimes
M. Comley, Southwest Nova Scotia Area Office, DFO Maritimes
J. Berthier, Resource and Indigenous Fisheries Management, DFO Maritimes
M. Sullivan, Ecosystem Science, DFO Maritimes
G. Herbert, Marine Planning and Conservation, DFO Maritimes
S. Hopper, Small Craft Harbours, DFO Maritimes and Gulf

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: March 18, 2022 1:41 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>; Dobson, Suzanne <Suzanne.Dobson@dfo-mpo.gc.ca>; Humphrey, Donald <Donald.Humphrey@dfo-mpo.gc.ca>; Williams, Wendy <Wendy.Williams@dfo-mpo.gc.ca>; McLean, Mark G <Mark.McLean@dfo-mpo.gc.ca>; FitzGerald, Jennifer L <Jennifer.FitzGerald@dfo-mpo.gc.ca>; Comley, Mark <Mark.Comley@dfo-mpo.gc.ca>; Stevens, Todd E <Todd.Stevens@dfo-mpo.gc.ca>; Berthier, Jacinta <Jacinta.Berthier@dfo-mpo.gc.ca>; Sullivan, Mike DJ <Mike.Sullivan@dfo-mpo.gc.ca>; Brager, Lindsay <Lindsay.Brager@dfo-mpo.gc.ca>; Herbert, Glen <Glen.Herbert@dfo-mpo.gc.ca>; Coffen-Smout, Scott <Scott.Coffen-Smout@dfo-mpo.gc.ca>; Hopper, Stephanie <Stephanie.Hopper@dfo-mpo.gc.ca>; Richard, Pauline M <Pauline.Richard@dfo-mpo.gc.ca>
Subject: DFO ADVICE: Liverpool Bay (Brooklyn) - Finfish Aquaculture Site - New Site - AQ#1432

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

Exercice caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Hi Lynn,

Please find attached to this email DFO's advice on Kelly Cove Salmon Ltd.'s application for an aquaculture licence for a new marine finfish cage aquaculture site 1432 in Liverpool Bay, Queens County, for the cultivation of Atlantic Salmon (Saint John River strain).

Thanks,
Ed

Edward Parker (he/him | il/lui)
Regional Senior Aquaculture Management Officer
Telephone | Téléphone 902-402-0298
Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca
Fisheries and Oceans Canada | Pêches et Océans Canada
PO Box 1006, P600, Dartmouth, NS B2Y 4A2
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Government of Canada | Gouvernement du Canada

If you have received this communication by mistake, please notify the sender immediately and delete the communication without printing, copying or forwarding it. Thank you.

Si vous avez reçu cette communication par erreur, veuillez en aviser l'expéditeur immédiatement et la supprimer sans l'imprimer, la copier, ou la faire suivre. Merci.



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16_Kelly Cove Salmo

1 Challenger Drive, P600
Dartmouth, NS
B2Y 4A2

March 18, 2022

DFO File # 2019-MarAq-016

Lynn Winfield, Licensing Coordinator
1575 Lake Road
Shelburne, Nova Scotia
B0T 1W0

Dear Lynn Winfield:

Subject: New Marine Finfish Cage Aquaculture Site 1432 – Kelly Cove Salmon Ltd.

As requested, Fisheries and Oceans Canada (DFO) has completed its review of the application of Kelly Cove Salmon Ltd. (the proponent) for an aquaculture licence under the provincial *Fisheries and Coastal Resources Act*. The proponent is requesting a licence for a new marine finfish cage aquaculture site 1432 in Liverpool Bay, Queens County, for the cultivation of Atlantic Salmon (Saint John River strain).

DFO's review consisted of the following:

- Email from Lynn Winfield, Licensing Coordinator, Nova Scotia Department of Fisheries and Aquaculture (NSDFA), dated June 27, 2019, titled, "AQ#1432 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Brooklyn), Queens County";
- Email from Leah Lewis-McCrea, Sweeney International Marine Corp, dated October 24, 2019, titled, "Liverpool Bay Deployments Raw Data";
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DFO's legislative mandate

In accordance with DFO's legislative mandate, which includes the *Fisheries Act*, *Species at Risk Act* (SARA), *Oceans Act* and applicable regulations, the application was reviewed to assess:

- the deposit of deleterious substances;
- the death of fish by means other than fishing;
- the harmful alteration, disruption or destruction of fish habitat;
- the killing, harming or harassing of SARA-listed species and the destruction of their critical habitat; and
- the introduction of aquatic species into regions or bodies of water frequented by fish where they are not indigenous.

The following DFO sectors/offices participated in the review:

- Small Craft Harbours;
- Ecosystem Management - Regulatory Review;
- Marine Planning and Conservation;
- Resource and Indigenous Fisheries Management;
- Southwest Nova Scotia Area Office; and
- Science.

The results of DFO Science's review will be published online by the DFO Canadian Science Advisory Secretariat in a Science Response titled, "DFO Maritimes Region Science Review of the Proposed Marine Finfish Aquaculture Boundary Amendment and New Sites, Liverpool Bay, Queens County, Nova Scotia". The publication can be searched for at the website <https://www.isdm-gdsi.gc.ca/csas-sccs/applications/Publications/search-recherche-eng.asp>.

DFO's risk-based approach for review of the application

DFO's review of the application used a risk-based approach with the objective of protecting fish and fish habitat, including SARA-listed species. DFO conducted a risk assessment using pathways of effects to establish cause-and-effect relationships by linking activities to stressors and stressors to effects on fish and fish habitat. Using the precautionary approach, the residual effects were evaluated after incorporating Kelly Cove Salmon Ltd.'s mitigation measures and the regulatory requirements of DFO and other federal and provincial regulators, to determine whether or not to recommend additional mitigation measures.

Fish and fish habitat, including SARA-listed species, at risk of impact from stressors

In addition to information provided by the proponent, DFO used its own databases and expert knowledge to identify which fish and fish habitat, including SARA-listed species, are at risk of impact by stressors as a result of the construction and operation of site 1432. Much of the data for the areas at risk of impact, however, are of low spatial and temporal resolution and too sparse to give a robust indication of the seasonality and spatial distribution of fish and fish habitat. Despite these limitations with the data, DFO focused on fish and fish habitat susceptible to aquaculture impacts, with particular focus on SARA-listed species and species assessed as endangered, threatened or of special concern by the Committee on the Status of Endangered Wildlife in Canada.

SARA-listed species likely to be found within the areas at risk of impact include: Fin Whale; Blue Whale; North Atlantic Right Whale; Leatherback Sea Turtle; White Shark; Spotted Wolffish; and Northern Wolffish. However, no critical habitat or residences of SARA-listed species are likely to be found within the areas at risk of impact. Species assessed by the Committee on the Status of Endangered Wildlife in Canada, and their habitat, that are likely to be found within the areas at risk of impact include: Southern Upland Atlantic Salmon (endangered); American Eel (threatened); Cusk (endangered); Atlantic Cod (Southern population) (endangered); and Bluefin Tuna (endangered).

Other fish, and their habitat, that are likely to be found within the areas at risk of impact include: American Lobster; Sea Scallop; Haddock, White Hake, Atlantic Halibut, Atlantic Herring, Atlantic Mackerel; Gaspereau; American Oyster; crab; clam, Blue Mussel, Green Sea Urchin and Waved

Whelk. There is no evidence of there being benthic macrophyte beds such as eelgrass beds or kelp beds within the areas at risk of impact.

DFO's risk assessment results

DFO assessed the risk of physical alteration of habitat structure of the water column and of the benthos due to the presence of the farmed fish and the site infrastructure, such as the mooring system, grid system and cages. Incidental death of slow moving or non-motile species that may occur due to the placement or movement of infrastructure is expected to be low relative to local population sizes. Bycatch or entanglement of fish is expected to be low relative to local population sizes. The likelihood of SARA-listed species being in close proximity to the site infrastructure is low given the relatively shallow water depth. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of alteration in light due to shading caused by the farmed fish and aquaculture site infrastructure, or due to increased light levels caused by artificial illumination. Although there is no evidence of there being benthic macrophyte beds within the area at risk of impact, shading of the beds, if present, should be avoided. Although the proponent plans to install four LED lights per cage at 5 meters depth, annually, from mid-November to mid-April, the illumination within the visible light spectrum is not likely to penetrate more than a few meters below the bottom of the cages. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of noise due to the use of acoustic deterrent devices, vessels, equipment and machinery for various day-to-day operations. The proponent does not plan to use acoustic deterrent devices, and other sounds have short-term localized effects that do not appear sufficient to cause injury or permanent displacement. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of the deposit of nutrients and organic material released through waste feed, feces, metabolic waste products and bio-fouling organisms. DFO made a precautionary overestimate, called benthic predicted exposure zone, of the area at risk of impact from the deposit of biochemical oxygen demanding matter. Waste feed is anticipated to have the greatest intensity of impact, and may extend up to 398 meters from the center of the cages, with the intensity of impacts decreasing with distance from cages.

The proponent submitted to DFO the predicted contours (i.e. spatial extent and intensity) of the footprint of the biochemical oxygen demanding matter that would be deposited as waste feed and feces during maximum daily quantity of feed usage. The prediction suggests a potential for elevated free sediment sulfide concentration, which is a measurement of the impact of biochemical oxygen demanding matter, under the cages. There is a risk that the mean concentration of free sediment sulfide could exceed 3000 micro-molar, a threshold above which the *Aquaculture Activities Regulations* would prohibit restocking of the site. The proponent should be reminded that under subsection 7(2) of the *Aquaculture Activities Regulations*, the proponent must take reasonable measures to minimize the deposit of waste feed and feces, having regard to the factors set out in paragraphs 7(1)(a) to (c).

DFO assessed the risk of the release of aquatic invasive species. The site infrastructure, such as the mooring system, grid system and cages provides additional artificial habitat for colonization by aquatic invasive species such as tunicates. Excessive growth of bio-fouling organisms will be prevented, however, through routine infrastructure cleaning and maintenance. Vessel and equipment movements can be pathways for the introduction of aquatic invasive species through ballast water, bilge water or hull fouling. Inspection and cleaning of equipment, ballast tanks, bilges and hulls, however, should reduce the risk. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of accidental and intentional deposit of chemicals. The intentional deposit of pest control products that are registered, or whose use is authorized under the federal *Pest Control Products Act*, is regulated by the *Aquaculture Activities Regulations*. DFO made a precautionary overestimate, called pelagic predicted exposure zone, of the area at risk of impact from deposit of azamethiphos, the most toxic pest control product. Concentrations of azamethiphos that may be toxic to susceptible species may travel up to 3.5 kilometers from the center of the cages. The intensity of exposure is expected to be highest near the site and decrease as distance from the site increases, except for in areas where overlaps in the pelagic predicted exposure zones are anticipated. This could occur if azamethiphos was to be deposited the same time as at site 1205 or the other proposed site 1433 in Liverpool Bay. Pelagic larval lifestages of American Lobster within the area at risk of impact may be exposed to toxic concentrations of azamethiphos. At shallower depths within the area at risk of impact, all lifestages of American Lobster may be exposed. Azamethiphos is unlikely to persist in the aquatic environment. The proponent should be reminded that under subsection 7(1) of the *Aquaculture Activities Regulations*, the proponent must, in depositing a pest control product referred to in paragraph 2(b), take reasonable measures to minimize detriment to fish and fish habitat outside the facility, having regard to paragraphs 7(1)(a) to (c). This is especially important during times of high larvae abundances, typically July through September. DFO recommends that the proponent implements their Sea Lice Management and Treatment Plan, received by email from Jennifer Hewitt on February 8, 2022, to mitigate this risk.

The intentional deposit of drugs whose sale is permitted or otherwise authorized, or whose importation is not prohibited under the federal *Food and Drugs Act*, is regulated by the *Aquaculture Activities Regulations*. DFO assumed that the deposit of in-feed drugs is dominated by the deposit of medicated waste feed and feces, therefore the area at risk of impact from the deposit of drugs is the same as the precautionary overestimate, called benthic predicted exposure zone, made for biochemical oxygen demanding matter. Waste feed and feces may extend up to 398 meters and 1825 meters beyond the proposed lease boundaries, respectively. The intensity of exposure is expected to be highest near the site and decrease as distance from the site increases, except for in areas where overlaps in the pelagic predicted exposure zones are anticipated. This could occur if in-feed drugs were to be deposited the same time as at 1205 or the other proposed site 1433 in Liverpool Bay. Adult lobsters may be exposed to in-feed drugs. Scientific uncertainties regarding the exposure and effects of drugs on non-target populations limits DFO's assessment of the deposit of drugs. The proponent should be reminded that under subsection 7(1) of the *Aquaculture Activities Regulations*, the proponent must, in depositing a drug referred to in paragraph 2(a), take reasonable measures to minimize detriment to fish and fish habitat outside the facility, having regard to paragraphs 7(1)(a) to (c).

The accidental or intentional deposit of deleterious substances other than those regulated by the *Aquaculture Activities Regulations* into waters frequented by fish is subject to the general prohibition under section 36 of the *Fisheries Act*, irrespective of the amounts or inherent toxicity of the substance. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of the release of farmed fish, henceforth referred to as Atlantic Salmon escapees. Southern Upland Atlantic Salmon are at highest risk of impact from Atlantic Salmon escapees. If, despite containment measures, Atlantic Salmon escapees were to occur, they would be capable of swimming to most Southern Upland Atlantic Salmon rivers. Direct genetic impacts of hybridization and introgression, as well as ecological interactions that alter selection pressures such as the transfer of diseases, predation, or competition for space, food, or mates could result in the reduction of population size and genetic diversity of Southern Upland Atlantic Salmon. Because the risks are proportional to the number of Atlantic Salmon escapees, DFO recommends that the proponent prioritize preventing Atlantic Salmon escapees. DFO recognizes NSDFA's increasing regulatory requirements for preventing and responding to Atlantic Salmon escapees. DFO will continue collaborating with NSDFA, industry and others towards further improvements in mitigating the effects of Atlantic Salmon escapees through improved prevention, early detection, tracking and response.

DFO's assessment of the risk of the release of pathogens will occur via the review of the proponent's application to DFO to stock Atlantic Salmon pursuant to sections 55 and 56 of the *Fishery (General) Regulations* made under the federal *Fisheries Act*. DFO will not issue the Licence if the Atlantic Salmon have any disease or disease agent that may be harmful to the protection and conservation of wild fish. To apply for an Introductions and Transfers License, the proponent should email NSITC.XMAR@dfo-mpo.gc.ca.

Potential overlaps with fisheries

Establishment of site 1432 has the potential to displace fisheries that occur within the lease area. DFO has coarse inshore lobster catch and effort data at the statistical grid level, as mapped in this report: <https://waves-vagues.dfo-mpo.gc.ca/Library/40573230.pdf>. All other fisheries are mapped on a hexagon grid level at 10 square kilometres, available in this report: https://publications.gc.ca/collections/collection_2020/mpo-dfo/Fs97-6-3373-eng.pdf. The spatial and temporal resolution of fisheries data, however, are too low to precisely indicate which fisheries occur within the lease area. Fisheries that occur in the general vicinity and could potentially be displaced include American Lobster, groundfish, Sea Scallop, Atlantic Mackerel and Atlantic Herring. The lease area of site 1432, however, is small relative to the fishing grounds for each of these fished species. Despite this, DFO encourages the proponent to engage with fishing industry rights holders and stakeholders on their proposal.

If you have any questions concerning this letter, or if DFO's understanding of the application is either incorrect, incomplete, or if there are changes to the application, please contact me either by telephone at 902-402-0298 or by email at Edward.Parker@dfo-mpo.gc.ca.

Sincerely,

Edward Parker
Senior Advisor, Aquaculture Management Office
Maritimes Region

cc: M. McLean, Ecosystem Management, DFO Maritimes
M. Comley, Southwest Nova Scotia Area Office, DFO Maritimes
J. Berthier, Resource and Indigenous Fisheries Management, DFO Maritimes
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G. Herbert, Marine Planning and Conservation, DFO Maritimes
S. Hopper, Small Craft Harbours, DFO Maritimes and Gulf

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: March 18, 2022 1:41 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>; Dobson, Suzanne <Suzanne.Dobson@dfo-mpo.gc.ca>; Humphrey, Donald <Donald.Humphrey@dfo-mpo.gc.ca>; Williams, Wendy <Wendy.Williams@dfo-mpo.gc.ca>; McLean, Mark G <Mark.McLean@dfo-mpo.gc.ca>; FitzGerald, Jennifer L <Jennifer.FitzGerald@dfo-mpo.gc.ca>; Comley, Mark <Mark.Comley@dfo-mpo.gc.ca>; Stevens, Todd E <Todd.Stevens@dfo-mpo.gc.ca>; Berthier, Jacinta <Jacinta.Berthier@dfo-mpo.gc.ca>; Sullivan, Mike DJ <Mike.Sullivan@dfo-mpo.gc.ca>; Brager, Lindsay <Lindsay.Brager@dfo-mpo.gc.ca>; Herbert, Glen <Glen.Herbert@dfo-mpo.gc.ca>; Coffen-Smout, Scott <Scott.Coffen-Smout@dfo-mpo.gc.ca>; Hopper, Stephanie <Stephanie.Hopper@dfo-mpo.gc.ca>; Richard, Pauline M <Pauline.Richard@dfo-mpo.gc.ca>
Subject: DFO ADVICE: Liverpool Bay (Mersey Point) - Finfish Aquaculture Site - New Site - AQ#1433

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

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Hi Lynn,

Please find attached to this email DFO's advice on Kelly Cove Salmon Ltd.'s application for an aquaculture licence for a new marine finfish cage aquaculture site 1433 in Liverpool Bay, Queens County, for the cultivation of Atlantic Salmon (Saint John River strain).

Thanks,
Ed

Edward Parker (he/him | il/lui)
Regional Senior Aquaculture Management Officer
Telephone | Téléphone 902-402-0298
Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca
Fisheries and Oceans Canada | Pêches et Océans Canada
PO Box 1006, P600, Dartmouth, NS B2Y 4A2
CP 1006, P600, Dartmouth, N-É B2Y 4A2
Government of Canada | Gouvernement du Canada

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LOA_2019-MarAq-0
17_Kelly Cove Salmo

1 Challenger Drive, P600
Dartmouth, NS
B2Y 4A2

March 18, 2022

DFO File # 2019-MarAq-017

Lynn Winfield, Licensing Coordinator
1575 Lake Road
Shelburne, Nova Scotia
B0T 1W0

Dear Lynn Winfield:

Subject: New Marine Finfish Cage Aquaculture Site 1433 – Kelly Cove Salmon Ltd.

As requested, Fisheries and Oceans Canada (DFO) has completed its review of the application of Kelly Cove Salmon Ltd. (the proponent) for an aquaculture licence under the provincial *Fisheries and Coastal Resources Act*. The proponent is requesting a licence for a new marine finfish cage aquaculture site 1433 in Liverpool Bay, Queens County, for the cultivation of Atlantic Salmon (Saint John River strain).

DFO's review consisted of the following:

- Email from Lynn Winfield, Licensing Coordinator, Nova Scotia Department of Fisheries and Aquaculture (NSDFA), dated June 27, 2019, titled, "AQ#1433 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Mersey Point), Queens County";
- Email from Leah Lewis-McCrea, Sweeney International Marine Corp, dated October 24, 2019, titled, "Liverpool Bay Deployments Raw Data";
- Email from Melinda Watts, Aquaculture Advisor, NSDFA, dated August 26, 2020, titled, "FW: QUESTION: Liverpool aquaculture proposals";
- Emails from Melinda Watts, Aquaculture Advisor, NSDFA, dated April 14, 2021, and May 14, 2021, titled, "RE: Liverpool Bay Aquaculture Site Proposals"; and
- Email from Jennifer Hewitt, Compliance Manager, Kelly Cove Salmon Ltd., dated February 8, 2022, titled, KCS Sea Lice Management Plan.

DFO's legislative mandate

In accordance with DFO's legislative mandate, which includes the *Fisheries Act*, *Species at Risk Act* (SARA), *Oceans Act* and applicable regulations, the application was reviewed to assess:

- the deposit of deleterious substances;
- the death of fish by means other than fishing;
- the harmful alteration, disruption or destruction of fish habitat;
- the killing, harming or harassing of SARA-listed species and the destruction of their critical habitat; and
- the introduction of aquatic species into regions or bodies of water frequented by fish where they are not indigenous.

The following DFO sectors/offices participated in the review:

- Small Craft Harbours;
- Ecosystem Management - Regulatory Review;
- Marine Planning and Conservation;
- Resource and Indigenous Fisheries Management;
- Southwest Nova Scotia Area Office; and
- Science.

The results of DFO Science's review will be published online by the DFO Canadian Science Advisory Secretariat in a Science Response titled, "DFO Maritimes Region Science Review of the Proposed Marine Finfish Aquaculture Boundary Amendment and New Sites, Liverpool Bay, Queens County, Nova Scotia". The publication can be searched for at the website <https://www.isdm-gdsi.gc.ca/csas-sccs/applications/Publications/search-recherche-eng.asp>.

DFO's risk-based approach for review of the application

DFO's review of the application used a risk-based approach with the objective of protecting fish and fish habitat, including SARA-listed species. DFO conducted a risk assessment using pathways of effects to establish cause-and-effect relationships by linking activities to stressors and stressors to effects on fish and fish habitat. Using the precautionary approach, the residual effects were evaluated after incorporating Kelly Cove Salmon Ltd.'s mitigation measures and the regulatory requirements of DFO and other federal and provincial regulators, to determine whether or not to recommend additional mitigation measures.

Fish and fish habitat, including SARA-listed species, at risk of impact from stressors

In addition to information provided by the proponent, DFO used its own databases and expert knowledge to identify which fish and fish habitat, including SARA-listed species, are at risk of impact by stressors as a result of the construction and operation of site 1433. Much of the data for the areas at risk of impact, however, are of low spatial and temporal resolution and too sparse to give a robust indication of the seasonality and spatial distribution of fish and fish habitat. Despite these limitations with the data, DFO focused on fish and fish habitat susceptible to aquaculture impacts, with particular focus on SARA-listed species and species assessed as endangered, threatened or of special concern by the Committee on the Status of Endangered Wildlife in Canada.

SARA-listed species likely to be found within the areas at risk of impact include: Fin Whale; Blue Whale; North Atlantic Right Whale; Leatherback Sea Turtle; White Shark; Spotted Wolffish; and Northern Wolffish. However, no critical habitat or residences of SARA-listed species are likely to be found within the areas at risk of impact. Species assessed by the Committee on the Status of Endangered Wildlife in Canada, and their habitat, that are likely to be found within the areas at risk of impact include: Southern Upland Atlantic Salmon (endangered); American Eel (threatened); Cusk (endangered); Atlantic Cod (Southern population) (endangered); and Bluefin Tuna (endangered).

Other fish, and their habitat, that are likely to be found within the areas at risk of impact include: American Lobster; Sea Scallop; Haddock, White Hake, Atlantic Halibut, Atlantic Herring, Atlantic Mackerel; Gaspereau; American Oyster; crab; clam, Blue Mussel, Green Sea Urchin and Waved

Whelk. There is no evidence of there being benthic macrophyte beds such as eelgrass beds or kelp beds within the areas at risk of impact.

DFO's risk assessment results

DFO assessed the risk of physical alteration of habitat structure of the water column and of the benthos due to the presence of the farmed fish and the site infrastructure, such as the mooring system, grid system and cages. Incidental death of slow moving or non-motile species that may occur due to the placement or movement of infrastructure is expected to be low relative to local population sizes. Bycatch or entanglement of fish is expected to be low relative to local population sizes. The likelihood of SARA-listed species being in close proximity to the site infrastructure is low given the relatively shallow water depth. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of alteration in light due to shading caused by the farmed fish and aquaculture site infrastructure, or due to increased light levels caused by artificial illumination. Although there is no evidence of there being benthic macrophyte beds within the area at risk of impact, shading of the beds, if present, should be avoided. Although the proponent plans to install four LED lights per cage at 5 meters depth, annually, from mid-November to mid-April, the illumination within the visible light spectrum is not likely to penetrate more than a few meters below the bottom of the cages. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of noise due to the use of acoustic deterrent devices, vessels, equipment and machinery for various day-to-day operations. The proponent does not plan to use acoustic deterrent devices, and other sounds have short-term localized effects that do not appear sufficient to cause injury or permanent displacement. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of the deposit of nutrients and organic material released through waste feed, feces, metabolic waste products and bio-fouling organisms. DFO made a precautionary overestimate, called benthic predicted exposure zone, of the area at risk of impact from the deposit of biochemical oxygen demanding matter. Waste feed is anticipated to have the greatest intensity of impact, and may extend up to 389 meters from the center of the cages, with the intensity of impacts decreasing with distance from cages.

The proponent submitted to DFO the predicted contours (i.e. spatial extent and intensity) of the footprint of the biochemical oxygen demanding matter that would be deposited as waste feed and feces during maximum daily quantity of feed usage. The prediction suggests a potential for elevated free sediment sulfide concentration, which is a measurement of the impact of biochemical oxygen demanding matter, under the cages. There is a risk that the mean concentration of free sediment sulfide could exceed 3000 micro-molar, a threshold above which the *Aquaculture Activities Regulations* would prohibit restocking of the site. The proponent should be reminded that under subsection 7(2) of the *Aquaculture Activities Regulations*, the proponent must take reasonable measures to minimize the deposit of waste feed and feces, having regard to the factors set out in paragraphs 7(1)(a) to (c).

DFO assessed the risk of the release of aquatic invasive species. The site infrastructure, such as the mooring system, grid system and cages provides additional artificial habitat for colonization by aquatic invasive species such as tunicates. Excessive growth of bio-fouling organisms will be prevented, however, through routine infrastructure cleaning and maintenance. Vessel and equipment movements can be pathways for the introduction of aquatic invasive species through ballast water, bilge water or hull fouling. Inspection and cleaning of equipment, ballast tanks, bilges and hulls, however, should reduce the risk. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of accidental and intentional deposit of chemicals. The intentional deposit of pest control products that are registered, or whose use is authorized under the federal *Pest Control Products Act*, is regulated by the *Aquaculture Activities Regulations*. DFO made a precautionary overestimate, called pelagic predicted exposure zone, of the area at risk of impact from deposit of azamethiphos, the most toxic pest control product. Concentrations of azamethiphos that may be toxic to susceptible species may travel up to 3.5 kilometers from the center of the cages. The intensity of exposure is expected to be highest near the site and decrease as distance from the site increases, except for in areas where overlaps in the pelagic predicted exposure zones are anticipated. This could occur if azamethiphos was to be deposited the same time as at site 1205 or the other proposed site 1432 in Liverpool Bay. Pelagic larval lifestages of American Lobster within the area at risk of impact may be exposed to toxic concentrations of azamethiphos. At shallower depths within the area at risk of impact, all lifestages of American Lobster may be exposed. Azamethiphos is unlikely to persist in the aquatic environment. The proponent should be reminded that under subsection 7(1) of the *Aquaculture Activities Regulations*, the proponent must, in depositing a pest control product referred to in paragraph 2(b), take reasonable measures to minimize detriment to fish and fish habitat outside the facility, having regard to paragraphs 7(1)(a) to (c). This is especially important during times of high larvae abundances, typically July through September. DFO recommends that the proponent implements their Sea Lice Management and Treatment Plan, received by email from Jennifer Hewitt on February 8, 2022, to mitigate this risk.

The intentional deposit of drugs whose sale is permitted or otherwise authorized, or whose importation is not prohibited under the federal *Food and Drugs Act*, is regulated by the *Aquaculture Activities Regulations*. DFO assumed that the deposit of in-feed drugs is dominated by the deposit of medicated waste feed and feces, therefore the area at risk of impact from the deposit of drugs is the same as the precautionary overestimate, called benthic predicted exposure zone, made for biochemical oxygen demanding matter. Waste feed and feces may extend up to 389 meters and 1659 meters beyond the proposed lease boundaries, respectively. The intensity of exposure is expected to be highest near the site and decrease as distance from the site increases, except for in areas where overlaps in the pelagic predicted exposure zones are anticipated. This could occur if in-feed drugs were to be deposited the same time as at 1205 or the other proposed site 1432 in Liverpool Bay. Adult lobsters may be exposed to in-feed drugs. Scientific uncertainties regarding the exposure and effects of drugs on non-target populations limits DFO's assessment of the deposit of drugs. The proponent should be reminded that under subsection 7(1) of the *Aquaculture Activities Regulations*, the proponent must, in depositing a drug referred to in paragraph 2(a), take reasonable measures to minimize detriment to fish and fish habitat outside the facility, having regard to paragraphs 7(1)(a) to (c).

The accidental or intentional deposit of deleterious substances other than those regulated by the *Aquaculture Activities Regulations* into waters frequented by fish is subject to the general prohibition under section 36 of the *Fisheries Act*, irrespective of the amounts or inherent toxicity of the substance. No additional mitigation measures for this stressor are recommended.

DFO assessed the risk of the release of farmed fish, henceforth referred to as Atlantic Salmon escapees. Southern Upland Atlantic Salmon are at highest risk of impact from Atlantic Salmon escapees. If, despite containment measures, Atlantic Salmon escapees were to occur, they would be capable of swimming to most Southern Upland Atlantic Salmon rivers. Direct genetic impacts of hybridization and introgression, as well as ecological interactions that alter selection pressures such as the transfer of diseases, predation, or competition for space, food, or mates could result in the reduction of population size and genetic diversity of Southern Upland Atlantic Salmon. Because the risks are proportional to the number of Atlantic Salmon escapees, DFO recommends that the proponent prioritize preventing Atlantic Salmon escapees. DFO recognizes NSDFA's increasing regulatory requirements for preventing and responding to Atlantic Salmon escapees. DFO will continue collaborating with NSDFA, industry and others towards further improvements in mitigating the effects of Atlantic Salmon escapees through improved prevention, early detection, tracking and response.

DFO's assessment of the risk of the release of pathogens will occur via the review of the proponent's application to DFO to stock Atlantic Salmon pursuant to sections 55 and 56 of the *Fishery (General) Regulations* made under the federal *Fisheries Act*. DFO will not issue the Licence if the Atlantic Salmon have any disease or disease agent that may be harmful to the protection and conservation of wild fish. To apply for an Introductions and Transfers License, the proponent should email NSITC.XMAR@dfo-mpo.gc.ca.

Potential overlaps with fisheries

Establishment of site 1433 will displace fisheries that occur within the lease area. DFO has coarse inshore lobster catch and effort data at the statistical grid level, as mapped in this report: <https://waves-vagues.dfo-mpo.gc.ca/Library/40573230.pdf>. All other fisheries are mapped on a hexagon grid level at 10 square kilometres, available in this report: https://publications.gc.ca/collections/collection_2020/mpo-dfo/Fs97-6-3373-eng.pdf. The spatial and temporal resolution of fisheries data, however, are too low to precisely indicate which fisheries occur within the lease area. Fisheries that occur in the general vicinity and could potentially be displaced include American Lobster, groundfish, Sea Scallop, Atlantic Mackerel and Atlantic Herring. The lease area of site 1433, however, is small relative to the fishing grounds for each of these fished species. Despite this, DFO encourages the proponent to engage with fishing industry rights holders and stakeholders on their proposal.

If you have any questions concerning this letter, or if DFO's understanding of the application is either incorrect, incomplete, or if there are changes to the application, please contact me either by telephone at 902-402-0298 or by email at Edward.Parker@dfo-mpo.gc.ca.

Sincerely,

Edward Parker
Senior Advisor, Aquaculture Management Office
Maritimes Region

cc: M. McLean, Ecosystem Management, DFO Maritimes
M. Comley, Southwest Nova Scotia Area Office, DFO Maritimes
J. Berthier, Resource and Indigenous Fisheries Management, DFO Maritimes
M. Sullivan, Ecosystem Science, DFO Maritimes
G. Herbert, Marine Planning and Conservation, DFO Maritimes
S. Hopper, Small Craft Harbours, DFO Maritimes and Gulf

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: May 20, 2022 2:52 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>; Dobson, Suzanne <Suzanne.Dobson@dfo-mpo.gc.ca>; Humphrey, Donald <Donald.Humphrey@dfo-mpo.gc.ca>
Subject: Liverpool Bay proposals-wharf usage concerns allayed

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Hi Lynn,

I am emailing regarding implications for usage of DFO's Small Craft Harbour infrastructure, specifically Brooklyn Government Wharf, that we identified after providing our letters of advice for Kelly Cove Salmon Ltd.'s proposals for Liverpool Bay. After having learned of these concerns, I followed up with Kelly Cove Salmon Ltd. to gather more specific information on their planned usage of the wharf. It turned out that their only planned usage was to tie up two additional 35 foot boats at Brooklyn Government Wharf, where they would also be refueled. All other site-related activity was planned to occur at Port Mersey Commercial Park Wharf. DFO Small Craft Harbours verified with the Brooklyn Government Wharf Harbour Authority, however, that there is no room for the boats. I informed Kelly Cove Salmon Ltd. of this, and they responded that their plan will be revised to not tie up at Brooklyn Government Wharf, but to either moor the boats in the harbor or tie them up at the Port Mersey Commercial Park Wharf.

To ensure that such last-minute issues related to Small Craft Harbour infrastructure are prevented for marine finfish and shellfish aquaculture site reviews in the future, we will be looking for the following details in applications from now on:

Specific dates identifying each of these 3 timeframes:

Construction phase, Operations phase, Decommissioning phase

Provide details regarding the items listed below for each of the 3 timeframes identified above:

Slip usage

Parking and Land use (ex.- storage for building materials, additional traffic, etc...)

Waste disposal (oil, garbage, etc.)

Power supply usage

Water supply

Berthage (How many vessels, size of vessels, etc.)

Fuel needs

Hoist usage

Thanks,

Ed

Edward Parker (he/him | il/lui)
 Regional Senior Aquaculture Management Officer
 Telephone | Téléphone 902-402-0298
 Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca

Fisheries and Oceans Canada | Pêches et Océans Canada
PO Box 1006, P600, Dartmouth, NS B2Y 4A2
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From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: July 12, 2022 9:16 AM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: CSAS Report for KCS Apps 1205X, 1432, 1433

Good morning Ed,

I hope you're enjoying summer so far!

Are you able to provide a status update of the FINAL draft of the CSAS Report for Kelly Cove Salmon's Liverpool Bay proposals? I have checked the DFO website but do not see anything as of yet.

Any insight would be helpful.

Thank you,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: July 13, 2022 1:28 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: CSAS Report for KCS Apps 1205X, 1432, 1433

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Summer is going great thus far! Thanks for asking Melinda! I hope you are enjoying it too. I don't see it online yet. I emailed the CSAS office but see that the individual is out of office for the next couple of days. So it may take a few to get back to you. I hope that's ok.

Ed

Edward Parker (he/him | il/lui)
Regional Senior Aquaculture Management Officer
Telephone | Téléphone 902-402-0298
Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca
Fisheries and Oceans Canada | Pêches et Océans Canada
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From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: July 13, 2022 2:14 PM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: CSAS Report for KCS Apps 1205X, 1432, 1433

Not a problem Ed, thank you for getting back to me and following up with the CSAS office.

Speaking of summer, I'm away next week on vacation but Lynn Winfield, who is copied here can update the bigger group if I'm not back before the response comes in.

Cheers,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: August 22, 2022 12:38 PM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: CSAS Report for KCS Apps 1205X, 1432, 1433

Good afternoon Ed,

Just checking in again on the Liverpool Bay CSAS reports.

I was just looking on the DFO portal and didn't see anything so wondering if you ever heard back from their office?

Thanks,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: Friday, August 26, 2022 9:19 AM
To: McIntyre, Tara M <Tara.McIntyre@dfo-mpo.gc.ca>
Cc: Brager, Lindsay <Lindsay.Brager@dfo-mpo.gc.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: CSAS Report for KCS Apps 1205X, 1432, 1433

Hi Tara,

Nova Scotia Department of Fisheries and Aquaculture are asking for a status update on the publication of the CSAS Science Report: **DFO MARITIMES REGION SCIENCE REVIEW OF THE PROPOSED MARINE FINFISH AQUACULTURE BOUNDARY AMENDMENT AND NEW SITES, LIVERPOOL BAY, QUEENS COUNTY, NOVA SCOTIA.**

Is this something the CSAS office can provide an update on, please? I've copied Melinda and Lynn with NS DFA in case you can update them at the same time.

Thanks,
Ed

Edward Parker (he/him | il/lui)
Regional Senior Aquaculture Management Officer
Telephone | Téléphone 902-402-0298
Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca
Fisheries and Oceans Canada | Pêches et Océans Canada
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From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: August 26, 2022 9:21 AM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: CSAS Report for KCS Apps 1205X, 1432, 1433

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Hi Melinda,

I had asked for an update immediately after you first asked last month, but have not received a response. I just cc'd you and Lynn on another request for an update.

Thanks and Sorry for the delay.
Ed

Edward Parker (he/him | il/lui)
Regional Senior Aquaculture Management Officer
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Facsimile | Télécopieur 902-426-7967
Edward.Parker@dfo-mpo.gc.ca
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From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: August 26, 2022 9:26 AM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: CSAS Report for KCS Apps 1205X, 1432, 1433

Not a problem Ed, thank you for following up with the CSAS folks, both times.

Cheers,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

From: McIntyre, Tara M <Tara.McIntyre@dfo-mpo.gc.ca>
Sent: August 26, 2022 9:44 AM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Cc: Brager, Lindsay <Lindsay.Brager@dfo-mpo.gc.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: CSAS Report for KCS Apps 1205X, 1432, 1433

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Hi Ed

The report is currently slated to be published in September.
I will forward you the posted notice when I receive it from the national CSAS office.

Tara

From: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Sent: September 21, 2022 8:58 AM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: CSAS Report for KCS Apps 1205X, 1432, 1433

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Hi Melinda and Lynn,

SRR2022/039 - DFO Maritimes Region Science Review of the Proposed Marine Finfish Aquaculture Boundary Amendment and New Sites, Liverpool Bay, Queens County, Nova Scotia has been published and can be found here: [Science Response 2022/039 \(dfo-mpo.gc.ca\)](https://www.dfo-mpo.gc.ca/science-response-2022-039).

Thanks,
Ed

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DFO MARITIMES REGION SCIENCE REVIEW OF THE PROPOSED MARINE FINFISH AQUACULTURE BOUNDARY AMENDMENT AND NEW SITES, LIVERPOOL BAY, QUEENS COUNTY, NOVA SCOTIA

Context

Kelly Cove Salmon Ltd. has submitted applications to the Province of Nova Scotia to amend their existing Liverpool site (#1205) and to construct and operate two new sites, Mersey Point (#1433) and Brooklyn (#1432), in Liverpool Bay, Queens County, Nova Scotia.

As per the Canada-Nova Scotia Memorandum of Understanding on Aquaculture Development, the Nova Scotia Department of Fisheries and Aquaculture (NSDFA) has forwarded these application to Fisheries and Oceans Canada (DFO) for review and advice in relation to DFO's legislative mandate. The applications were supplemented by information collected by the proponent as required by the *Aquaculture Activities Regulations* (AAR).

To help inform DFO's review of these applications, the Regional Aquaculture Management Office has asked for DFO Science advice on the Predicted Exposure Zones (PEZs) associated with the range of aquaculture activities, and the predicted impacts on susceptible fish and fish habitat, including sensitive *Species at Risk Act* (SARA) listed species, susceptible fishery species, and the habitats that support them.

Specifically, the following questions are addressed for each application:

Question 1. Based on available data for the site and scientific information, what is the predicted exposure zone from the use of approved fish health treatment products in the marine environment, and the potential consequences to susceptible species?

Question 2. Based on available information, what are the Ecologically and Biologically Significant Areas (EBSAs), Species At Risk (SAR), fishery species, Ecologically Significant Species (ESS) and their associated habitats that are within the predicted benthic exposure zone and vulnerable to exposure from the deposition of organic matter? How does this compare to the extent of these species and habitats in the surrounding area (i.e., are they common or rare)? What are the anticipated impacts to these sensitive species and habitats from the proposed aquaculture activity?

Question 3. How do the impacts on these species from the proposed aquaculture site compare to impacts from other anthropogenic sources (including existing finfish farms)? Do the zones of influence overlap with these activities and if so, what are the potential consequences?

Question 4. To support the analysis of risk of entanglement with the proposed aquaculture infrastructure, which pelagic aquatic species at risk make use of the area, and for what duration and when?

Question 5. Which populations of conspecifics are within a geographic range that escapes are likely to migrate to? What is the size and status trends of those conspecific populations in the escape exposure zone for the proposed site? Are any of these populations listed under Schedule 1 of the SARA?

This Science Response Report results from the Science Response Process of February 24–25, 2021, on DFO Maritimes Region Review of the Proposed Marine Finfish Aquaculture Sites and Boundary Amendment, Liverpool Bay, Queens County, Nova Scotia.

Background

Kelly Cove Salmon Ltd. is requesting an amendment to expand the boundaries and increase the production level at their existing Liverpool #1205 site, and to construct and operate two new sites, Mersey Point (#1433) and Brooklyn (#1432), in Liverpool Bay, Queens County, Nova Scotia. The proposed actions will increase the total leased area and production of Atlantic Salmon within the bay. The only other aquaculture activity in the vicinity of the sites is a land-based facility. The location of the sites are shown in Figure 1.

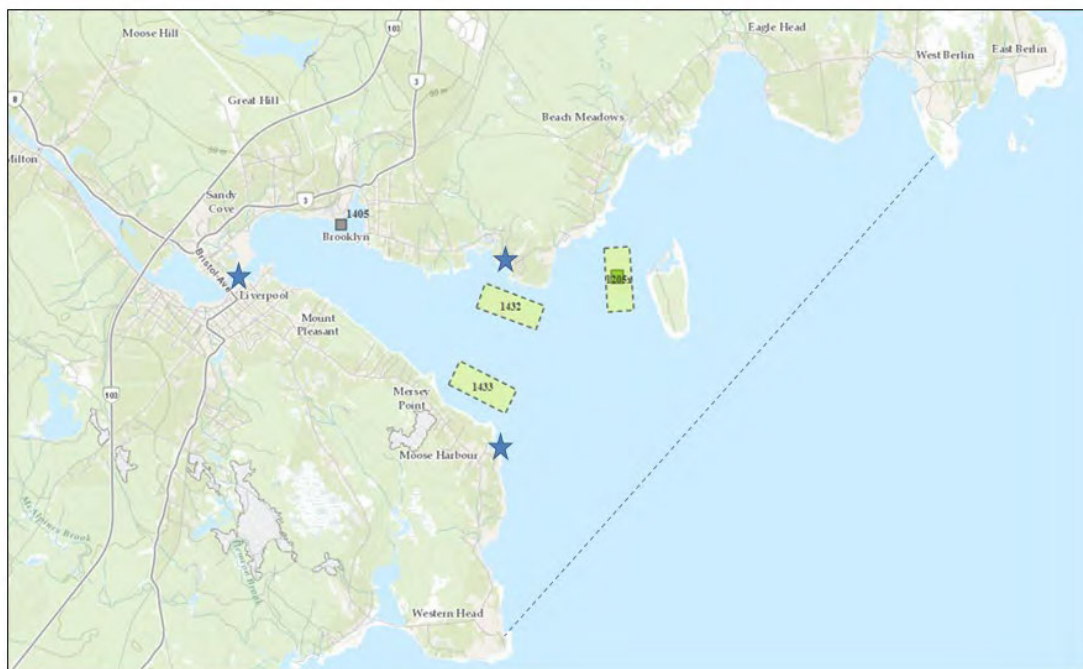


Figure 1. Map of finfish aquaculture site leases in Liverpool Bay, Queens County, Nova Scotia. Light green polygons represent proposed finfish leases requested by Kelly Cove Salmon Ltd. The darker green box denotes the existing #1205 Liverpool site lease. The grey square represents the location of a land-based aquaculture facility. Maps were retrieved from the NSDFA Site Mapping Tool website on August 17, 2020 (NSDFAa). Stars show approximate locations of seasonal lobster holding facilities. The dotted blue line is the approximate 'open boundary' used by Gregory et al. 1993 for Liverpool Bay.

The existing site (#1205) has been in operation since 2002, and was acquired by Kelly Cove Salmon Ltd. in 2011. The current area under lease by site #1205 is approximately 4 hectares (ha) with 14 cages in a 2 x 7 grid configuration. The proposed amendment would

increase the area of the site to a total of 40.7 ha. This increase allows for the incorporation of all aquaculture-related gear, above and below the water line, and the addition of six cages to the south of the current grid for a total of 20 cages in a 2 x 10 configuration. The same lease sizes and cage configurations are proposed for the additional sites at Mersey Point and Brooklyn. Liverpool Bay has previously been estimated to have an area of 3590 ha within the 'open boundary' shown in Figure 1 (Gregory et al. 1993). Therefore, approximately 3.4% of Liverpool Bay would be occupied by finfish leases with the proposed expansion. The approved production at the existing site 420,000 Atlantic Salmon. The maximum production plan at the proposed sites is 660,000 Atlantic Salmon per site, with a grow-out period of approximately 22 months from stocking. This represents an approximate 370% increase in the number of farmed fish in Liverpool Bay. The site development plan for the bay, with bathymetry, is presented in Figure 2.

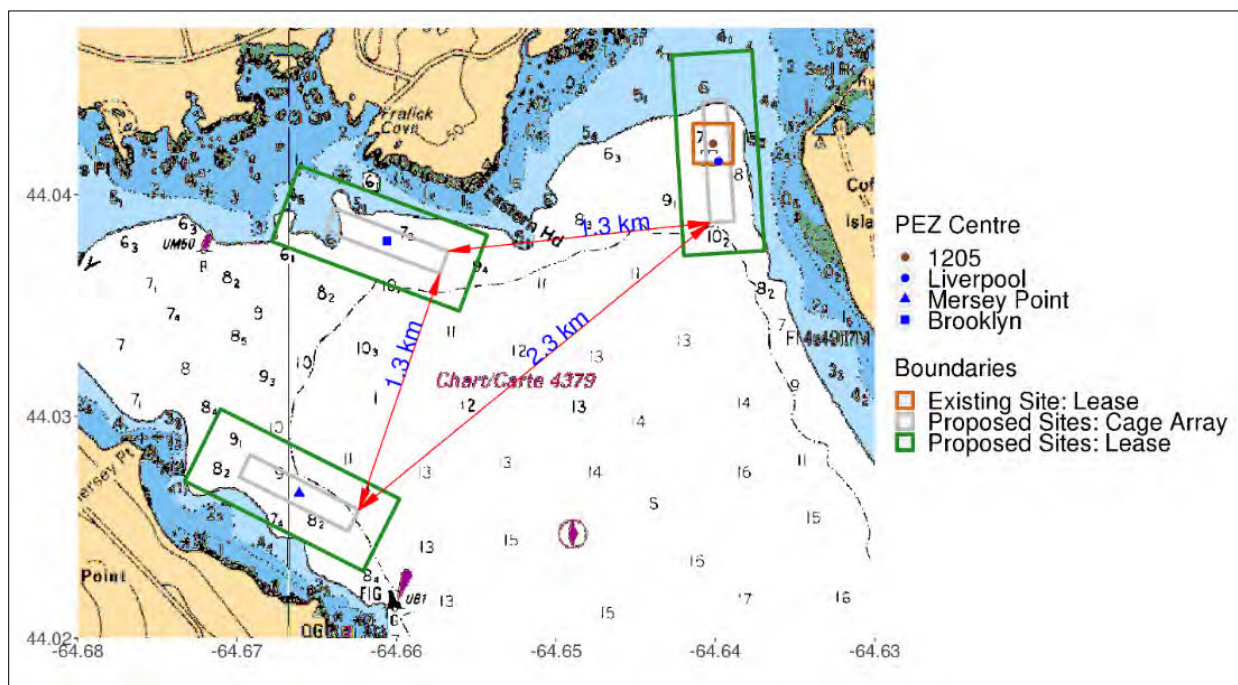


Figure 2. Current (brown) and proposed (green) lease boundaries overlaid on CHS chart #4379 (depths shown in fathoms). Distance between each proposed cage array (grey) is shown. The centers of each lease for predicted exposure zone calculations are also shown.

The sites are located in an area with variable bottom type and ecosystem characteristics (i.e., sand, mud, cobble, boulder, bedrock, shell debris). Proponent-submitted baseline data indicates the seabed beneath the proposed Mersey Point site is characterized by mixed substrates (hard-packed sand, pebbles, cobble, rubble and boulders), while the proposed Brooklyn site is characterized by harder and coarser sediment types only such as bedrock, boulders, and cobble. Baseline data collected at Liverpool while the existing #1205 site was stocked indicated mostly hard-packed sand and shell debris. Prevalent waste feed was also noted at the site center. Sediment sulfide concentration ranges based on Environmental Monitoring Program (EMP) data collected at the existing #1205 site from 2011–2019 are shown in Table 1.

Table 1. Station mean sediment sulfide concentration ranges (measured according to the Environmental Monitoring Program (EMP) Framework for Marine Aquaculture in Nova Scotia, NSDFAb). Records are shown from when the proponent acquired the site. The EMP data was retrieved from Nova Scotia's Open Data Portal on August 17, 2020 (NSDFAb).

Date	Sulfide Concentration Range (μM)	Sample Size (n)*	Production Stage
July 2011	77–3,677	3 stations	Year 1 fish
July 2012	51–5,477	4 stations	Year 2 fish
June 2013	78–551	3 stations	Harvest and fallow
July 2014	53–470	5 stations	Year 1 fish
July 2015	74–11,030	3 stations	Year 2 fish
July 2016	0	1 station	Harvest and fallow
October 2017	220–540	6 stations	Year 1 fish
July 2018	120–2,327	4 stations	Year 2 fish
July 2019	38–110	4 stations	Harvest and fallow

**each station consisted of 3 replicate samples*

Linkages between sediment sulfide concentrations and overall sediment conditions such as oxic state and macrofauna diversity at aquaculture sites are well documented (Pearson and Rosenberg 1978, Hansen et al. 2001, Wildish et al. 2001, Hargrave et al. 2008). The sediments beneath the existing site have demonstrated elevated sediment sulfides in the past with concentrations at some stations reaching Hypoxic B ($> 3,000 \mu\text{M}$) levels in 2011 and 2012, and an Anoxic ($> 6,000 \mu\text{M}$) level in 2015 based on Hargrave 2010 oxic categories (Appendix A). The location of these stations are shown in Figure 3. Some of the highest sulfide concentrations were observed during production stages of larger fish (i.e., year 2).

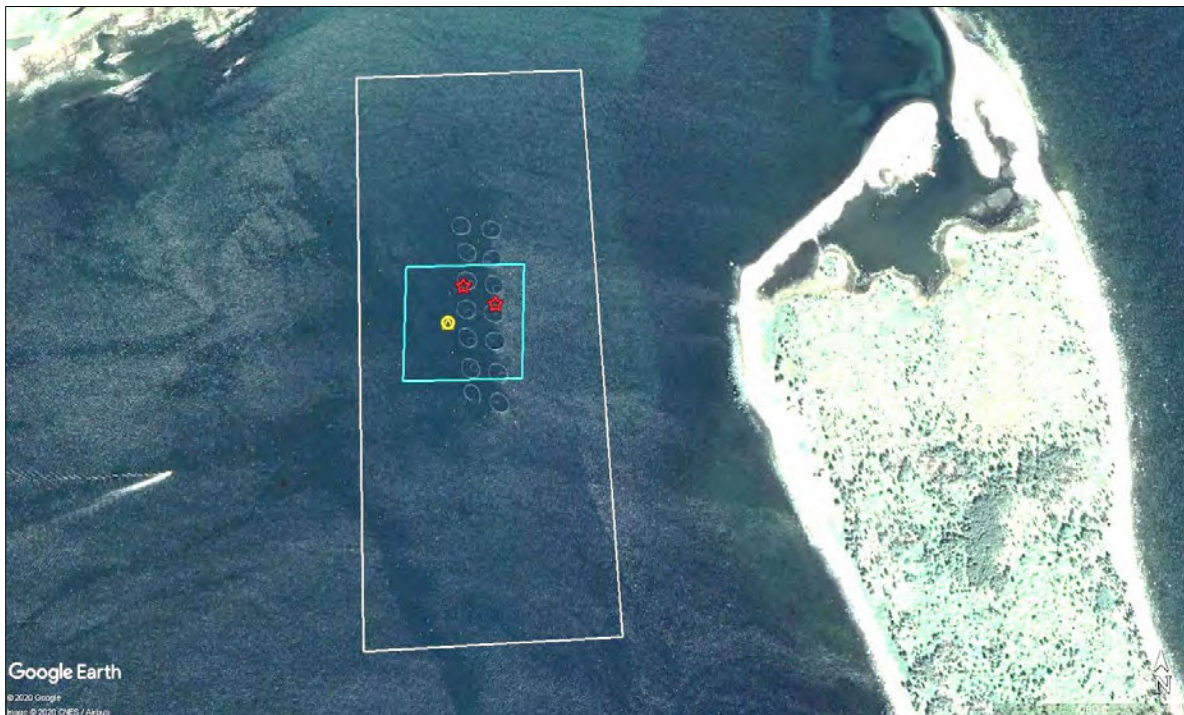


Figure 3. Environmental Monitoring Program stations at site #1205 that have exceeded mean sediment sulfide concentrations of 3,000 μM (yellow) and 6,000 μM (red), respectively, overlaid on a Google Earth image of the existing cages. Exceedances occurred in 2011 (triangles), 2012 (circles), and 2015 (stars). The existing #1205 lease boundary is shown in cyan and proposed lease boundary in white.

The Google Earth imagery (Figure 3) depicts net-pens are anchored outside of the currently issued lease but within the proposed #1205 expanded lease boundaries. Available AAR data from 2015–2018 indicate that no pest control products (i.e., azamethiphos, hydrogen peroxide, emamectin benzoate) have been used at the existing site. This is consistent with other finfish sites in Nova Scotia. Available information on reported escapes since 2010 indicate there have been no reports of escapes at the existing site (DFO 2020a). Additionally, there have been no reports of entanglements of marine mammals, sea turtles, or other species of concern to this review at the existing site.

Fishing vessel traffic from DFO's Vessel Monitoring System (VMS) database shows that all three sites, including site #1205, are located in an area with active fisheries. Lobster is the predominant commercial benthic invertebrate fishery occurring from late November through May each year. These sites are located within Lobster Fishing Area (LFA) 33, where the stock is considered to be healthy based on determined stock reference points (DFO 2020b), and more specifically within reporting grid 310. Catch and effort data reported by fishermen show that within LFA 33, 5.4% of licenses annually report landings from this grid, which represents 2.4% of total landings for the LFA, on average. Three licensed lobster holding facilities exist within 1 km of the proposed sites at Moose Harbour wharf, Mersey Seafoods wharf, and Fralick Cove (as shown on Figure 1; DFO Resource Management). These facilities consists of holding cages placed in the water adjacent to the wharves and are used by lobster fishers to store catch while waiting for the appropriate market conditions to sell their product. These facilities are only used

during the commercial lobster season and are removed from the water during the off-season. The sites are also located within Scallop Fishing Area 29; however, the commercial fishery for scallop is typically further offshore.

Commercial groundfish and pelagic species in the area include Haddock, Atlantic Cod, Hake, Atlantic Halibut, Atlantic Herring, and mackerel. Cod and Haddock in Liverpool Bay are within the 4X5Y Northwest Atlantic Fisheries Organization (NAFO) management unit for these fisheries. The exact stock structure of Cod inshore is unknown; however, 4X5Y Cod is considered in the Critical zone. A review of tagging studies by Fowler (2011) concluded that there may have been several discrete Haddock reproductive populations in the past, many of which were inshore, but currently the remaining populations are offshore. The remaining populations are thought to be highly migratory and may come inshore during warmer months. The 4X5Y Haddock stock was considered in the Healthy zone in 2019 (DFO 2019a). All three proposed sites overlap with identified gillnet fishing activities within the Little Hope Herring fishing area, an area that is > 100,000 ha in size off SWNS from LaHave Islands down to Western Head. Herring spawning is also known to occur within the Little Hope fishing area from September–November based on the spawning condition of Herring landed from the area. The actual locations of Herring spawn on substrate within the Little Hope area is currently undocumented. The area is also noted to be used by juvenile Herring since they typically feed close to shore and fishermen have reported schools near shore (e.g., wharves). Gaspereau were also noted as a commercial fishery in the area (DFO Resource Management). Marine plants such as rockweed and wrack seaweed are also harvested for commercial purposes in the area.

There are Food, Social, and Ceremonial (FSC) fisheries for Lobster and Eel in Liverpool Bay (DFO Resource Management). All three proposed sites were noted to overlap with identified glass eel (pre-elver) fishing and nursery areas through DFO's Coastal Fisheries Mapping Project (DFO Oceans and Coastal Management Division). Additional information on the size of the area or how specifically juveniles use the coastal habitat around the sites is lacking. Glass eels likely pass through these areas when migrating to streams further into bay and estuary such as the Mersey River, Herring Cove Brook, and Beach Meadows Brook. American Eel populations have been assessed as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) since 2012 and are under consideration for listing under the SARA. Recreational fisheries for groundfish species and mackerel also occur in the area.

DFO database searches also indicated presence of Cusk and Bluefin Tuna in the area (both assessed by COSEWIC as Endangered), crab, and more sessile species such as clam, sea urchin, and whelk. Proponent-submitted baseline data also commonly identified the presence of mussel shells.

The existing and proposed sites are both within the migration pathways and range of the Nova Scotia Southern Upland (SU) wild Atlantic Salmon population. The nearby Mersey and Medway rivers are known Atlantic Salmon rivers. The SU Salmon run in the Medway River in Port Medway Harbour, which is approximately 10–12 km from Liverpool Bay, while the Mersey River is thought to be extirpated. Aquaculture escapees have been found in rivers at distances of up to 200–300 km from the nearest aquaculture site (Morris et al. 2008) and, although the Mersey and Medway rivers are closest in proximity, the majority of salmon rivers in the SU region are within that range. The SU Salmon have been assessed as Endangered by COSEWIC since

2010 and are under consideration for SARA-listing. Beginning in 2010, all rivers within Salmon Fishing Area (SFA) 21 were closed to recreational fishing for Atlantic Salmon and there have been no FSC allocations.

Species at risk that may be present in the area according to DFO's Aquatic Species at Risk Map include White Shark, Northern Wolffish, Spotted Wolffish, Leatherback Sea Turtle, North Atlantic Right Whale, Blue Whale, and Fin Whale. No overlaps between the proposed aquaculture sites and Critical Habitat for these species were identified (DFO 2019b).

Additionally, no DFO Ecologically and Biologically Significant Areas (EBSA) or Ecologically Significant Species (ESS) have been identified as having the potential to overlap with the proposed aquaculture activities. There is anecdotal information that suggests eelgrass (an ESS) could be present in Liverpool Bay, including documented eelgrass presence in neighbouring bays and along the south shore of Nova Scotia; however, satellite images from 2012 and 2016 and drone images from 2017 of Liverpool Bay does not indicate the presence of eelgrass. Furthermore, proponent-submitted baseline data collected at each site in 2019 did not indicate the presence of eelgrass. While this does not preclude the possibility of small patches existing in sheltered areas with suitable habitat, eelgrass is unlikely to occur in significant aggregations within the vicinity of the sites based on available data.

A provincially-designated nature reserve is located on Coffin Island, approximately 250 m from the proposed #1205 site and within 5 km of all three proposed sites. Other human activities, that represent a combination of land- and marine-based sources that have the potential to influence the Liverpool Bay marine ecosystem, also occur within 5 km of the existing and proposed sites. These include other industrial activities, the presence of land-based contaminated sites near the coastline, boat traffic, commercial fishing activities, and nutrient loading.

Key oceanographic, farm infrastructure and grow-out characteristics of the existing sites and proposed expansion considered in the following analyses are summarized in Table 2.

Table 2. Key oceanographic, farm infrastructure and grow-out characteristics of the existing and proposed site. Information sources are the proponent's development plan and baseline data reports, as well as the wind and wave conditions report for Liverpool Bay (CMAR 2020). Information not available for the existing site at the time of this review is indicated by n/a.

Characteristic	Liverpool	Mersey Point	Brooklyn	Additional Information
Tidal range (m)	2.1	2.1	2.1	<ul style="list-style-type: none"> • Same at existing site. • Range does not include surges in sea level.
Depth of tenure (m)	7.0–20.0	8.0–21.0	4.0–20.0	<ul style="list-style-type: none"> • 7.0–14.0 m at existing site. • Relative to vertical chart datum (lowest normal tide).
Current speed (cm/s)				<ul style="list-style-type: none"> • Same at existing site.

Characteristic	Liverpool	Mersey Point	Brooklyn	Additional Information
• Surface	0.1–52.5	0.1–29.7	0.1–37.3	• Surface currents measured at 14–16 m from bottom.
• Midwater	0.2–53.7	0.1–21.6	0.0–20.2	• Midwater currents measured at 8–9 m from bottom.
• Bottom	0.0–43.3	0.0–23.4	0.1–18.2	• Bottom currents measured at 3–4 m from bottom.
	Dominant flow directionality to N-NW.	Dominant flow directionality to SE-NW.	Dominant flow directionality to NW.	• Current speeds measured at the Liverpool site include a storm event.
Maximum 10-year significant wave height (m)	3.24 (S)	2.95 (ESE)	3.42 (SSE)	• Same at existing site.
Salinity (PSU)	30–32	30–32	30–32	• Same at existing site. • Length of measurement unknown.
Temperature (°C)	-0.4–19.9	-0.4–19.9	-0.4–19.9	• Same at existing site. • Measured from May 2014–November 2018.
Dissolved oxygen (mg/L)	4.35–14.3	4.35–14.3	4.35–14.3	• Same at existing site. • Typically above 6 mg/L. • Measured from June 2014–June 2018.
Substrate type	Mainly hard-packed sand and shell debris	Mix of hard-packed sand, pebbles, cobble, rubble, boulders	Mainly bedrock, cobble, boulders	• Same at existing site.
Net-pen array configuration	2 x 10	2 x 10	2 x 10	• 2 x 7 at existing site.
Individual net-pen	100	100	100	• Same at existing site.

Characteristic	Liverpool	Mersey Point	Brooklyn	Additional Information
circumference (m)				
Net-pen depth (m)	9	8	8	<ul style="list-style-type: none"> • Same at existing site. • Predator nets to 9–10 m.
Grow-out period (months)	< 22 months	< 22 months	< 22 months	<ul style="list-style-type: none"> • Same at existing site.
Maximum number of fish on site	660,000	660,000	660,000	<ul style="list-style-type: none"> • 420,000 at existing site.
Initial stocking number (fish/pen)	33,000	33,000	33,000	<ul style="list-style-type: none"> • 30,000 at existing site.
Average harvest weight (kg)	5.5	5.5	5.5	<ul style="list-style-type: none"> • Same at existing site.
Expected maximum biomass (kg)	3,630,000	3,630,000	3,630,000	<ul style="list-style-type: none"> • 2,310,000 at existing site. • Assumes fish grown to 5.5 kg.
Maximum stocking density (kg/m³)	25.0	25.0	25.0	<ul style="list-style-type: none"> • n/a for existing site.

Sources of Data

Information to support this analysis includes data and information from the proponent, data holdings within DFO, publicly available literature, and registry information from the SARA database. Additionally, supporting information files submitted to DFO for consideration and used in its review are shown in Table 3.

Table 3. Summary table of information files submitted to DFO.

Description	Filename
Proposed development plan package	1) Liverpool Bay Package_FINAL_4Mar19.pdf
Baseline survey data submission	

Description	Filename
Proponent-collected raw current meter data	1) Liverpool 2010 Raw Direction & Speed Data.xlsx 2) Mersey Point 2012 Raw Direction & Speed Data.xlsx 3) Brooklyn 2019 Raw Direction & Speed Data.xlsx

The following DFO databases were searched for species records within the Predicted Exposure Zones (PEZs) of the proposed sites and records are in Appendix B:

- Ecosystem Research Vessel (RV) Survey
- Industry Survey Database (ISDB)
- Maritime Fishery Information System (MARFIS)
- Whale Sightings Database

Site Description

The physical characteristics of the existing and proposed sites are reasonably expected to be similar given the close proximity to one another (Figure 2). The water temperature and salinity at the proposed sites are expected to have some variation on tidal time scales, but larger variations on wind-driven and seasonal time scales. Values are expected to fall within the ranges indicated above (Table 2). Temperature records provided in the baseline submission report a maximum low temperature that is above the required $-0.7\text{ }^{\circ}\text{C}$ for “superchill” events; however, a die-off event that occurred in March 2019 at the existing #1205 site was suspected to have been related to cold ocean temperatures.

Near-shore bathymetry information in the vicinity of the proposed sites to supplement information submitted by the proponent is lacking in Departmental and public data holdings. Proponent collected bathymetry data shows a depth range between 4 and 21 m within the proposed leases, with the most shallow depths at the Brooklyn site. In comparison to the existing #1205 lease, the proposed expansion will shift the northern and southern portions of the lease closer to slightly shallower and deeper waters, respectively.

The wave information provided in the proponent’s report is from an open ocean buoy located 215 km south-southwest of Liverpool Bay, and is not considered representative of the waves experienced at the proposed sites. A wind and wave conditions report for the proposed sites indicate that the sites are particularly vulnerable to waves from the east and southeast that will travel directly into the bay (CMAR 2020). Wave modelling for Liverpool Bay (CMAR 2020) predicts reasonably large maximum significant wave heights (Table 2), although more typical wave heights are likely to be less.

Current meter deployments occurred in September–October 2010 and 2012 at the Liverpool and Mersey Point sites, respectively, and January–February 2019 at the Brooklyn site. The difference in timing likely accounts for the differences in maximum observed current speeds

(Table 2), particularly at the Liverpool site where the highest maximum current speed was observed between the three sites. It was confirmed that Hurricane Earl passed through during that deployment on September 4, 2010. This presents a unique opportunity to consider the potential spatial extent of exposure in both 'typical' and 'storm' conditions, and demonstrates that current speeds vary with complexities of seasonal, wind, and storm influences that may or may not be captured in the records. Based on proximity of the sites, it is reasonable to assume that, at any given time, current speeds at all three sites would be similar.

Over the 32–37 day period that current speeds were measured at the proposed sites, average current speeds did not vary significantly with depth. Depth-averaged current speeds were consistent between sites with a range between 5.05 and 5.34 cm/s, and 52–71% of observed current speeds were from 2–8 cm/s at all depths and all sites. Current speeds > 16 cm/s were only observed approximately 2% of the time. Therefore, current dynamics at these sites are considered to be “low energy” with respect to marine finfish farming, with the periodic occurrence of large waves and storm events.

Based on the depth profiles of current speed data, temperature, and salinity at the site, stratification is expected to be weak. Therefore, exposure predictions do not need to consider stratification influences.

Benthic Predicted Exposure Zones and Interactions

Benthic Predicted Exposure Zone

The benthic-PEZ is an early screening step in a triage-based approach. A precautionary first-order estimate is used to determine the size and location of areas that may be exposed to a substance introduced into or released from a site. It is used to broadly assess the potential for impacts on the benthic community and seafloor from the deposit of waste feed and feces, which can result in organic loading and direct habitat and infaunal species impacts. Additionally, it is assumed that the PEZ associated with the release of in-feed drugs is dominated by the deposition of medicated feed waste and feces. These predicted exposure zones are precautionary overestimates and are considered sufficient for identifying, albeit at a larger spatial scale, the potential for impacts from the proposed activity.

The dominant factors that will affect estimations of benthic exposure are farm layout, feeding practices, and oceanographic conditions such as the bathymetry and water currents. Benthic exposure can also occur in relation to the use of bath pesticides, particularly at sites over or near shallow depths such as all three proposed sites; however, this will be considered in the Pelagic-PEZ and Interactions section of this review.

First-order estimates of the spatial extent of the benthic-PEZ related to organic effluent and in-feed drugs from the proposed Liverpool, Mersey Point, and Brooklyn sites were calculated. Sinking rates of different particulate materials released from farmed fish (i.e., waste feed and feces) vary, although the distribution of the sinking speeds amongst the released particles is poorly characterized. Therefore, the minimum sinking rate for each category of particle (Table 4), along with the maximum site depth and maximum observed mid-water current speed in the proponent's record were used. The fish, and therefore the release of waste feed and

feces, are within the surface layer. Since these particles sink from the net-pens to the seabed, a mid-water current speed was selected as representative.

Table 4. First order benthic-Predicted Exposure Zone (PEZ) estimates of the potential horizontal distances travelled by sinking particles such as waste feed pellets, fish feces and in-feed drugs released from the fish farm (settling rates obtained from literature; Findlay and Watling 1994, Chen et al. 1999, Chen et al. 2003, Cromey et al. 2002, Sutherland et al. 2006, Law et al. 2014, Bannister et al. 2016, Law et al. 2016, Skoien et al. 2016).

Particle Type	Min. Sinking Rate (cm/s)	Max. Observed Current (cm/s)	Horizontal Distance Travelled (m)	PEZ Radius
LIVERPOOL				
Feed	5.3	53.7 <i>No storm - 20.3</i>	203 <i>No storm: 77</i>	515 <i>No storm: 389</i>
Feces	0.3	53.7 <i>No storm - 20.3</i>	3,580 <i>No storm: 1,353</i>	3,892 <i>No storm: 1,665</i>
Fines and Floccs	0.1	53.7 <i>No storm: 20.3</i>	10,740 <i>No storm: 4,060</i>	11,052 <i>No storm: 4,372</i>
MERSEY POINT				
Feed	5.3	21.6	86	398
Feces	0.3	21.6	1,512	1,825
Fines and Floccs	0.1	21.6	4,536	4,849
BROOKLYN				
Feed	5.3	20.2	76	389
Feces	0.3	20.2	1,347	1,659
Fines and Floccs	0.1	20.2	4,040	4,353

A PEZ is a circular zone centered on the middle of the proposed cage array and represent the outer limit for potential exposure; however, the benthic footprint is more likely a curved ellipse with a major axis length scale due to current directionality. The zones for each site were estimated by adding the horizontal transport distance to the longest length scale of the proposed net-pen array.

The benthic-PEZ does not provide an estimate of the intensity of organic loading within the site, and the zones do not imply that everywhere within the zone has the same exposure risk. The intensity of exposure is expected to be highest near the net-pen arrays and decrease as distance from the net-pens increases. The waste feed-PEZ is anticipated to have the greatest intensity of exposure, and is conservatively a circle centered on the net-pen array. The spatial extent of exposure has been estimated for the Liverpool site using the maximum observed current speed both including and excluding the storm event on September 4, 2010 (Figure 4).

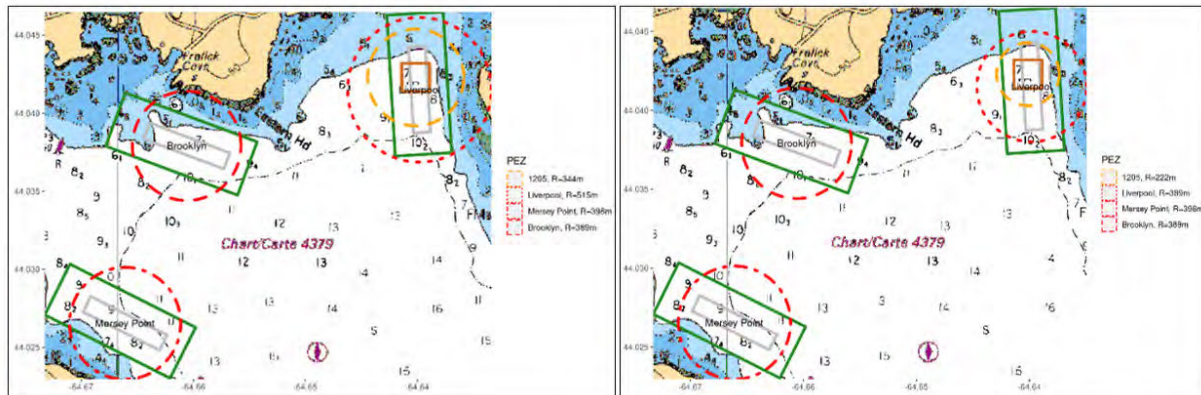


Figure 4. Benthic-Predicted Exposure Zones (PEZs) for the Liverpool (left: including storm event, right: excluding storm event), Mersey Point and Brooklyn proposed sites using the waste feed minimum sinking rate are shown in red overlaid on CHS chart #4379 (depths shown in fathoms). Net-pen arrays (grey) and lease boundaries (green) are shown. The existing #1205 Liverpool lease boundary and estimated benthic-PEZ are also indicated in brown and orange, respectively.

Based on the waste feed-PEZs, there are no overlaps between the benthic deposition zones where smothering and oxic-state changes are anticipated to occur due to organic loading (Figure 4). The spatial extent of the PEZs based on feces provides a better indication of the full area that could be exposed to any in-feed drugs used (Figure 5).

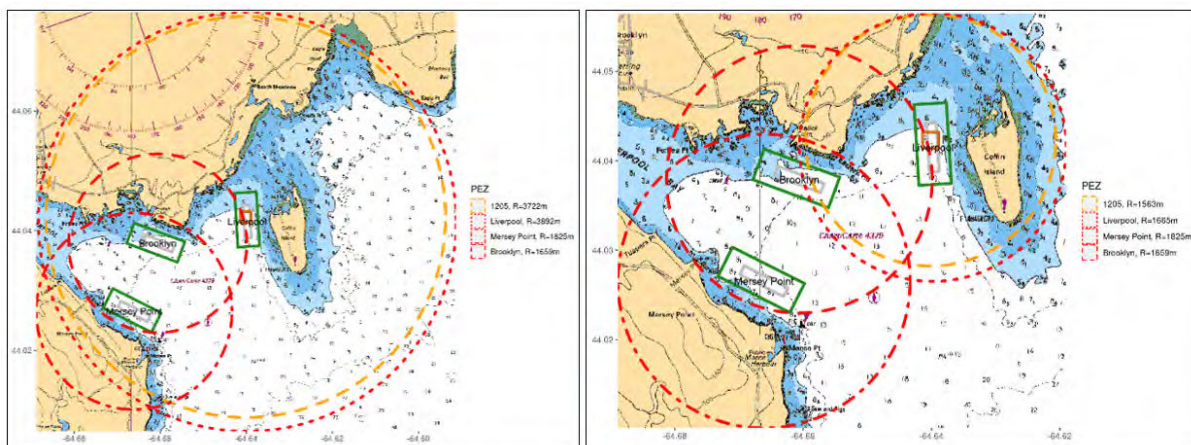


Figure 5. Benthic-Predicted Exposure Zones (PEZs) for the Liverpool (left: including storm event, right: excluding storm event), Mersey Point and Brooklyn proposed sites using the feces minimum sinking rate are shown in red overlaid on CHS chart #4379 (depths shown in fathoms). Cage arrays (grey) and lease boundaries (green) are shown. The existing #1205 Liverpool lease boundary and estimated benthic-PEZ are also indicated in brown and orange, respectively.

Overlaps in areas of feces deposition are predicted when the maximum current speed, both including and excluding the storm event captured in the Liverpool current meter record, is used (Figure 5). It is important to note that, although not done for the purposes of this review, using the maximum observed current speed during the storm event from the Liverpool current meter

record to estimate PEZs for the Mersey Point and Brooklyn sites would result in much larger PEZs for those sites and encompass some areas that are not covered in Figures 4 and 5.

Current- and wave-induced bottom resuspension is not explicitly considered for these first-order estimates of exposure. The large maximum significant wave heights predicted by modelled wave dynamics at the proposed sites and the shallow water depths suggest that material deposited on the seabed will be resuspended and shifted around by these extreme waves during storm events. Studies in nearby Jordan Bay have shown that waves do generate sediment resuspension and greater dispersal of particulates (Law and Hill 2019); hence, it is not unreasonable to assume similar results from wave action in Liverpool Bay. Waste particles are unlikely to extend beyond the benthic-PEZs estimated for fines and flocs, particularly when considering the spatial extent of particulates predicted from the Liverpool site which captures the full extent of transport during these storm events. The overall potential impacts of redistribution and flocculant deposition is unknown, but are not anticipated to occur at levels where significant exposures are predicted.

Sediment sulfide concentrations in certain locations at the existing site have reached Hypoxic B and Anoxic oxic categories under current levels of production (Table 1; Figure 3), and these levels may increase as the total benthic footprint within the bay increases with the proposed expansion and addition of two new sites. The resuspension and transport of accumulated material on the bottom due to the periodic occurrence of large waves and storm events in Liverpool Bay likely contribute to the seabed beneath the proposed sites being periodically reset, and predicted exposures and interactions may therefore be transient.

Susceptible Species Interactions

Species are considered to be susceptible within the benthic-PEZ if they are sessile at any life stage and are sensitive to either low oxygen levels, smothering, loss of access to the site, or exposure to in-feed drugs, if used. This includes species such as crustaceans and bivalves. Specific consideration was also given to the presence of certain sensitive sessile species, such as sponges, corals and eelgrass, and Critical Habitat for SARA-listed species in the baseline survey data, scientific literature, and Departmental biological data holdings. When the available data are limited, consideration as to whether the benthic substrate type is suitable for the growth of these species was considered.

Although industry and internal holdings are limited in their abilities to observe all susceptible species in the coastal zone, available data indicate that Lobster, crab, clam, mussels, sea urchin, and whelk are present within the benthic-PEZ.

Studies have demonstrated the correlation of Lobster presence points (as indicated by Lobster traps) with the presence of rock and gravel substrate within Liverpool Bay. The most suitable habitat within Liverpool Bay appears to be closer to the shoreline and in proximity to the Liverpool, Mersey Point, and Brooklyn proposed sites, with a slightly higher probability of presence near the Liverpool and Brooklyn as compared to the Mersey Point site (McKee et al. 2020). However, preliminary results from a DFO Lobster tagging study in Liverpool Bay show that Lobster travel throughout most areas of the bay (Figure 6).

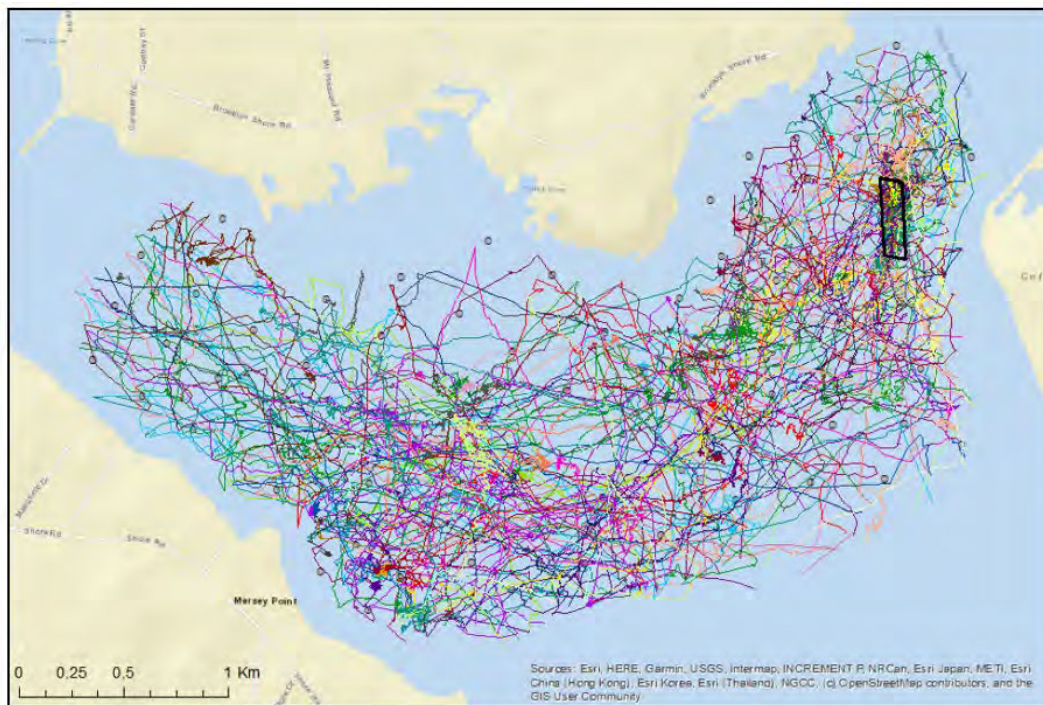


Figure 6. Movement of 50 lobsters tagged in Liverpool Bay in 2019. The black polygon represents the existing lease.

Areas of bottom habitat at the proposed aquaculture sites may also be highly suitable for settlement of larval lobster given the preferential selection for hard-bottom substrates. Increased sedimentation associated with the proposed aquaculture activities may preclude the settlement of larval lobster. Bivalves such as clams and mussels are also sensitive to siltation and the potential for smothering due to excess deposition that exists within the benthic-PEZ, particularly given their sessile nature. The potential for smothering also exists for the other sessile species in the area such as sea urchin and whelk. Given the periodic occurrence of large waves and storm events that contribute to the seabed being periodically reset, the accumulation of depositional material on the seabed may not be sufficient to result in smothering.

In-feed anti-sea lice drugs, such as Emamectin Benzoate (EB), have been shown in lab studies to have lethal toxic effects to crustaceans and can induce sub-lethal effects, including premature moulting (Burrige et al. 2000, Waddy et al. 2002, Burrige et al. 2008). If sea lice becomes an issue and anti-sea lice drugs are used, this may be of particular concern given the presence of Lobster within the benthic-PEZs. Bivalves in the vicinity of net pens have also been shown to have measureable quantities of in-feed drugs such as EB. Currently, hazard information is primarily based on acute exposures; however, it does not indicate a high level of risk (Burrige et al. 2011).

While the potential for exposures to organic matter and in-feed drugs (if used) already exist at the current #1205 Liverpool site, it is anticipated to increase as the individual and cumulative benthic-PEZs increase with the proposed expansion.

Pelagic Predicted Exposure Zones and Interactions

Pelagic Predicted Exposure Zones for Pesticides

The pelagic-PEZ is an early screening step in a triage-based approach. A precautionary first-order estimate is used to determine the size and location of areas that may be exposed to a substance introduced into or released from a site. It is used to broadly assess the potential for impacts on susceptible species from the use of registered pesticides used in finfish aquaculture, if required. These predicted exposure zones are precautionary overestimates and are considered sufficient for identifying, albeit at a larger spatial scale, the potential for impacts from the proposed activity.

The two pesticides available for use in bath treatments (e.g., tarp bath and well-boat) are azamethiphos and hydrogen peroxide. The size of the pelagic-PEZ depends on the decay and/or dilution rate of the pesticide, a chosen concentration threshold, and choice of horizontal water current speed. The PEZ is estimated using toxicity information of azamethiphos, the most toxic of the pesticides registered for use in Canada. Health Canada's Pest Management Regulatory Agency (PMRA) has assessed that neither of the two registered pesticides (hydrogen peroxide and azamethiphos), nor their breakdown products, are expected to remain in suspension since they do not bind with organics or sediments and do not accumulate in organisms' tissues. Their half-lives are days to weeks, suggesting they will not persist in the environment at concentrations considered to be toxic (PMRA 2014, PMRA 2016a, PMRA 2016b, PMRA 2017).

The pelagic-PEZ for azamethiphos was calculated assuming the maximum near-surface current speed persists throughout the dilution or decay scale (Figure 7). The spatial extent of exposure has been estimated for the Liverpool site using the maximum observed current speed both including and excluding the storm event on September 4, 2010. A 3-hour duration was used to estimate the time required for the maximum azamethiphos target treatment concentration of 100 µg/L to dilute to the PMRA environmental effects threshold of 1 µg/L (DFO 2013a).

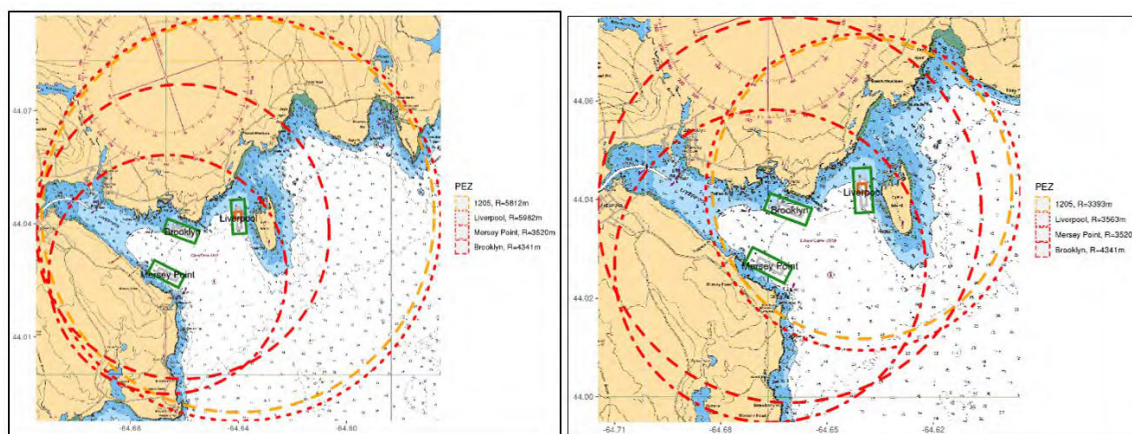


Figure 7. Pelagic-PEZs for the Liverpool (left: including storm event, right: excluding storm event), Mersey Point and Brooklyn proposed sites are shown in red overlaid on CHS chart #4379 (depths shown in fathoms). Net-pen arrays (grey) and lease boundaries (green) are shown. The existing #1205 Liverpool lease boundary and estimated benthic-PEZ are also indicated in brown and orange, respectively.

The near-surface current speed was used since the application of tarp bath treatments occurs in the surface waters. The pelagic-PEZ was calculated assuming the use of tarp bath treatments, regardless of whether all cages would meet the PMRA treatment conditions for application, given the larger exposure zone anticipated to result from a tarp treatment versus a well boat.

The pelagic-PEZ was estimated by adding the horizontal transport distance to the longest length scale of the proposed net-pen array. The pelagic-PEZ does not quantify the intensity or duration of exposure, nor include a frequency of exposure. The zones do not imply that areas within the pelagic-PEZ have the same exposure risk. The intensity of exposure is expected to be highest near the net-pen arrays and decrease as the distance from the net-pens increases, except for in areas of anticipated overlaps where cumulative exposures may occur.

The exposure is expected to primarily occur in the pelagic zone; however, areas within the pelagic-PEZ where the bathymetry is less than 10 m may also be at risk of exposure to toxic pesticide concentrations. The PMRA restriction on the use of azamethiphos at shallow sites (i.e., no application to tarped net pens in water depths ≤ 10 m) may be applicable to some net-pens.

If treatment is used at more than one site simultaneously, exposure overlaps associated with pesticide releases from the proposed sites are predicted when the maximum current speed, both including and excluding the storm event captured in the Liverpool current meter record, is used (Figure 7). However, it is recognized that estimates of exposure associated with storm scenarios would be a large overestimate since it is unlikely tarp applications would be used during a storm event.

The proposed addition of 6 net pens at the existing site may increase exposure time to azamethiphos within the pelagic-PEZ if the entire site requires treatment. This is based on the number of tarped net pens that can be treated simultaneously (no more than two) according to PMRA restrictions. This potential increase in exposure time is further amplified if sea lice were to become an issue within the bay at all three sites by the overall proposed addition of 46 net pens within the bay.

Since 2015, AAR reporting regarding the application of pesticides indicates that the existing #1205 Liverpool site has not required the use of pesticides such as azamethiphos.

Susceptible Species Interactions

Species were considered to be susceptible within the pelagic-PEZ if they are known to have sensitivities to pesticide exposures, should treatment be required. Specific consideration was given to the potential for interactions with crustaceans due to their higher relative susceptibility to the pesticides used in aquaculture.

Although industry and internal holdings are limited in their ability to observe all susceptible species in the coastal zone, available data indicate that Lobster and crab are present within the pelagic-PEZs for azamethiphos.

Azamethiphos tarp bath treatments are reported to pose risk levels that are below the established Level of Concern (LOC) for marine fish, marine mammals, and algae, but they are above the LOC for pelagic and benthic invertebrates. While in the environment, azamethiphos is

toxic to non-target crustaceans, including all life stages of Lobster (PMRA 2016b, PMRA 2017, Burridge 2013).

Little is known about the larval Lobster dispersal or retention along the South shore of Nova Scotia. Miller (1997) examined larval distribution along the south shore of Nova Scotia from Sambro to Jordan Bay. Lower abundances of larval Lobster were found at study locations to the east of Port l'Hebert, including Liverpool Bay, as compared to western study areas. When present, Lobster larvae are likely in the water column from July through September, with the highest abundances from mid-July to mid-August (Tremblay and Sharp 1987, Miller 1997). A seasonal movement is also likely for adult lobster, with Lobster moving to the deeper offshore waters during the coldest months to maintain ideal temperatures and returning in proximity to the proposed sites as inshore bottom waters warm during the summer months. When they are present, they appear to travel throughout most areas of the bay (Figure 6).

The presence of Lobster holding facilities within 1 km of the proposed sites (Figure 1) means that the PMRA restriction concerning the use of pesticides within 1 km of any active licensed Lobster holding facilities may be applicable at certain times. These facilities are active during the commercial Lobster fishing season, which occurs from late November through May.

Should anti-sea lice pesticides be used at any of these three sites, overlaps with shallow hard-bottom areas that are suitable settlement habitat for post-larval juvenile and adult Lobsters are predicted, with higher probability of interaction from July through September. Additionally, the PMRA restriction is expected to be applicable from late November through May during the commercial Lobster season based on overlaps with these facilities. Timing and method of treatment is an important consideration that can reduce the potential for impacts on non-target crustaceans.

Genetic Interactions

The proposed leases are within the range of the SU wild Atlantic Salmon population and SFA 21. The SU Atlantic Salmon population levels remain critically low and have been assessed as Endangered by COSEWIC since 2010. The SU population of Atlantic Salmon is considered to be biologically unique, and its extirpation would constitute an irreplaceable loss of Atlantic Salmon biodiversity (Gibson et al. 2011).

Escapes have been identified as an ongoing threat to the genetic integrity and persistence of wild Atlantic Salmon populations (Forseth et al. 2017, Bradbury et al. 2020b, Glover et al. 2020). Escapes of Atlantic Salmon from finfish aquaculture sites occur regularly, including in Atlantic Canada (Glover et al. 2017, Keyser et al. 2018, Diserud et al. 2019), and the true number of escapees are estimated to significantly exceed the number reported (Skilbrei et al. 2015, Mahlum et al. 2021, Føre and Thorvaldsen 2021). Escaped Atlantic Salmon have been found in rivers at distances of up to 200–300 km from the nearest aquaculture site (Morris et al. 2008), and escapees may continue to pose a threat to wild salmon for several years after escape (Aronsen et al. 2020). Recent genetic studies have documented widespread hybridization between wild Atlantic Salmon and aquaculture escapees across the natural range of wild Atlantic Salmon, notably in Norway (Karlsson et al. 2016) and Newfoundland (Sylvester et al. 2019, Wringe et al. 2018). These interactions can occur over large areas, and escapees can represent a significant portion of a population's annual production (Glover et al. 2013, Glover et

al. 2017, Heino et al. 2015, Sylvester et al. 2018, Wringe et al. 2018). Across the North Atlantic, the magnitude of genetic impacts on wild populations due to escaped farmed Atlantic Salmon has been correlated with the biomass of farmed salmon in net-pens and the distance between net-pens and rivers, as well as the size of wild populations (Keyser et al. 2018).

Direct genetic (i.e., reproductive) interactions between escapees and wild Atlantic Salmon can have negative impacts on the wild population (Glover et al. 2012). Both experimental and field studies have demonstrated decreased survival of hybrids in the wild (Fleming et al. 2000, McGinnity et al. 2003, Sylvester et al. 2019), and recent modeling indicates that population declines and loss of genetic diversity are likely when the percentage of escapees in a river relative to wild population size exceeds 10% annually (Castellani et al. 2015, 2018, Sylvester et al. 2019, Bradbury et al. 2020b). Recently, several modelling approaches have been used to estimate the impact of aquaculture production and escapees on wild Atlantic Salmon populations:

1. Propagule pressure
2. Individual-Based Salmon Eco-Genetic Model
3. Spatial dispersal of escapees

Propagule Pressure

Propagule pressure has been adapted from invasive species research where it represents the intensity of human-mediated species introductions. Propagule pressure has been used previously (e.g., Keyser et al. 2018) to quantify the intensity of aquaculture production on a river-by-river level assessment, where it was found to correlate with both numbers of escapees and levels of hybridization. Propagule pressure is calculated separately for each river, and uses geographical coordinates of all farms and river mouths, farm-level production (i.e., number of fish stocked) and a distance function for each farm to each river (Keyser et al. 2018). This model makes no assumptions about salmon behaviour or mortality, and therefore represents a geographical relationship between all farms and rivers. Propagule pressure was calculated for both the current stocking levels as well as the proposed expansion scenario (Keyser et al. 2018, see methods in Appendix C). With the proposed expansion, rivers in proximity to the expansion site will see the greatest increase; however, the propagule pressure experienced by nearly all rivers in the Maritimes Region will rise (Figure 8). Propagule pressure for rivers within 100 km of the proposed sites will increase by an average of approximately 17%, those within 50 km by an average of approximately 55%, and the largest increase will be approximately 107% for the Mersey River (Figure 8). Although, the Atlantic Salmon population in the Mersey River is considered extirpated, increases in escapees may hinder any future recovery efforts.

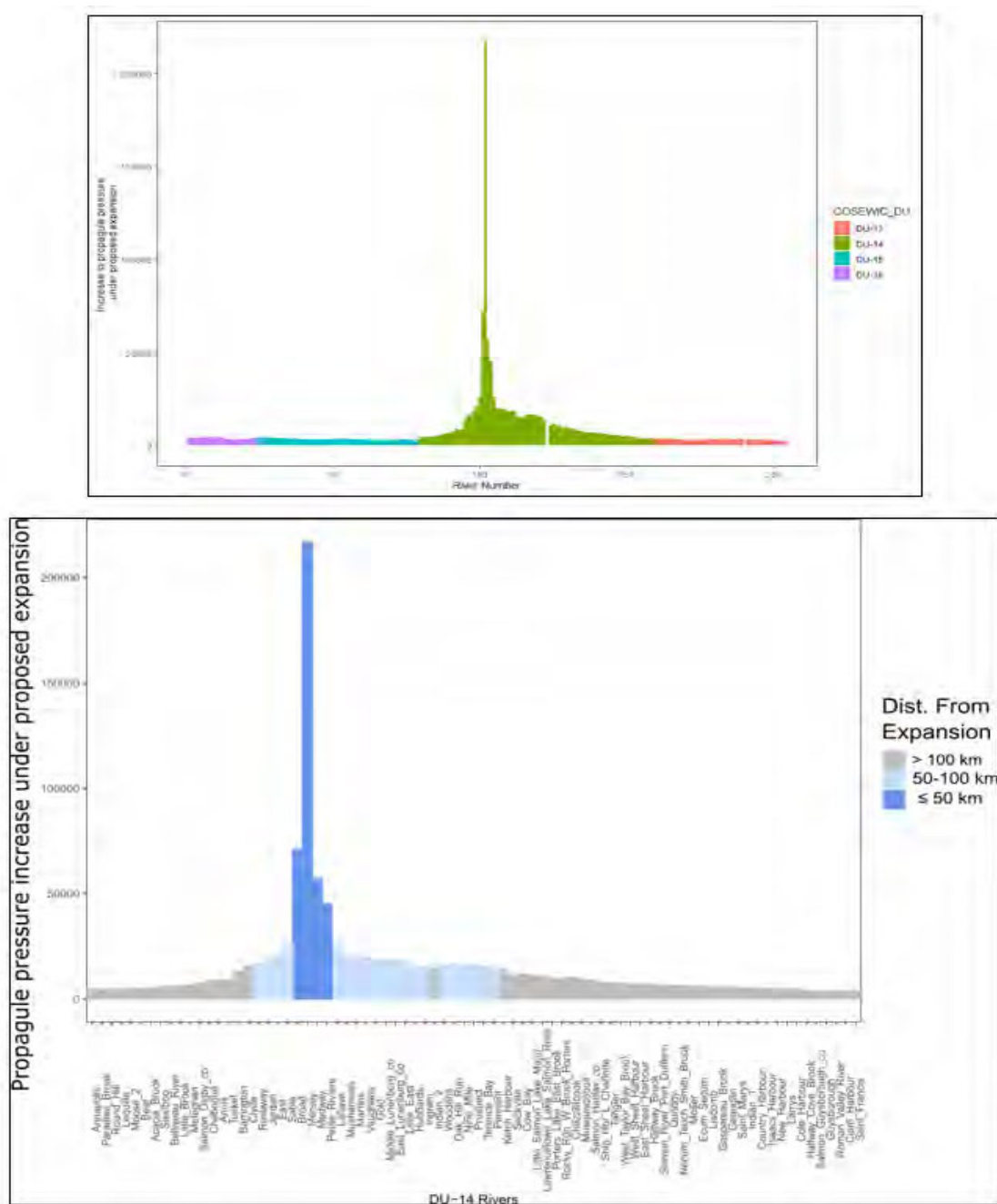


Figure 8. Top: Increase in propagule pressure for select rivers within the Maritimes Region. Propagule pressure was calculated as per Keyser et al. (2018). The proposed expansion is located approximately 10 km from the mouth of the Mersey River, number 102. Rivers are plotted west to east around the coast from the St. Croix River in Charlotte County (River 1), NB to the Salmon River in Victoria County in NS (River 204). Rivers are coloured by Designateable Unit (DU). Bottom: Increase in propagule pressure under the proposed expansion for select rivers within the Southern Uplands DU (DU-14). Rivers plotted are a subset of those in the top panel and correspond to river numbers 80 to 159. Colours indicate distance from the proposed expansion.

Individual-Based Salmon Eco-Genetic Model

To assess demographic and genetic impacts of aquaculture escapees on wild salmon populations, the Individual-Based Salmon Eco-Genetic Model (IBSEM, Castellani et al. (2015) used by Bradbury et al. (2020b) was adapted for this review. The IBSEM models changes in abundance, genotype, and individual size in response to the introduction of domesticated individuals (Castellani et al. 2015, 2018, Sylvester et al. 2019, Bradbury et al. 2020b). It considers the duration of invasion by farm escapees, wild population size, number of invaders, environmental conditions, individual size, genotypic and phenotypic and fitness differences between individuals of farm and wild origin. Simulations show the impact on abundance and genetic change during the invasion period as well as after the invasion has been “turned off” to assess the potential for recovery in these two measures. The IBSEM was re-parameterized to simulate the Tobique River for environmental and life-history data since it has the most parameters available for the IBSEM. Other values to parameterize the model were taken from across the global range of Atlantic Salmon. Invasions of 1–100% of the wild population per year were modelled, and the results were compared to a zero-percent invasion baseline.

As in Bradbury et al. (2020b), the number of returning spawners declined during the invasion period, but returned to the zero-percent invasion baseline relatively quickly during the recovery period at proportions of escapees between 2.5 and 10% of the wild population per year (see Figure C1, Appendix C). Above 10% escapees per year, the number of returning spawners declined during the invasion period, and were either slow to return, or did not fully return to the zero-invasion baseline during the 100 year recovery period (see Figures C1 and C2, Appendix C). The magnitude of decline in abundance was found to increase with the proportion of escapees entering rivers, and declines were continuous while invasions were occurring.

Within the model, wild individuals have genetic values approaching 1, and farmed individuals values approaching 0. Therefore, if the population genetic average declines, this indicates the population is becoming genetically more “farm-like”. As with abundance, if the average genetic value falls below the 95% confidence interval of the zero-percent invasion baseline, a genetic impact has been observed (Bradbury et al. 2020b). Compared to demographic impacts, genetic impacts were found to occur at a lower proportion of escapees, and require a longer time to recover (if at all). Genetic impacts were detected during the invasion period when the level of escapees were 2.5% or greater compared to the wild population (see Figure C3 and Figure C4, Appendix C). At levels of 7.5% and above, genetic impacts never fully recovered back to levels observed in the zero-percent invasion baseline during the 100 year recovery period (Figure C3 and C4, Appendix C). Like demographic impacts, genetic impacts were also shown to increase with the proportion of escapees entering rivers, and the genetic impacts increased while invasions were occurring.

A lower and higher impact threshold of 4% and 10%, respectively, was chosen for the proportion of escapees. The IBSEM simulations suggest that at invasion percentages of 5% or less demographic and genetic recovery was likely within 100 years of escapes stopping, while lasting demographic and genetic impacts are likely in populations experiencing influx levels at or above 10% even if escapes stopped (see Figures C1-C4, Appendix C). Between these two thresholds, the IBSEM results suggested that during the simulated 100 year recovery period following the cessation of escapes, demographic recovery was likely, but genetic recovery may

not fully occur (Figure C1 and Figure C3, Appendix C). The lower and upper threshold have both been used in previous siting reviews (DFO unpublished manuscript)¹.

Spatial Dispersal of Escapees

Dispersal of escapees from aquaculture facilities was modelled using Johannsson et al. (2017), as described in Bradbury et al. (2020b). This model incorporates information on local levels of aquaculture production, rates of escape, survival, behaviour, environment, and size of wild populations. The model output is the proportion of escapees (as a function of wild population size estimates) within a given river. Previous estimates from this model have been shown to be consistent with observed levels of hybridization (Bradbury et al. 2020b). Salmon populations in all rivers are assumed to be at 5% of the conservation egg requirement (Gibson and Claytor 2012), a value that is consistent with the best available estimates (DFO 2020c), and percentages of escapees are calculated relative to these values. At current production levels, the dispersal model predicts that a large number of rivers in the Maritimes Region are expected to be above both thresholds (Figure 9). Within the Southern Uplands DU, except for the Annis and Tusket rivers, all rivers to the west of Liverpool Bay are currently predicted to be above the upper 10% threshold, while all rivers to the east as far as Pennant River, near Halifax, are above the 4% threshold (Figure 9).

¹ DFO. 2021. Review Of The Marine Harvest Atlantic Canada Inc. Aquaculture Siting Baseline Assessments For The South Coast Of Newfoundland. Manuscript in preparation.

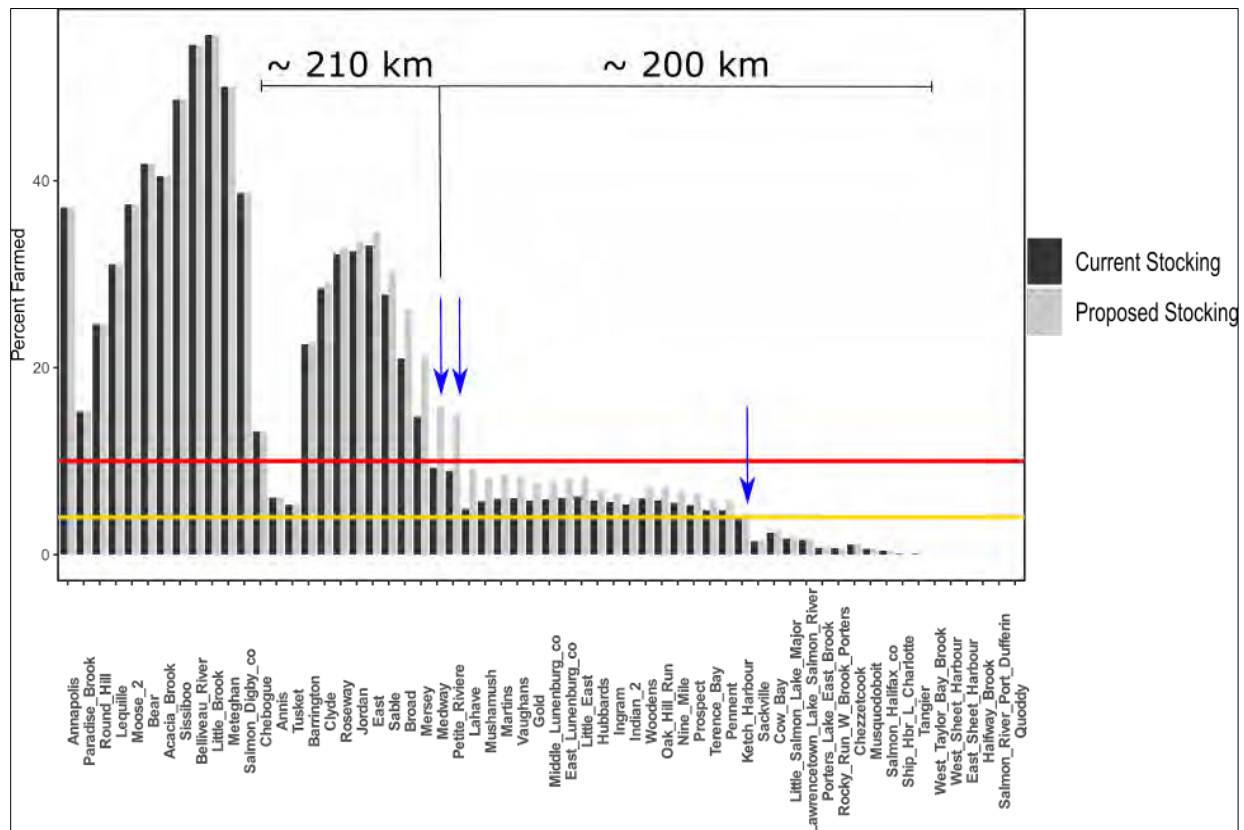


Figure 9. Predicted percent farmed salmon in selected rivers, arranged west to east, within the Southern Uplands DU. Rivers from the border of with the Inner Bay of Fundy DU in the east, to the Quoddy River to the west are shown (Numbers 80–40 in Figure 8). Expected proportions under current stocking numbers are shown in black. Expected proportions with the proposed expansion in Liverpool Bay operational are shown in grey. The horizontal yellow and red lines are the 4% and 10% thresholds, respectively. The proposed expansion is located approximately 10 km from the mouth of the Mersey River and is predicted to result in the Mersey, Medway and Ketch Harbour rivers (blue arrows) moving into higher risk thresholds. Distances from the proposed expansion site are shown by scale bars.

Compared to current production, the dispersal model predicts that the proposed expansion would result in an increase in the proportion of escapees in most rivers within 200 km on either side of the proposed Liverpool Bay expansion sites (Figure 9). Based on wild populations at 5% of the CER, the proportion of escapees in Mersey and Medway Rivers would increase beyond the 10% threshold, while the proportion in Ketch Harbour River would increase from being below the lower risk threshold to above the 4% threshold (Figures 9). Given the IBSEM model suggests that demographic and genetic impacts will increase with the proportion of escapees entering rivers, greater impacts to wild populations are expected in rivers where the dispersal model predicted increases in the percentage of escapees. Furthermore, increases in escapees may hinder future recovery efforts in rivers, such as Mersey River, where Atlantic Salmon are considered extirpated.

Summary of Genetic Results

Keyser et al. (2018) found that the number of aquaculture escapees and their genetic impact was positively correlated with propagule pressure, while the IBSEM results shown here, and in Bradbury et al. (2020b), indicate that both the genetic and demographic impact of aquaculture escapees increases with their proportion in rivers. Given that both propagule pressure and proportion of escapees in rivers will increase with the proposed Liverpool Bay expansion, it is likely the genetic and demographic impact from escapees impact will also increase as a result of the expansion.

Additionally, impacts on wild Atlantic Salmon population are possible in the absence of direct genetic impacts of hybridization or introgression between wild and escapee salmon. Bradbury et al. (2020a) highlighted the potential for ecological interactions, including competition, predation, and introduction of disease or parasites, to change the selective landscape, resulting in changes to fitness-related allele frequencies. Ecological interactions can also lead to reduced wild Atlantic Salmon population size and consequently reduce their genetic diversity. Reduced population size and genetic diversity would in turn lead to increased susceptibility to genetic drift and impact of stochastic events.

The closest rivers to the proposed sites are the Mersey and Medway. Southern Upland Atlantic Salmon were present in the Medway River during electrofishing surveys conducted by DFO in 2008. Salmon were not detected in the Mersey River during the survey, and the population is considered to be extirpated. Increases in escapees may hinder future recovery efforts in the Mersey and other SU rivers. In SFA 21, the index population for Atlantic Salmon assessment activities is the LaHave River, which is located approximately 40 km from the existing and proposed sites. The LaHave River watershed is one of the largest in SFA 21, and annual adult counts have occurred since 1970 at the Morgan Falls fishway (representing 51% of the total salmon rearing habitat of LaHave River). In 2019, monitoring efforts indicated that adult salmon returns to Morgan Falls were among the lowest returns on record, at 4% of the conservation egg requirement (DFO 2020c). The total counts at the Morgan Falls fishway have been below 250 individuals since 2012, with fewer than 100 returning salmon in 4 of those years (DFO 2020c). Recreational angling data from 1984–2008 indicate similar if not more severe declines in other SU rivers (Gibson et al. 2009a), prior to the complete closure of Atlantic Salmon angling for all rivers in SFAs 20 and 21 in 2010. For the LaHave River the proposed expansion would be expected to increase the propagule pressure by about 19% and the dispersal model predicts the proportion escapees would nearly double from 4.87 to 9.11%. While the LaHave River would remain below the 10% upper threshold, the IBSEM model indicated demographic and genetic impacts generally increased with proportion of escapees.

Given the low levels of SU Atlantic Salmon and the proximity of the proposed sites to salmon rivers, impacts to wild salmon should be minimized to the lowest possible level. Mitigation measures that decrease the likelihood of a containment breach (e.g., physical and containment and biocontainment measures) should be considered (DFO 2013, Benfey 2015, Bridger et al. 2015).

While the risks to SU Atlantic Salmon already exist at the current lease, these risks are expected to be at least proportional to the intensity of the activities themselves. Therefore, the

risks to the wild Salmon population will be greater with the proposed increases in the number of farmed Salmon within Liverpool Bay between the Liverpool, Mersey Point, and Brooklyn sites.

Pest and Pathogen Interactions

Cultured fish may acquire endemic diseases and/or sea lice infestations from wild fish or from other farmed fish in the area (DFO 2014). Given density-dependent transmission is observed in many host-pathogen systems, including sea lice on salmonid farms (Kristoffersen et al. 2013, Frazer et al. 2012), this can pose a significant health risk to farmed and wild fish when present at certain host density threshold levels (Krkošek 2010).

Since 2015, available AAR data confirm that no pest control products have been used at the existing site in Liverpool Bay. However, the sea lice abundance at the sites is unknown and the historical use of approved drugs and pesticides may not be a predictor of future disease outbreaks as production within the bay increases or as other influencing factors change. The addition of farmed fish to an area can reasonably be expected to amplify both endemic pathogens and pests in that area, due to the increase in the number of host fish. The impact on wild susceptible fish species will depend on the duration and extent of their exposure to the farm, the increased concentration of pathogens and parasites, and their relative susceptibility to infection and disease within the environmental conditions found in Liverpool Bay.

Physical Interactions

Bycatch or entanglement of wild species (e.g., wild fish, marine mammals, turtles, sharks) associated with the placement of infrastructure are also potential interactions associated with aquaculture sites.

The proposed increase in total leased area within Liverpool Bay may result in a loss of access to habitat used by wild populations during various life history stages. Overlaps between the proposed sites and herring spawning grounds were identified; however, the spawning area was defined using the spawning condition of landed herring rather than the presence of non-motile spawn on the substrate. Additionally, this habitat is not unique to the proposed lease areas or to Liverpool Bay given the size of the Little Hope fishing area and related spawning area.

Overlaps between the proposed sites and nursery habitat for juvenile American Eel were also identified. The size and uniqueness of the nursery habitat, as well as habitat use is unknown.

All near-shore areas along the North American coast with suitable surface temperatures and high prey densities are likely to be the primary feeding and staging grounds for immature wild salmon destined to return as spawners to rivers in the SU region (Thorstad et al. 2011). Additionally, limited data from a post-spawn adults (kelts) tracking study on LaHave River suggest that coastal habitats in the vicinity of their natal river are important for consecutive spawning adult Atlantic Salmon while reconditioning between spawning events (Hublely et al. 2008).

The proposed increase in total leased area may result in Lobster being inaccessible to the traditional Lobster fishery in Liverpool Bay. Preliminary results from a DFO Lobster tagging study in Liverpool Bay have found that individuals tagged under the existing Liverpool #1205 site did not stay beneath the site and individuals tagged at reference locations did not go under

the site (Figure 6; McKindsey and Robinson, DFO, pers. comm.). While the site was followed during the first year of sampling in Liverpool Bay, data were collected in 2020 when the site was stocked and are currently being analyzed. The results of this study will provide information on the behavior of Lobster beneath fish cages.

Potential *SARA*-listed marine mammal and sea turtle species within the area include North Atlantic Right Whale, Blue Whale, Fin Whale, and Leatherback Sea Turtle (DFO 2019b). North Atlantic Right Whale, Blue Whale, and Fin Whale frequent both offshore and coastal waters, particularly to feed and mate. The likelihood of these species being in close proximity to the site infrastructure is considered low given the relatively shallow water depths within the proposed lease areas. Leatherback Sea Turtle is the most common sea turtle recorded in Nova Scotian coastal waters; they inhabit both offshore and coastal waters, but have a median sightings water depth of over 100 m.

White Shark, Spotted Wolffish, and Northern Wolffish are also SAR identified in the area. Tracking data from August–October 2019 detected the presence of at least 15 distinct White Shark in Liverpool Bay directly around the proposed aquaculture sites (Trudel and McKindsey, DFO, pers. comm). To date, there have been no reports of White Shark entanglements in marine finfish aquaculture gear in Atlantic Canada. Additionally, both wolffish species are unlikely to be near the proposed sites, as their preferred habitat is in much deeper waters and trenches.

There have been no entanglement reports of wild species at the existing #1205 Liverpool site. The magnitude of exposure and physical interactions between fish and infrastructure at the proposed Liverpool, Mersey Point, and Brooklyn sites are unknown; however, if present, the increase in total leased area and infrastructure from the proposed expansion suggests a greater potential for interactions between these species and the infrastructure associated with the footprint of the existing site.

Potential Cumulative Interactions

The entire area of interest surrounding the three proposed finfish aquaculture sites in Liverpool Bay is influenced by human activity (Figure 10; Table 5).

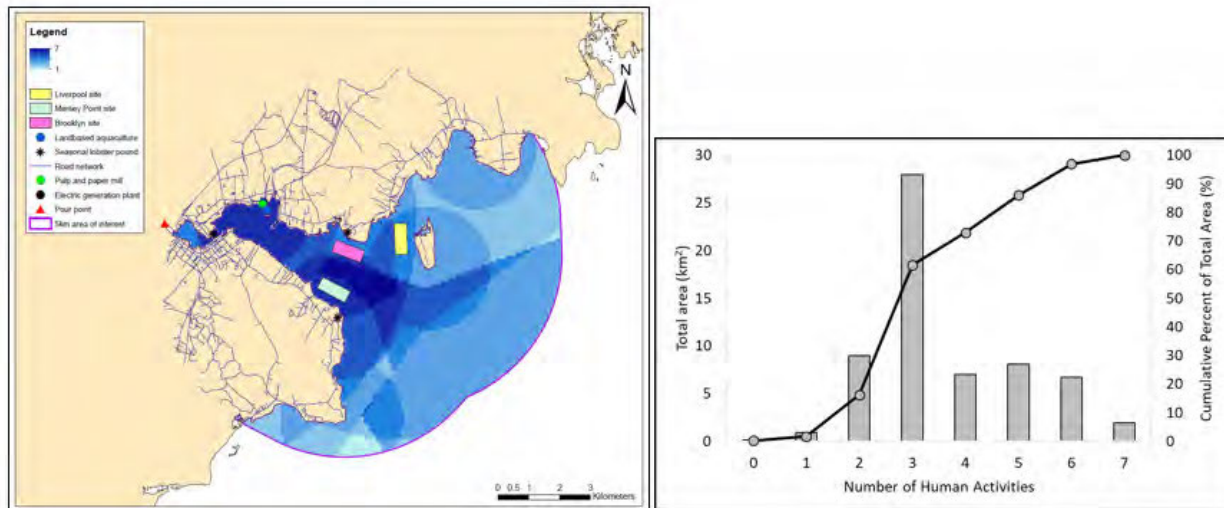


Figure 10. Left: Number of overlapping human activities in each 0.01 km² grid cell within the 5 km area of interest. The existing Liverpool Bay lease boundary amendment is represented by the yellow rectangle. The red triangle is the pour point location (i.e., the location where the Mersey River drains into Liverpool Bay). Locations of seasonal lobster holding facilities are presented for interest, but were not included in the analysis. Right: Total area (km²; grey bars), and the cumulative percent of the total area (%; black line, grey circles), in all grid cells with the corresponding number of human activities.

The larger, widespread estimated PEZ (pelagic-PEZ) associated with marine aquaculture activities results in significant spatial overlap among the existing and proposed lease areas, as well as with all other human activities occurring in the area of interest. The number of overlapping activities is high, with approximately 84% of the area of interest being influenced by three or more co-occurring human activities in any given grid cell (Figure 10).

The greatest degree of overlap and heaviest area of use occurs in the corridor between the proposed Mersey and Brooklyn sites towards the outer bay, followed by the inner bay close to the community of Liverpool (Figure 10). The overlap in human activities also extends to the outer bay and to the limit of the area of interest (i.e., overlap of multiple human activities still occur at 5 km away from the lease areas). Appendix C provides methodology details of this analysis.

The stressors linked to human activities in the marine environment can be grouped into three main categories: physical (direct alteration to habitats), chemical (effects on water and sediment quality), and biological (changes to non-target species). All human activities considered within this analysis that have been identified as occurring within Liverpool Bay have been linked to > 1 stressor impact, and five of these activities have influences across all three categories (Table 5).

Finfish aquaculture, boat traffic, Lobster fishing, and nutrient loading activities generate the greatest number of different types of chemical stressors that can affect water and sediment quality (Table 5). Boat traffic is also associated with causing the greatest number of different physical stressors, while finfish aquaculture activities are linked to the greatest proportion of different biological stressors (Table 5). Overall, finfish aquaculture activities and recreational boating may be responsible for the largest proportion of different stressor effects, while contaminated sites and marine plant harvesting may generate the smallest proportion of

different stresses on species and habitats in Liverpool Bay (Table 5). The most common stressors linked to the seven human activities are benthic disturbance (physical stressor; 6 of 7 activities), contamination (chemical stressor; 6 of 7 activities), and biomass removal through incidental mortality (biological stressor; all 7 activities) (Table 5).

At present, there is little scientific evidence to be able to weigh the relative magnitude of each stressor effect listed in Table 5. Many of these impacts will vary spatially and temporally (e.g., increased boating traffic related to seasonal fishing or recreational activities, increased influx of nutrient loading or urban runoff in spring due to snow melt; etc.), and may be of concern at particular times of year. Further, little information is available on the acute and chronic effects of these stressors (e.g., noise, light, marine debris, changes in currents/circulation).

Table 5. Comparison of stressors associated with human activities identified in this analysis.

Stressors		Activities						
		Finfish aquaculture	Lobster fishing	Marine plant harvesting	Boat traffic ^a	Nutrient loading ^b	Commercial and industrial ^c	Contaminated sites ^d
Physical (direct alteration to habitats)	Benthic disturbance	X	X	X	X	X	X	-
	Change in temperature	-	-	-	-	X	-	-
	Collisions	-	X	-	X	-	-	-
	Change in currents/circulation	X	-	-	X	-	-	-
	Light	X	-	-	X	-	X	-
	Marine debris	-	X	-	X	X	-	-
	Noise	X	X	-	X	X	X	-
Chemical (water and sediment quality)	Bacteria	X	X	-	X	X	X	-
	Contaminants	X	X	-	X	X	X	X
	Nutrients	X	X	-	X	X	-	-
	Oil/waste	X	X	-	X	X	X	-
	Organic waste	X	X	-	X	X	X	-
	Sediment transport (turbidity)	X	X	-	X	X	X	-
Biological (changes to non-	Changes in behaviour (predator or prey)	X	-	X	X	-	-	X

Stressors		Activities						
		Finfish aquaculture	Lobster fishing	Marine plant harvesting	Boat traffic ^a	Nutrient loading ^b	Commercial and industrial ^c	Contaminated sites ^d
target species)	Biomass removal (incidental mortality)	X	X	X	X	X	X	X
	Diseases and parasites	X	-	-	-	-	-	X
	Genetic interaction	X	-	-	-	-	-	X
	Invasive species	X	-	-	X	X	X	-

^a combined stressors from small docks, ramps, wharves, fishing vessel, pleasure boating, and kayaking activity categories of Ban et al. (2010)

^b combined stressors from human settlements and agriculture categories of Ban et al. (2010)

^c combined stressors from pulp and paper, industry land-based activity categories of Ban et al. (2010)

^d combined known effects of the majority of contaminants found at the Liverpool Bay contaminated sites (e.g., PCBs, PAHs, PCDD/Fs, and organometalloids) (CCME 1999a, b, 2001a, b, 2010)

Weighing the relative impact of each human activity on a broad spatial scale (e.g., the whole of Liverpool Bay), can be considered by examining the spatial distribution of the activity multiplied by a specific vulnerability score, which estimates the vulnerability to human activities of different habitats known to be present in Liverpool Bay (Kappel et al. 2012; see Appendix D for further explanation). The use of habitats also indirectly captures impacts on associated species. Contaminated sites, followed closely by boating traffic and marine aquaculture, have the greatest (potential) relative impact scores (Figure 11; Table D2 in Appendix D).

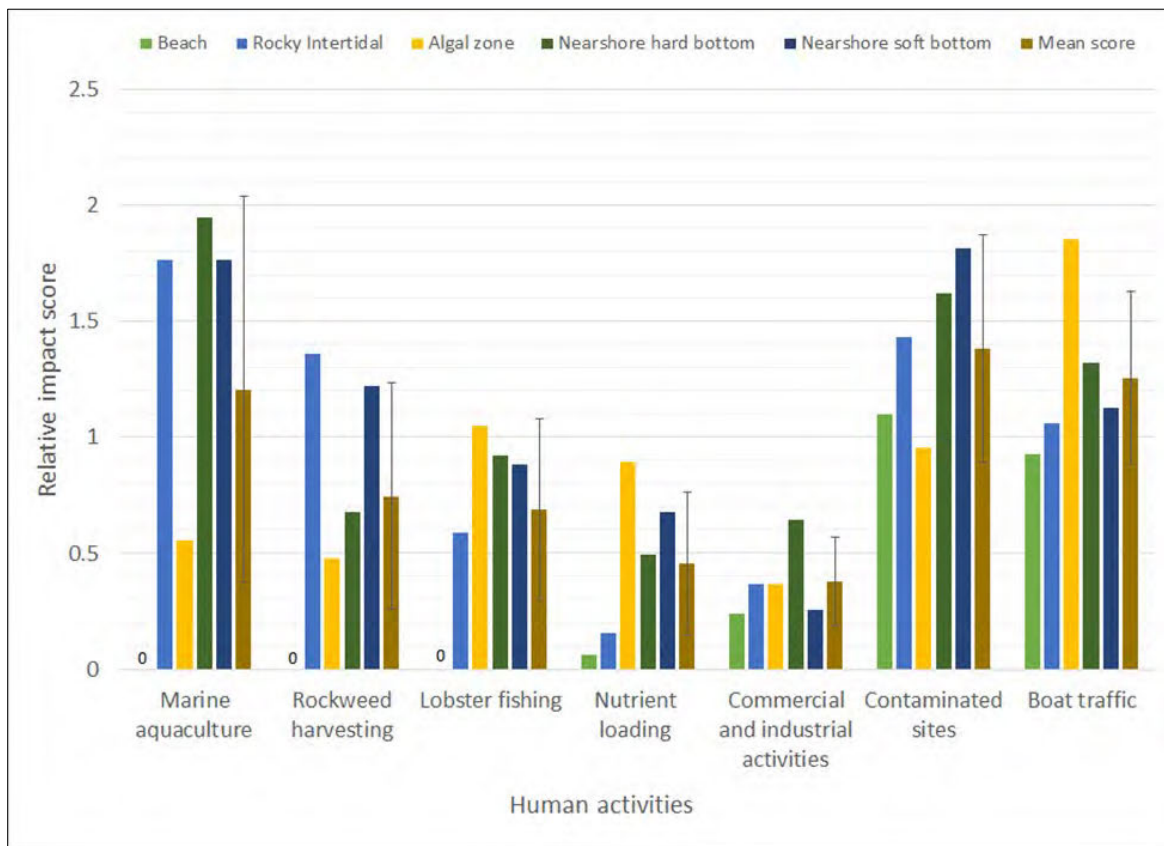


Figure 11. Relative impact score of human activities occurring in Liverpool Bay in 5 different habitat types (beach, rocky intertidal, algal zone, nearshore soft benthic, nearshore hard benthic) plus their mean value. Relative impact score in the vulnerability score multiplied by the proportion of total area in which the human activities occur within the 5 km area of interest. Larger values indicate the potential for more widespread impacts on habitats in Liverpool Bay. Wider error bars indicate more variable vulnerabilities to activities across the 5 different habitat types. See also Table D2 in Appendix D.

High impacts from land-based contaminated sites near the coastline and boating traffic are a result of the high average vulnerability of different marine habitats to these activities, due to the potential of these activities to impact a wide range of trophic levels and a large proportion of biomass. In contrast, high impacts from marine aquaculture are a result of the wide spatial distribution of this activity throughout the area of interest (e.g., highest intensity) despite having a relatively lower mean vulnerability score. This analysis suggests that boating traffic, marine

aquaculture, and contaminated sites have the largest potential impacts, and that the cumulative effect of these three activities may have the most significant anthropogenic footprint on the Liverpool Bay ecosystem.

Cumulative impacts on coastal water and sediment quality may result from the overlap in marine aquaculture, boating traffic, and contaminated sites, and to a lesser extent commercial and industrial activities and nutrient loading. While the magnitude of recreational boating traffic is currently unknown, it is likely highly seasonal, following the typical tourist season for Nova Scotia (May–October, with peaks in June–August). Further, as lobster fishing season occurs between November through May, the overlap with fishing vessels suggests a constant, year-round pressure from vessel traffic. While individually the impacts of boating are considered minor, their cumulative impact may result in detrimental effects on species and/or habitats. Small vessels contribute to reduced water quality through pollution due to leakage of fuels and oils, antifouling paints (containing copper), and human waste (sewage effluents) (Leon and Warnken 2008).

The majority of the reported pollutants at the contaminated sites include PCBs, PAHs, PCDD/Fs, and organometalloids. Pelagic species may take up some of these contaminants directly from the water column, while benthic organisms may absorb these substances through contact with the sediments as well as the overlying water (CCME 1999b, 2010). While the ultimate fate for these types of contaminants is the benthos, how much may leach from nearby contaminated soils and groundwater into the water column and marine sediments is unknown (included in this analysis in order to be precautionary). Further, legacy impacts from pollution attributed to land-based industrial activities could also contribute to impacts on water and sediment quality, particularly for localized areas immediately adjacent to the aquaculture leases. Data collected in Liverpool Bay through DFO's Aquaculture Monitoring and Modelling Program (AMMP) in 2019 showed a clear example of contributions from another industrial source, in which organic matter, sulfides, and trace metals were locally high near the now defunct Bowater Mersey pulp and paper plant further up in the bay in Brooklyn, NS. The plant was closed in 2012 but is still in use for other industrial purposes. The addition of increased feed and waste products from the proposed increase in the production of fish in nearby marine aquaculture facilities, in combination with land- and marine-based pollutant sources, boating traffic, and contaminated sites, suggests a high potential for cumulative effects on water and sediment quality, particularly impacting benthic habitats and associated species.

Boating also contributes to the secondary spread of non-native species (Clarke Murray et al. 2011, Burgin and Hardiman 2011). Aquaculture activity adds or removes physical structures (e.g., ropes, buoys, anchors) that can be colonized by diverse biological assemblages, which can affect the local ecosystem (DFO 2010). The invasive tunicates *Botryllus schlosseri*, *Botryllus schlosseri* and *Ciona intestinalis* are already present in Liverpool Bay (Sephton et al. 2017); the combined effect of high boating traffic and aquaculture structures may contribute to the spread and subsequent establishment of other non-native species already present elsewhere along the NS coastline (e.g., *Botrylloides violaceus*).

The spatial overlap of boat traffic, marine aquaculture sites, and rockweed harvesting, suggests increased benthic disturbance in areas where they may overlap. The presence of finfish aquaculture has been associated with decreased macro-infaunal biomass, and shifts in benthic community structure (Cullain et al. 2018). Marine plant harvesting can directly influence the

availability of fish habitat and herbivore driven and detrital food webs through the biomass removal of the plants themselves, but may also indirectly increase the by-catch of plant-associated invertebrates, and alter the behaviours of predators and prey (Vandermuelen 2013, Sharp et al. 2006, Kay 2015). The movement of vessels in shallow waters causes turbulence through propeller action, benthic disturbance and destruction due to anchoring and dragging, which are a particular threat to submerged macrophytes (Bishop 2008, Lewin et al. 2019). Little information was available on the specific areas in which rockweed is harvested in Liverpool Bay (its spatial distribution could only be estimated from the larger lease area); however, if plant harvesting areas occur within or adjacent to aquaculture sites alongside or within the heavy boat use corridors, an increased cumulative impact on algal species and their associated fauna is a likely outcome.

Conclusions

Question 1: *Based on available data for the site and scientific information, what is the predicted exposure zone from the use of approved fish health treatment products in the marine environment, and the potential consequences to susceptible species?*

- The seabed up to approximately 3.8 km from the proposed sites may be exposed to in-feed drugs present in feces, if used.
- Pesticide levels that are toxic to susceptible species may travel up to approximately 4.3 km from the proposed sites, if used.
- Overlaps in the predicted exposure zones from fish health treatment products (both in-feed drugs and bath pesticides) are anticipated, if used at more than one site.
- The intensity of exposure is expected to be highest near the net-pen arrays and decrease as distance from the net-pens increases, except for in areas of anticipated overlaps where cumulative exposures may occur.
- The proposed site locations are likely to result in the benthic environment in shallower areas around the site being exposed to concentrations of pesticides that are toxic to sensitive benthic life stages and species, if present.
- Lobster and crab have been identified within the PEZs of fish health treatment products used at the proposed sites. Adult Lobsters may be exposed to in-feed drugs and toxic concentrations of pesticides in shallower areas around the site. Larval Lobster may also be exposed to toxic concentrations of pesticides.
- The PMRA conditions on use of azamethiphos may apply from November–May, when commercial Lobster holding facilities less than 1 km from the proposed sites are operational.

Question 2: *Based on available information, what are the Ecologically and Biologically Significant Areas (EBSAs), SAR, fishery species, Ecologically Significant Species (ESS), and their associated habitats that are within the predicted benthic exposure zone and vulnerable to exposure from the deposition of organic matter? How does this compare to the extent of these species and habitats in the surrounding area (i.e., are they common or rare)? What are the anticipated impacts to these sensitive species and habitats from the proposed aquaculture activity?*

- The total benthic footprint within Liverpool Bay is anticipated to increase, but overlaps in the areas of organic matter exposure due to waste feed are not predicted.
- Lobster, crab, clams, mussels, sea urchin, and whelk have been identified within the benthic-PEZ and are susceptible to deposition of organic matter.
- Bivalves and other sessile species are susceptible to smothering and the potential for oxic state changes. Additionally, increased sedimentation may preclude the settlement of larval Lobster given their preferential selection for harder-bottom substrates.
- Available information suggests these species are not unique to Liverpool Bay.
- Predicted exposures and interactions may be transient as the seabed is periodically reset due to large waves and storm events.

Question 3: *How do the impacts on these species from the proposed aquaculture site compare to impacts from other anthropogenic sources (including existing finfish farms)? Do the zones of influence overlap with these activities and if so, what are the potential consequences?*

- The entire area of interest around the proposed sites is influenced by human activities with significant overlap.
- Human activities include commercial and industrial activities, nutrient loading, presence of land-based contaminated sites near the coastline, boat traffic, Lobster fishing, rockweed harvesting, and marine aquaculture.
- Contaminated sites, boating traffic, and marine aquaculture have the largest potential impacts, and the interactions of these three activities may have the most significant anthropogenic footprint on the Liverpool Bay ecosystem.

Question 4: *To support the analysis of risk of entanglement with the proposed aquaculture infrastructure, which pelagic aquatic species at risk make use of the area, and for what duration and when?*

- SAR identified with the potential for being in the vicinity are North Atlantic Right Whale, Blue Whale, Fin Whale, Leatherback Sea Turtle, White Shark, Spotted Wolffish and Northern Wolffish.
- Preferred bathymetric ranges suggest these species are unlikely to be present near the site infrastructure, with the exception of White Shark, which has been observed in the vicinity of the proposed sites.

Question 5: *Which populations of salmonids are within a geographic range that escapes are likely to migrate to? What is the size and status trends of those conspecific populations in the escape exposure zone for the proposed site? Are any of these populations listed under Schedule 1 of SARA?*

- The proposed leases are within the Nova Scotia Southern Upland (SU) region of wild Atlantic Salmon and SFA 21.
- SU Atlantic Salmon population levels remain critically low and have been assessed as Endangered by COSEWIC since 2010.

- The majority of identified watersheds in the Southern Upland region that have historically contained Atlantic Salmon are within the range (200–300 km) that escaped farmed fish could travel.
- There will be increased genetic risks to wild Salmon with the proposed increases in the number of farmed Salmon within Liverpool Bay between the Liverpool, Mersey Point, and Brooklyn sites.

Sources of Uncertainty

Predicted Exposure Zones

Results of calculations based on the proponent's data are a subset of the full range of potential calculation outputs. The predicted exposure zones are based on current meter data provided by the proponent and is from a single location over a 30-day time window. The first-order estimates assume the current is spatially homogenous and seasonally consistent, and the current data are unlikely to represent the temporal and spatial variability needed to estimate exposure and deposition zones. Since the state of knowledge concerning the assessment of potential in-feed drugs and pesticides impacts is evolving, a more detailed assessment of potential pesticide and drug impacts was not conducted.

Species and Habitat Distributions

Coastal areas are generally not adequately sampled on spatial and temporal scales of most relevance to aquaculture (i.e., tens to hundreds of meters and hours to months). Information on these space and time scales is typically not contained within the various data sources available to DFO to evaluate presence/use of species and habitats in those areas. Data based on surveys do not fully sample the area spatially or temporally and additional information on presence and habitat use (i.e., spawning, migration, feeding) must be drawn from larger-scale studies. Therefore, there is uncertainty as to the exact spatial and temporal distribution of species in the area of the proposed activities, which leads to uncertainty in the full scale of potential interactions of wild species with the proposed activities.

Farmed-Wild Interactions

Information is generally lacking on the size and distribution of wild Atlantic salmon populations. Improved estimates of wild Atlantic salmon population size and the presence of escapees in salmon-bearing rivers within Maritimes region would improve the assessment of genetic and demographic risk. Significant knowledge gaps also exist regarding disease and sea lice infestation levels in wild and farmed Atlantic salmon, and monitoring and reporting of these levels would be informative.

Potential Cumulative Interactions

Many regional and global-scale human activities, that may overlap with local-scale activities, were excluded from this analysis, due to limits on data availability and/or spatial resolution. Historical activities that may have legacy effects (e.g., sedimentary contamination), impacts from natural disturbances (e.g., storms, marine heat wave), or episodic activities that can create

infrequent but intense disturbances (e.g., oil spill) were not included in the current analysis. The geographic extent of human activities is likely a minimum estimate. Buffer distances used in the analysis may be a conservative estimate, as the original studies on which the estimates were based were not designed to measure maximum detectable distances of human impacts. Also, the influence of human activities was assumed to diffuse equally in all directions, although it is more likely that alongshore currents and river plumes influence the diffusion of impacts, particularly close to the coastline. Overall, the human activity map should be considered a preliminary and conservative estimate of human uses within the area of interest. Despite the limitations outlined above, this mapping exercise can identify areas of particular concern where a high degree of cumulative impacts from multiple overlapping human activities are to be expected.

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Appendix A: Organic Enrichment Interactions

Benthic condition ^a	Geochemical status ^b	Oxygen stress ^c	Sediment condition ^d	Geochemical category ^e	Macrofauna diversity ^f	Oxic category ^g	'Free' S (μM)	Eh _{NHE} (mV)
Normal	Oxic	Pre-hypoxic	Very good	Normal	High	Oxic A	100	225
							150	200
							250	175
							400	150
							625	125
Normal	Post-oxic	Aperiodic	Good	Oxic	Good	Oxic A/B threshold	750	100
						Oxic B	875	75
							1250	25
Transitory	Sulfidic	Moderate	Less good	Hypoxic	Moderate	Oxic B/ hypoxic A threshold	1500	0
						Hypoxic A	1750	-25
Polluted	Sulfidic	Severe	Bad	Hypoxic	Poor	Hypoxic A/B threshold	3000	-100
						Hypoxic B	4000	-150
							5000	-175
Grossly polluted	Methanic	Persistent anoxia	Very bad	Anoxic	Bad	Anoxic threshold	6000	-185
						Anoxic	7000	-195
							8500	-200
							10000	-210

^aPearson & Rosenberg (1978), ^bBerner (1981), ^cDiaz & Rosenberg (1995), ^dHansen et al. (2001), ^eWildish et al. (2001), ^fRosenberg et al. (2004), ^gHargrave et al. (2008a)

Figure A1. Nomenclature for gradients in benthic organic enrichment from Hargrave (2010).

Appendix B: Species Database Searches within the Region of Interest

Regional databases with records from 2002–2018 were queried for information on observed species within the PEZs of the proposed sites and associated aquaculture activities. Databases searched include the Ecosystem Research Vessel (RV) Survey, Industry Survey Database (ISDB), Maritime Fishery Information System (MARFIS), and the Whale Sightings Database. Recorded species are listed in Table B1. Sighting effort has not been quantified (i.e., the numbers cannot be used to estimate true species density or abundance for an area). Lack of sightings do not represent species absence in a particular area.

Table B1. Species records presented as combined numbers from all databases queried. Species names are written as returned from database.

Species	Records (databases combined)		
	Liverpool	Mersey	Brooklyn
American Lobster	20	21	20
Sea Raven	3	2	2
Longhorn Sculpin	2	4	3
Toad Crab	2	2	2
Atlantic Cod	-	1	1
Mackerel	1,461	2,018	1,443
Herring	125	161	101
Ocean Quahaug	72	206	75
Cusk	16	-	-
Halibut	16	-	-
Catfish	8	-	-
Cod (Atlantic)	8	1	-
Haddock	8	-	-
Monkfish	8	-	-
Pollock	8	-	-
White Hake	8	-	-
Clam, Propellor	7	8	7
Tuna, Bluefin	6	4	2
<i>Strongylocentrotus droebachiensis</i>	-	2	1
Whelk	-	2	1

Appendix C: Genetic Interactions

Propagule Pressure Details

$$\text{Propagule pressure for a given river } (R) = \sum_{i=1}^S \frac{F_i}{LCD(S_i \text{ to } R)}$$

Where F_i is the number of fish in the i th aquaculture site, S_i , and LCD represents the least-cost distance function between the river R and S_i . For the purposes of risk assessment, the number of fish at each site was set to the greater of the number of fish for which the site was licensed, or the number of fish for which an introduction and transfer permit had been authorized.

IBSEM Details

Gibson et al. (2009b) state that the wild population size required to meet the conservation egg requirement (Elson 1967) is 5,600 returning adults; however, to reduce the time required for each simulation to complete, this number was reduced by a factor of 10. The results for a simulated returning spawner population sizes of 5,600 and 560 were compared and the results were found to be qualitatively the same and differed only in scale. The model was allowed to run for 100 years to stabilize, at which point escapees were introduced for 50 years. After the 50 years period of introgression, escapees were ceased, and the population was allowed to recover for 100 years. The proportion of escapees entering the river was simulated between 0 and 100% of the initial wild population, and each scenario was replicated 10 times (Bradbury et al. 2020b). In accordance with (Bradbury et al. 2020b), this analysis focused on the number of returning spawners, as well as the population allele frequency. Hybridization and introgression from invading escapees was tracked through changes in allele frequency over time. Wild individuals are denoted by allele frequencies approaching 1, and conversely farmed individuals have allele frequencies approaching 0. Thus a shift in overall population allele frequencies away from 1 indicates a greater proportion of escapee, hybrid, and introgressed individuals in the population. Readers are directed to (Castellani et al. 2015) and (Bradbury et al. 2020b) for further information on the model.

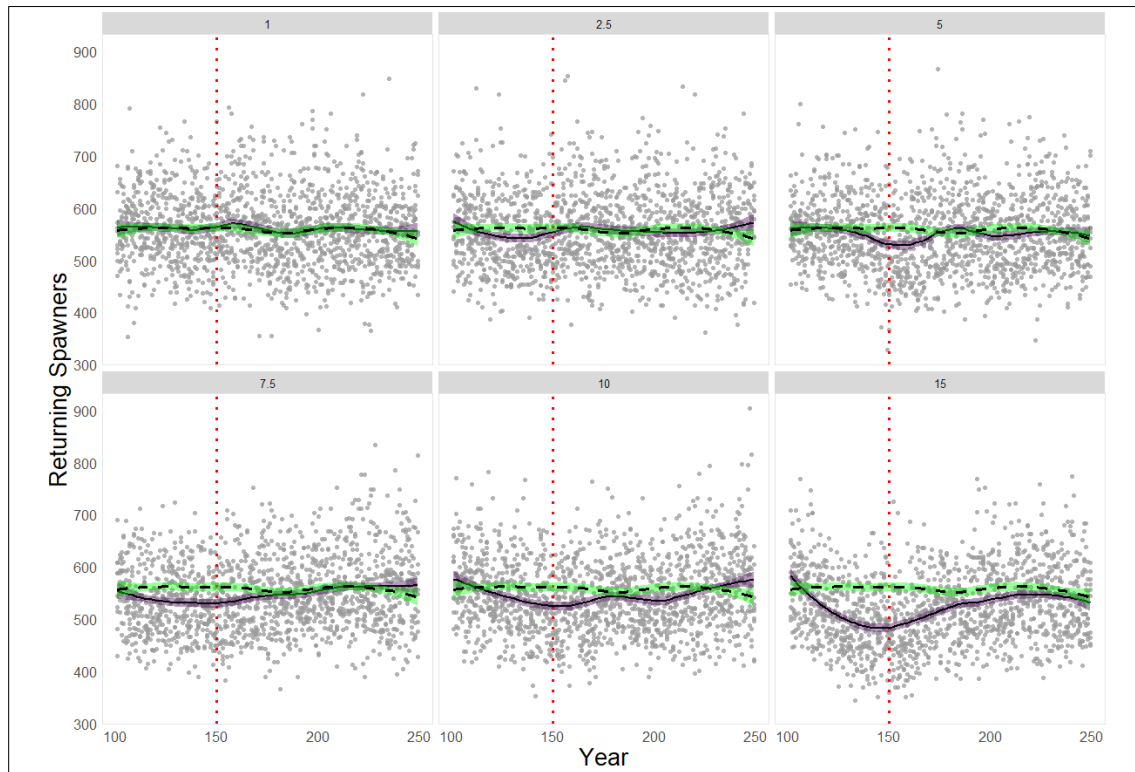


Figure C1. Model-predicted change in the number of returning spawners during and after a 50 year invasion period by escaped farmed salmon. The IBSEM model was allowed to stabilize for 100 years and the invasion begins at year 100. The invasion period is 50 years, and its end point at year 150 is marked by a dashed vertical red line. The results of 10 iterations of the IBSEM model with escapee proportions of 1, 2.5, 5, 7.5, 10, and 15% per year are shown, and numbers at the top of each panel indicate the percentage of escapees entering the river each year during the invasion period. Impacts are said to have occurred when the proportion of returning adults from the invasion scenario (solid horizontal black lines, purple 95% CIs) deviate from the results of the zero-invasion simulation (dashed horizontal black line, green 95% confidence interval CIs). The smoothed lines and associated 95% CI were calculated using a loess regression with span of 0.5 with the ggplot2 function `geom_smooth`.

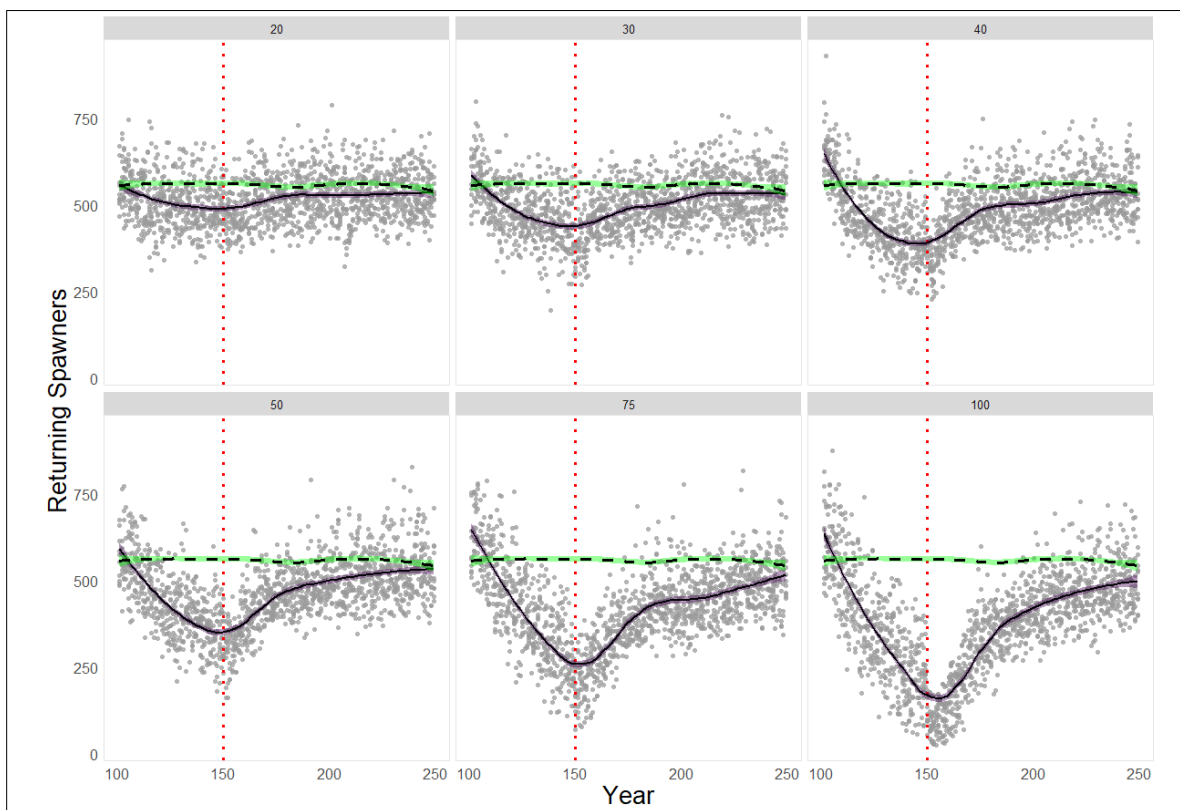


Figure C2. Model-predicted change in the number of returning spawners during and after a 50 year invasion period by escaped farmed salmon. The results of 10 iterations of the IBSEM model with escapee proportions of 20, 30, 40, 50, 75, and 100% per year are shown, and numbers at the top of each panel indicate the percentage of escapees entering the river each year during the invasion period. Refer to Supplementary Figure C3 for more information.

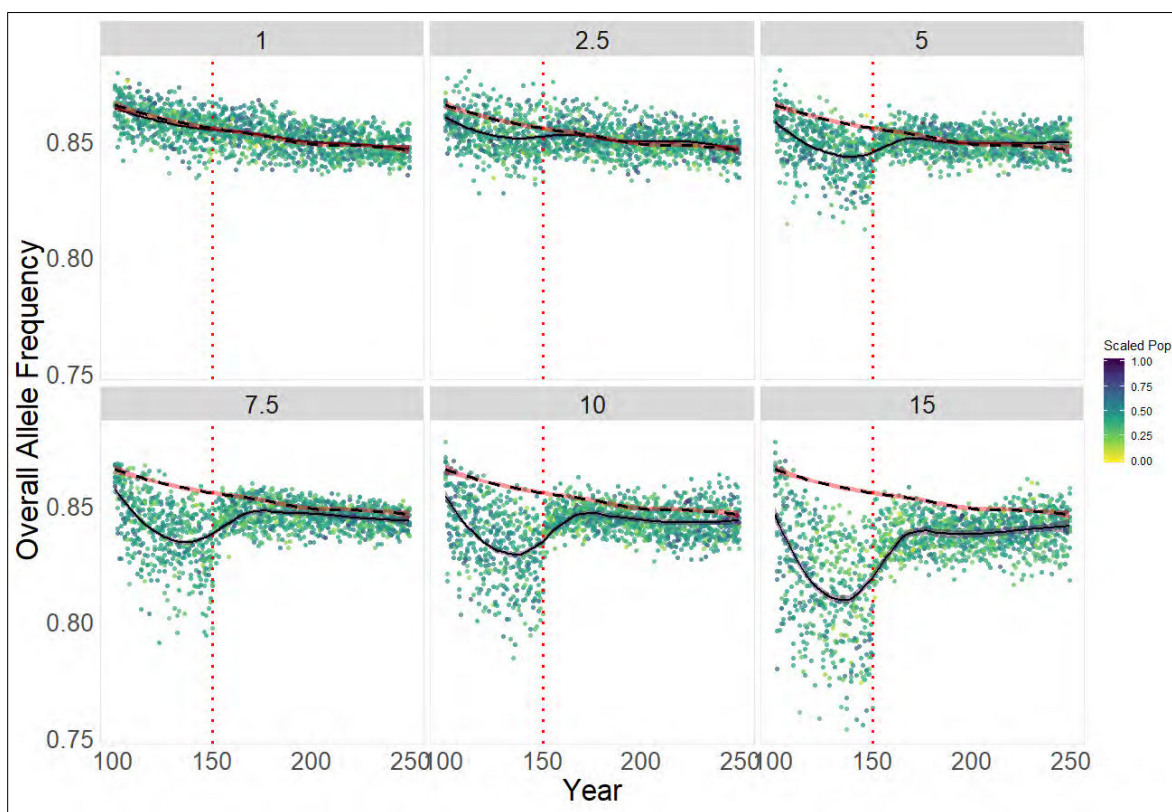


Figure C3. Model-predicted change in allele frequency during and after a 50 year invasion period by farmed salmon. Escapee proportions of 1, 2.5, 5, 7.5, 10, and 15% per year are shown and numbers at the top of each panel indicate the percentage of escapees entering the river each year during the invasion period. Wild populations are characterized by an allele frequency of 1, and farmed populations by an allele frequency of 0. Points are coloured relative to their scaled population size, with 1 being the largest population size observed during the simulation and 0 being the smallest; Refer to Figure C1. For the zero-invasion the 95% Confidence Interval (CI) is shown in red, but all other details are as described in Figure C1.

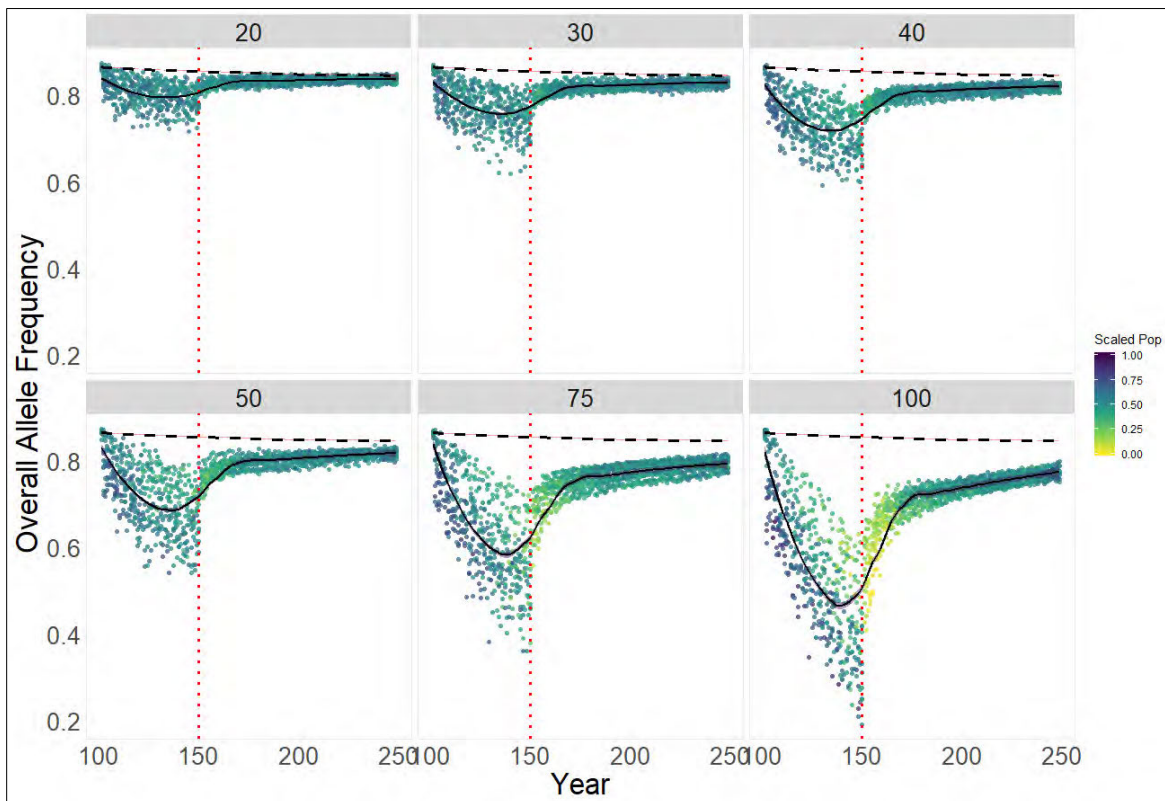


Figure C4. Model-predicted change in allele frequency during and after a 50 year invasion period by farmed salmon. Escapee proportions of 20, 30, 40, 50, 75, and 100% per year are shown and numbers at the top of each panel indicate the percentage of escapees entering the river each year during the invasion period. Wild populations are characterized by an allele frequency of 1, and farmed populations by an allele frequency of 0. Points are coloured relative to their scaled population size, with 1 being the largest population size observed during the simulation and 0 being the smallest; Refer to Figure C2. For the zero-invasion the 95% Confidence Interval (CI) is shown in red, but all other details are as described in Figure C1 and C2.

Dispersal Model Details

Similarly to the calculation of propagule pressure, the number of fish at each site was set to the greater of the number of fish for which the site was licenced, or the number of fish for which an introduction and transfer permit had been authorized. Numbers of fish were converted to harvest biomass using an individual harvest weight of 5 kg, a 25% reduction to account for periods of fallowing, and then multiplying by 0.65, which is a ratio found to convert numbers stocked to numbers harvested in Newfoundland (Bradbury et al. 2020). A maximum dispersal distance of 200 km was used, and rates of escapees was set at 0.4 fish per tonne. This rate was calculated from the latest published figures from Norway (Føre and Thorvaldsen 2021, Skilbrei et al. 2015), and is within the lower range of rates tested by (Bradbury et al. 2020b). Using the most recent region-wide estimates (DFO 2020c), populations of wild salmon in every river were set at 5% of the number of spawners required to meet the CER. Numbers of spawners and CER values were taken from O'Connell et al. (1997), or estimated using the linear relationship between CER and river axial distance.

Appendix D: Cumulative Occurrence of Human Activities

Identification of Anthropogenic Sources

A visual representation of the pattern of human use can help illustrate the distribution of human activities in the ocean and identify overlaps among them. Spatial data for marine activities within a 5 km radius for the three sites (hereafter the “area of interest”) were collated from a larger inventory of human activities developed for the Maritimes region (N. Kelly, DFO, pers. comm.). We selected human activities that occurred on a “local” scale, defined as those operating over small spatial scales (i.e., < 10 km) or from point-sources that could produce a localized zone of impact, such as marine recreation, aquaculture, or benthic structures. The most recent years of data or up-to-date information were included when possible.

Overlapping Occurrence of Human Activities

The impact of human activity in the marine environment often extends beyond its immediate occurrence. A “zone of influence” was used to estimate the actual footprint of the stressor(s) (assumed to be) caused by an activity. To estimate the geographical extent of each activity beyond its location of occurrence, we added a buffer that radiated from the point source of the activity. The furthest distance from the activity’s origin was determined for the same or most similar activity based on either available data or extensive reviews presented in Ban and Alder (2008), Ban et al. (2010), and/or Clarke Murray et al. (2015) (“buffer radius”, see Table D1).

A GIS approach (ESRI ArcGIS version 10.6.1) was used to map each activity and its associated buffer. The map was then converted to a raster (100 m x 100 m grid). Where activities (and their buffers) overlapped, the values in the grid cell were summed to estimate the total number of overlapping human activities per grid cell.

Table D1. Human activities occurring in the area of interest and buffer radius applied beyond location of activity occurrence. The buffer radius is the furthest extent an activity’s impact extends from its origin.

Category	Human activity layer	Layer description	Buffer radius (m)
Marine	Finfish aquaculture	Pelagic PEZ model for 3-hr pesticides, based on maximum current speeds.	Brooklyn: 4,341
			Mersey Point: 3,520
			Liverpool: 5,982
Marine	Boat traffic	Small craft harbours and boat launches (point sources) captures activity from kayaking, recreational boating, fishing tours.	2,000
		Polygon containing the locations of all fishing vessel traffic in 2019 as reported in DFO’s Vessel Monitoring System (VMS) database.	0
Fishing	Lobster fishing	Potential locations of traps based on VMS fishing vessel traffic polygon, restricted to the outer bay only.	0

Category	Human activity layer	Layer description	Buffer radius (m)
	Marine plant harvesting [‡]	Polygon of merged boundaries for two rockweed harvesting leases in the Bay.	0
Land-based	Commercial and industrial activities	Captures inputs from point sources (electrical generation plant, Bowater-Mersey pulp & paper mill, Port Mersey commercial park); outer buffer radius based on the furthest sediment sampling sites containing elevated chemical concentrations as measured by DFO's Aquaculture Marine Monitoring Program (AMMP) in 2019.	1,136
	Contaminated sites [†]	Four sites within 50 m of coastline with impacts of organic pollutants (e.g., PAHs, PCBs, PCDD/Fs, organometalloids) to soil, sediment, and/or groundwater.	2,000
	Nutrient loading	Captures activities within the watershed that input nitrogen into the bay, including on-shore aquaculture, agriculture, human settlements, wastewater inputs, runoff from roads, buildings, and other impervious surfaces. Layer is centered on the pour point of the Mersey River draining into Liverpool Bay, with a buffer radius based on the stream order of the river (after Clarke Murray et al. 2015).	8,170

† [Federal Contaminated Sites Inventory](#) (FCSI)

‡ [Province of Nova Scotia marine aquaculture site mapping tool](#)

Estimating Relative Impact Among Human Activities

Human activities in the ocean are presumed to cause stress on marine ecosystems. A literature review was conducted to examine the stressors linked to the 7 different human activities occurring in the area of interest. Stressor effects linked to fin-fish aquaculture, lobster fishing, boat traffic, nutrient loading, and commercial and industrial activities were summarized from Ban et al. (2010; Table S4), contaminated sites summarized from CCME (1999a, 1999b, 2001a, 2001b, 2010), and marine plant harvesting were summarized from Vandermuellen (2013), Sharp et al (2006), and Kay (2015).

The relative impact of human activities on the marine environment depends on the spatial distribution of activities, the intensity of those activities in any particular place, and the vulnerability of the ecosystem component to a particular activity. To compare the relative impacts among human activities occurring in Liverpool Bay (e.g., at the bay scale), stressor-habitat vulnerability scores previously generated for the Cape Cod/Southern Gulf of Maine through an expert elicitation approach (Kappel et al. 2012) were matched to existing human activities and known habitat types occurring in Liverpool Bay. Habitat types in Liverpool Bay included beach, rocky intertidal, algal zone, nearshore hard bottom, and nearshore soft bottom. Human activities in Liverpool Bay were matched to the closest stressor category, based on the predominant stressor linked to that activity (Table D2). The mean (\pm SD) vulnerability score was then calculated across 5 habitats for each of 7 human activities (Table D2). The

proportion of total area over which each activity occurs within the area of interest was used as a measure of intensity for each activity. The proportional area value was then multiplied by the mean vulnerability score to generate an overall relative impact score (\pm propagated SD error) for each human activity (Table D2; Figure 11).

Table D2. Mean (\pm SD) relative impact score for seven human activities occurring in Liverpool Bay. Relative impact score calculated as the product of the mean vulnerability score (\pm SD) and the proportion of total area over which each activity occurs within the area of interest. Mean vulnerability scores are calculated using individual activity-habitat vulnerability scores (from Kappel et al. 2012) for 5 different habitat types in Liverpool Bay (beach, rocky intertidal, eelgrass, algal habitat, nearshore soft benthic, nearshore hard benthic).

Human activity category	Matching activity category from Kappel et al. (2012)	Mean vulnerability score (\pm SD)	Proportion of total area	Relative impact score (\pm SD)
Marine aquaculture	Aquaculture: finfish (predators)	1.30 (0.89)	0.93	1.21 (0.83)
Rockweed harvesting	Aquaculture: marine plants	1.10 (0.72)	0.68	0.75 (0.49)
Lobster fishing	Fishing: demersal, non-destructive, low bycatch	1.64 (0.93)	0.42	0.69 (0.39)
Nutrient loading	Nutrient input: into oligotrophic waters	1.48 (1.01)	0.31	0.46 (0.31)
Commercial and industrial activities	Pollution input: inorganic	2.04 (1.07)	0.18	0.38 (0.19)
Contaminated sites	Pollution input: organic	2.90 (1.02)	0.48	1.38 (0.49)
Boat traffic	Tourism: recreational boating	1.90 (0.56)	0.66	1.26 (0.37)

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DFO. 2022. DFO Maritimes Region Science Review of the Proposed Marine Finfish Aquaculture Boundary Amendment and New Sites, Liverpool Bay, Queens County, Nova Scotia. DFO Can. Sci. Advis. Sec. Sci. Resp. 2022/039.

Aussi disponible en français :

MPO. 2022. Examen scientifique par la région des Maritimes du MPO de la modification proposée des limites de la pisciculture marine et des nouveaux sites dans la baie de Liverpool, comté de Queens, en Nouvelle-Écosse. Secr. can. des avis sci. du MPO, Rép. des Sci. 2022/039.

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: September 21, 2022 9:12 AM
To: Parker, Edward V <Edward.Parker@dfo-mpo.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: CSAS Report for KCS Apps 1205X, 1432, 1433

Great, thank you Ed.

I have shared with the team and will reach out with any questions following our review and discussion.

Cheers,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

APPENDIX C – CANADIAN FOOD INSPECTION AGENCY

From: Winfield, Lynn <0.Lynn.Winfield@novascotia.ca>
Sent: June 27, 2019 10:05 AM
To: Hood, Shane (CFIA/ACIA) <shane.hood@canada.ca>; MacArthur, David (EC) <david.macarthur@canada.ca>; Gautreau, Rachel (EC) <rachel.gautreau@canada.ca>; Birch, Angela <Angela.Birch@novascotia.ca>; Miller, L (Dawn) <Dawn.Miller2@novascotia.ca>; Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>; Murrant, Darryl D <Darryl.Murrant@novascotia.ca>; Blackburn, Lori M <Lori.Blackburn@novascotia.ca>; Smith, Angela (CFIA/ACIA) <angela.smith@canada.ca>
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County
 Attn: Network Review Agencies:

Attached please find the Boundary Amendment application and information for Kelly Cove Salmon AQ#1205 in Liverpool Bay, Queens County.

Please respond with your feedback by August 27, 2019.

Thanks,



E. Lynn Winfield

**Licensing Coordinator,
 Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
 Shelburne, NS BOT 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429
 Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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***Please refer to Application Package, Section 2.0 - Applicant's Aquaculture Development Plan, for documents sent to and reviewed by Canadian Food Inspection Agency.**

NOTE: THIS EMAIL WAS DUPLICATED FOR AQ#1432 AND AQ#1433 AND SENT TO THE SAME RECIPIENTS.

From: Smith, Angela (CFIA/ACIA) <angela.smith@canada.ca>
Sent: July 10, 2019 11:04 AM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: -AQ1205_Network_Agency_Review_Form_2019

Hi,

See attached review form.

Angela Smith

Regional Program Officer, Shellfish and Food Safety Programs, Operations Branch, Nova Scotia
Canadian Food Inspection Agency / Government of Canada
angela.smith@canada.ca / Tel: 902-986-1679 (cell)

Agent régionale des programmes mollusques et salubrité des aliments (N-É) / Direction générale des
Opérations
Agence canadienne d'inspection des aliments / Gouvernement du Canada
angela.smith@canada.ca / Tel: 902-986-1679 (cell)



CFIA_ACIA-#119815
41-v1-AQ1205_Netw

Network Agency Review of an Aquaculture Application

Agency	CFIA
Division (if applicable)	
Date	July 10, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1205 (Coffin Island), Queens County
Type of application	Boundary Amendment
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Public Notice and Disclosure

As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

Privacy Statement

The network review information collected as part of an aquaculture application will only be used or disclosed by Fisheries and Aquaculture for the purpose of deciding on the application.

All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Smith, Angela (CFIA/ACIA) <angela.smith@canada.ca>
Sent: August 9, 2019 8:59 AM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: AQ#1432 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Brooklyn),
Queens County

See attached review form.

Angela Smith

Regional Program Officer, Shellfish and Food Safety Programs, Operations Branch, Nova Scotia
Canadian Food Inspection Agency / Government of Canada
angela.smith@canada.ca / Tel: 902-986-1679 (cell)

Agent régionale des programmes mollusques et salubrité des aliments (N-É) / Direction générale des Opérations
Agence canadienne d'inspection des aliments / Gouvernement du Canada
angela.smith@canada.ca / Tel: 902-986-1679 (cell)

Network Agency Review of an Aquaculture Application

Agency	CFIA
Division (if applicable)	
Date	Aug 9, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1432 (Brooklyn), Queens County
Type of application	Marine Finfish Cage Cultivation (Atlantic Salmon)
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

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All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Smith, Angela (CFIA/ACIA) <angela.smith@canada.ca>
Sent: July 10, 2019 11:20 AM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: AQ1433_Network_Agency_Review_Form_finfish_2019

Hi,

See attached completed review form.

Angela Smith

Regional Program Officer, Shellfish and Food Safety Programs, Operations Branch, Nova Scotia
Canadian Food Inspection Agency / Government of Canada
angela.smith@canada.ca / Tel: 902-986-1679 (cell)

Agent régionale des programmes mollusques et salubrité des aliments (N-É) / Direction générale des Opérations
Agence canadienne d'inspection des aliments / Gouvernement du Canada
angela.smith@canada.ca / Tel: 902-986-1679 (cell)



CFIA_ACIA-#119816
55-v1-AQ1433_Netw

Network Agency Review of an Aquaculture Application

Agency	CFIA
Division (if applicable)	
Date	July 10, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1433 (Mersey Point), Queens County
Type of application	Marine Finfish Cage Cultivation (Atlantic Salmon)
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

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As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

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APPENDIX D – TRANSPORT CANADA

On Jun 20, 2019, at 2:33 PM, Winfield, Lynn <Lynn.Winfield@novascotia.ca> wrote:

Hi Jennifer,

Can you advise if the boundary amendment for Liverpool Bay AQ#1205, along with the new sites Brooklyn AQ#1432 and Mersey Point AQ#1433 have been submitted directly to Transport Canada for NPP approval?

Thanks,



E. Lynn Winfield

Licensing Coordinator,

Nova Scotia Department of Fisheries and Aquaculture

<image001.png>

1575 Lake Road

Shelburne, NS B0T 1W0

Phone: 902-875-7440

Fax: 902-875-7429

Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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From: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>

Sent: June 20, 2019 2:46 PM

To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>

Subject: Re: Boundary amendment/New Site Apps

No we have no submitted anything officially.

Sent from my iPhone

From: Winfield, Lynn
Sent: June 27, 2019 9:34 AM
To: NPPATL-PPNATL@tc.gc.ca
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Feehan, Jennifer Kathleen <Jennifer.Feehan@novascotia.ca>
Subject: AQ1205

Attn: Transport Canada,

Please see the attached information regarding a Boundary Amendment for AQ#1205 Kelly Cove Salmon, Liverpool Bay (Coffin Island), Queens County, along with the completed Navigation Protection Act Notice of Works Form.

Thanks,



E. Lynn Winfield

**Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
Shelburne, NS B0T 1W0
Phone: 902-875-7440
Fax: 902-875-7429
Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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Transport Canada,
Survey and Maps.pdf



1205 NPP Forms
.pdf



1432 NPP Forms
Brooklyn.pdf



Transport Canada
Memo & Info..pdf



Mersey Point NPP
Forms.pdf



Transport Canada
Memo & Info AQ#14

***Please refer to Application Package, Section 2.0 - Applicant's Aquaculture Development Plan, for documents sent to and reviewed by Transport Canada.**

NOTE: THIS EMAIL WAS DUPLICATED FOR AQ#1432 AND AQ#1433 AND SENT TO THE SAME RECIPIENTS.

MEMORANDUM

To: Transport Canada

From: Lynn Winfield, Licensing Coordinator, Aquaculture Division
Nova Scotia Department of Fisheries and Aquaculture

CC: Matthew King, GIS Analyst
Nathaniel Feindel, Manager of Aquaculture Development
Joe Hanrahan, Coastal Resource Coordinator

Date: June 27, 2019

RE: Boundary Amendment Application No. 1205 (Coffin Island) – Queens County
Aquaculture Network Review

Attention Transport Canada, Kelly Cove Salmon Ltd. has submitted a Boundary Amendment application for Site#1205. The site is located in Liverpool Bay (Coffin Island), Queens County. Consider this correspondence as a formal request by the Nova Scotia Department of Fisheries and Aquaculture to process this application for Navigation Protection Act approval/authorization.

Please find attached information relating to the following aquaculture Marine Finfish application:

Application No.:	1205
Proponent:	Kelly Cove Salmon Ltd.
Application Type:	Boundary Amendment
Location:	Liverpool Bay (Coffin Island), Queens County

To facilitate the screening process, NSDFA offers the following points of information:

1. AQ#1205 was first issued on March 27, 2000 for a ten year term (April 1, 2000 to April 1, 2010). Kelly Cove Salmon Ltd. was assigned AQ#1205 on May 17, 2012.
2. Following the review of the application by our Network Partners, this application will be provided to the Aquaculture Review Board for final decision;
3. The applicant is making application to Transport Canada for an authorization under the Navigation Protection Act for the placement of marine cages.

We request that you review and submit all components that pertain to this application and provide NSDFA with confirmation should an authorization be issued under the Navigation Protection Act.

Note: We require a written (mail/email) response from each of our review agencies in order to process this application. You may contact me at by phone at 902-875-7440 or email Lynn.Winfield@novascotia.ca if you have any questions.

Sincerely,



Lynn Winfield,
Licensing Coordinator

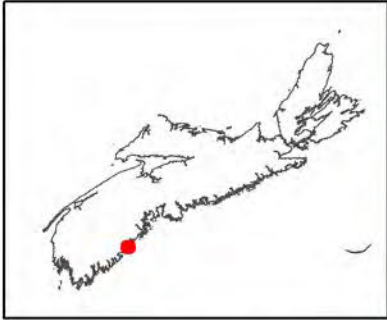
Schedule A
GPS COORDINATE INFORMATION SHEET

Note: The coordinates and dimensions for this site have been taken a legal survey.

Application #:	1205x		
Applicant:	Kelly Cove Salmon Ltd.		
Location:	Liverpool Bay	County:	Queens
Hydrographic Chart:	4211	Orthophoto #:	
Dimensions of site:	Approx. 405 m x 1005m	Size:	Approx. 40.70 ha.

Approximate Coordinates of Application:

Datum used:	NAD 83				
Centre coordinates (approx.)	Lat.	44° 02' 31.08"			
	Long.	-64° 38' 23.01"			
Corner #1	Lat.	44° 02' 46.61"	Corner #2	Lat.	44° 02' 47.41"
	Long.	-64° 38' 33.81"		Long.	-64° 38' 15.65"
Corner #3	Lat.	44° 02' 14.90"	Corner #4	Lat.	44° 02' 14.11"
	Long.	-64° 38' 12.93"		Long.	-64° 38' 31.09"



**Aquaculture Site
1205x**

Centre
 Lat 44° 02' 31.08" Long -64° 38' 23.01"
 Corner 1
 Lat 44° 02' 46.61" Long -64° 38' 33.81"
 Corner 2
 Lat 44° 02' 47.41" Long -64° 38' 15.65"
 Corner 3
 Lat 44° 02' 14.90" Long -64° 38' 12.93"
 Corner 4
 Lat 44° 02' 14.11" Long -64° 38' 31.09"

DATUM NAD 83
 The above coordinates
 are from a legal survey



Application Information

Proponents : Kelly Cove Salmon Ltd.
 Site Location : Liverpool Bay
 Dimensions : Approx. 405m x 1005m x 405m x 1005m
 Area : Approx. 40.70 ha

- Proposed Application
- Other Issued Lease
- Other Proposed Lease
- ~ OMHW Mark
- Low Water Mark

Species: Atlantic Salmon

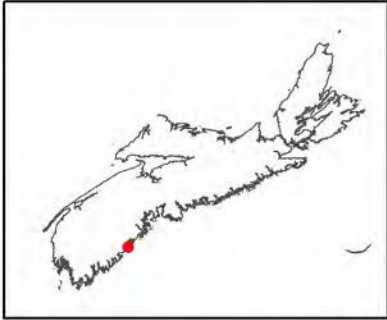
Chart No.
4211



Disclaimer

This map should not be used for navigation or legal purposes. It is intended for general reference use only.

MK-1205x-APR-2019



Aquaculture Site
1205x

Centre
 Lat 44° 02' 31.08" Long -64° 38' 23.01"
 Corner 1
 Lat 44° 02' 46.61" Long -64° 38' 33.81"
 Corner 2
 Lat 44° 02' 47.41" Long -64° 38' 15.65"
 Corner 3
 Lat 44° 02' 14.90" Long -64° 38' 12.93"
 Corner 4
 Lat 44° 02' 14.11" Long -64° 38' 31.09"

DATUM NAD 83
 The above coordinates
 are from a legal survey



Application Information

Proponents : Kelly Cove Salmon Ltd.
 Site Location : Liverpool Bay
 Dimensions : Approx. 405m x 1005m x 405m x 1005m
 Area : Approx. 40.70 ha

- Proposed Application
- Other Issued Lease
- Other Proposed Lease
- OMHW Mark
- NS Bathymetry
- Low Water Mark

Species: Atlantic Salmon

Chart No.
4211

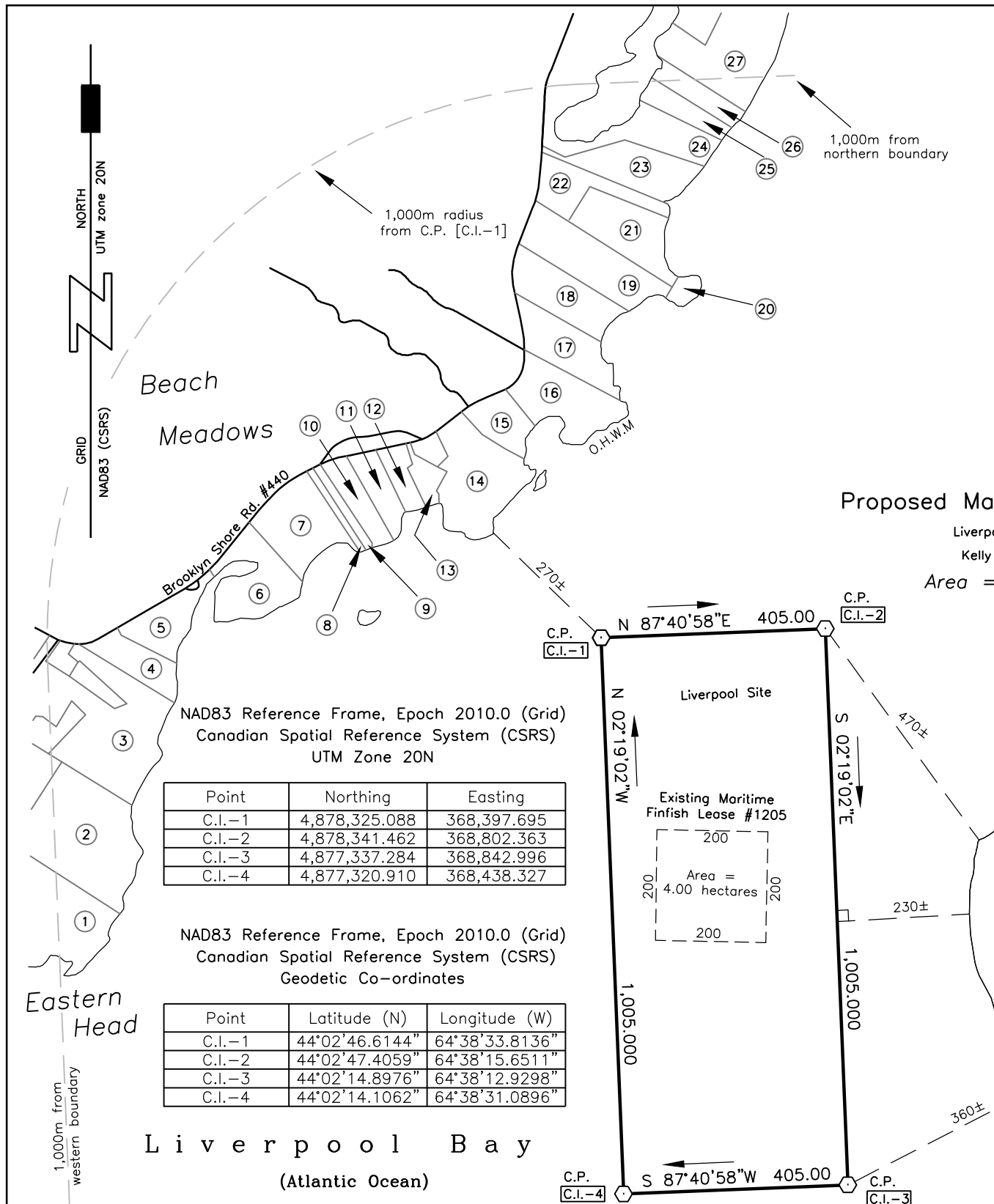


Disclaimer

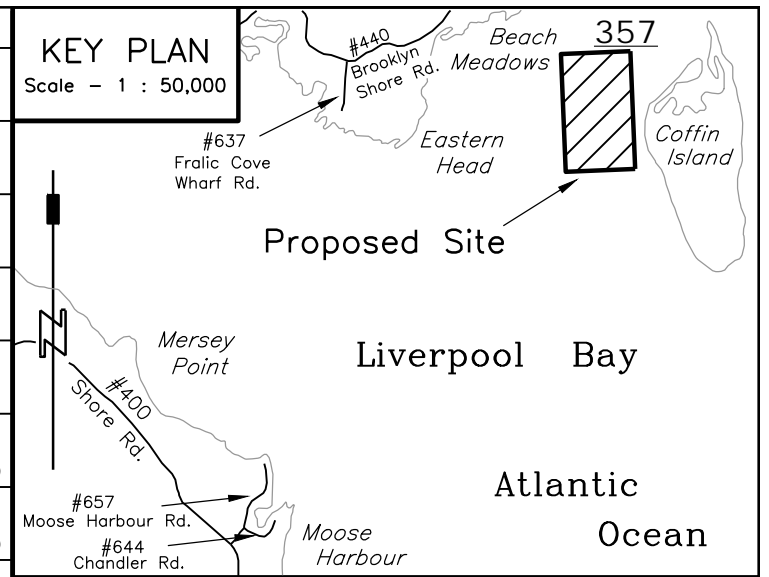
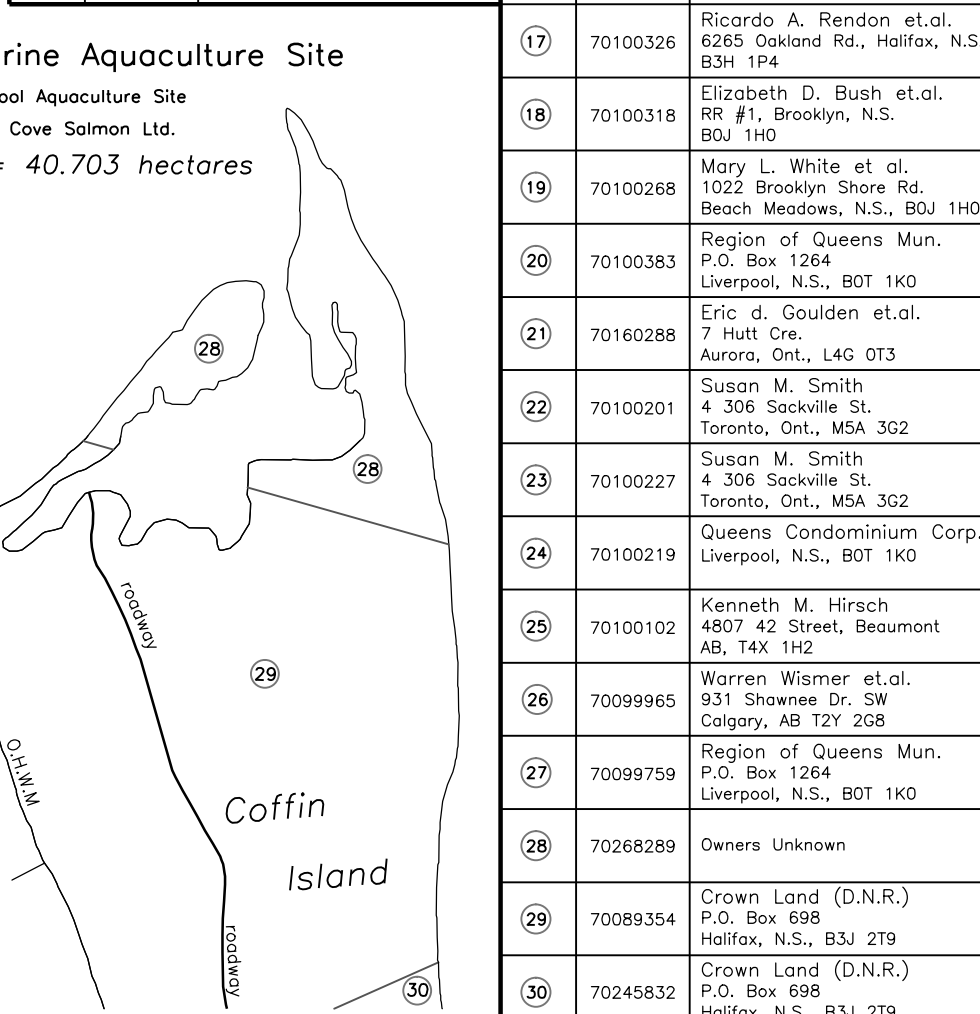
This map should not be used for navigation or legal purposes. It is intended for general reference use only.

MK-1205x-APR-2019

NS1205 Liverpool



#	P.I.D. #	OWNER / ADDRESS	#	P.I.D. #	OWNER / ADDRESS
1	70100946	Dennis Conrad RR #1, Brooklyn, N.S. BOJ 1H0	9	70168976	Rosalie E. Fralic et.al. RR #1, Brooklyn, N.S. BOJ 1H0
2	70100672	Wilhelmina R. Conrad et.al. RR #1, Brooklyn, N.S. BOJ 1H0	10	70100532	John T. Cumber et.ux. 380 Old Chequessett Neck Rd. Wellfleet, MA., USA., 02667
3	70100656	Hazel M. Mouzar P.O. Box 173, Liverpool, N.S. BOT 1K0	11	70100524	Joel Gerrett Connor 4997 Prospect Lake Rd. Victoria, B.C., Can., V9E 1J5
4	70100599	Donald T. Fralic et.ux. RR #1, Brooklyn, N.S. BOJ 1H0	12	70167093	Thomas P. Marian 14759 Niagara Pky, RR #1 Niagara, ON., Can., L0S 1J0
5	70100086	Wilhelmina R. Conrad et.al. RR #1, Brooklyn, N.S. BOJ 1H0	13	70168984	Beach Meadows Cemetery RR #1, Brooklyn, N.S. BOJ 1H0
6	70100540	Andrew R. Godfrey et.al. RR #1, Brooklyn, N.S. BOJ 1H0	14	70100474	Patrick J. Smith 950 Brooklyn Shore Rd. Beach Meadows, N.S., BOJ 1H0
7	70100615	Rosalie E. Fralic et.al. RR #1, Brooklyn, N.S. BOJ 1H0	15	70100433	Stanley A. Wentzell et.ux. RR #1, Brooklyn Beach Meadows, N.S., BOJ 1H0
8	70231675	Owners Unknown	16	70100342	Stanley A. Wentzell 174 Pretoria Ave, Ottawa, Ont. K1S 1X2



Legend:

- CALCULATED POINT C.P. (C)
- CALCULATED (c.)
- N.S. PROPERTY IDENTIFICATION NUMBER P.I.D. #00000000
- NORTHING / EASTING N. / E.
- LOCAL REGISTRY NUMBER Book: / Page:
- ORDINARY HIGH WATER MARK O.H.W.M.
- BOUNDARY DEALT WITH BY THIS PLAN
- OTHER BOUNDARY
- TIE LINES
- NOT TO SCALE
- MAJOR CONTOURS
- MINOR CONTOURS
- DEPTH SOUNDINGS + 00.0
- CONCRETE MOORING
- SHOVEL ANCHOR

AQUACULTURE SITE DEVELOPMENT PLANS
 SHOWING
 PROPOSED BOUNDARY AMENDMENT TO LEASE #1205
KELLY COVE SALMON LTD. / LIVERPOOL SITE
 LOCATED AT:
**COFFIN ISLAND, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA**

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 9th day of January, 2019.

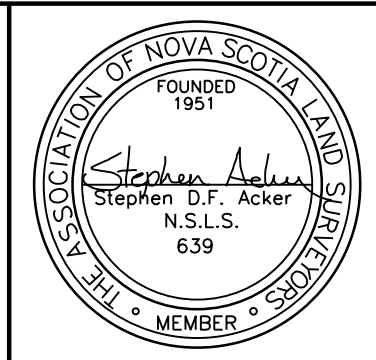
Jeff Nickerson

A&D JOB #300-18-1205

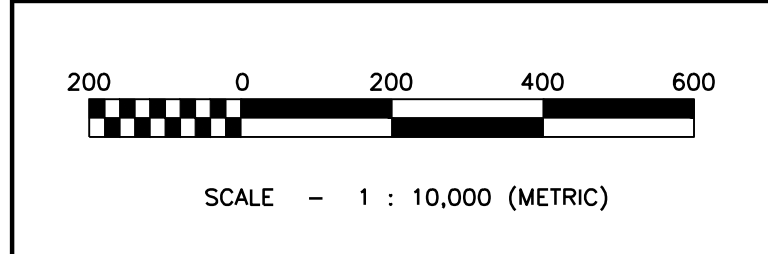
SHEET 1 OF 6 **DATE: JAN. 9, 2019**

NOTES:

- ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
- THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
- ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
- DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
- SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
- NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
- ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
- ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).



PURPOSE OF PLAN (SHEET 1 OF 6)
 THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND AS WELL AS ADJACENT PARCELS OF LAND, FOR ADDITIONAL SITE INFORMATION, REFER TO SHEETS 2-6.



Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
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80B Ohio Road, P.O. Box 387
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 Nova Scotia, Canada
 B0T 1W0

Phone: (902) 648-2186
 www.adsurveying.ca

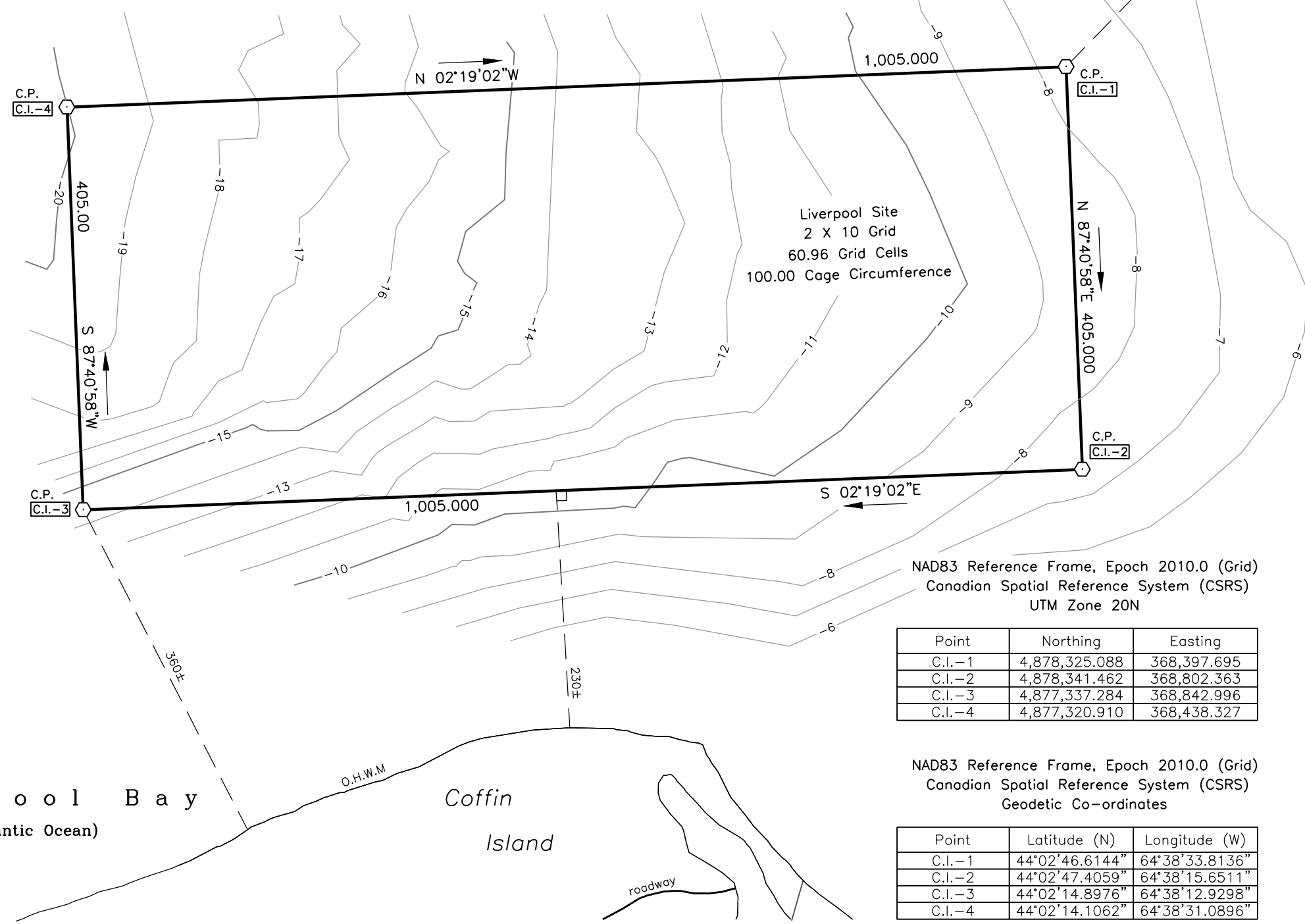
Phone: (902) 875-2110
 info@adsurveying.ca

Proposed Marine Aquaculture Site

Liverpool Aquaculture Site
Kelly Cove Salmon Ltd.

Area = 40.703 hectares

GRID NORTH
NAD83 (CSRS) UTM zone 20N



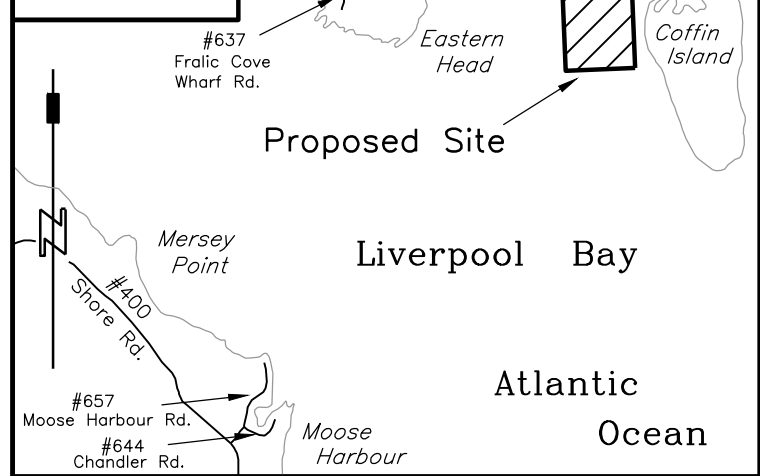
NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
C.I.-1	4,878,325.088	368,397.695
C.I.-2	4,878,341.462	368,802.363
C.I.-3	4,877,337.284	368,842.996
C.I.-4	4,877,320.910	368,438.327

NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
C.I.-1	44°02'46.6144"	64°38'33.8136"
C.I.-2	44°02'47.4059"	64°38'15.6511"
C.I.-3	44°02'14.8976"	64°38'12.9298"
C.I.-4	44°02'14.1062"	64°38'31.0896"

KEY PLAN
Scale - 1 : 50,000



- Legend:**
- CALCULATED POINT C.P. (c)
 - CALCULATED (c.)
 - N.S. PROPERTY IDENTIFICATION NUMBER P.I.D. #00000000
 - NORTHING / EASTING N. / E.
 - LOCAL REGISTRY NUMBER Book: / Page:
 - ORDINARY HIGH WATER MARK O.H.W.M.
 - BOUNDARY DEALT WITH BY THIS PLAN
 - OTHER BOUNDARY
 - TIE LINES
 - NOT TO SCALE
 - MAJOR CONTOURS
 - MINOR CONTOURS
 - DEPTH SOUNDINGS + 00.0
 - CONCRETE MOORING
 - SHOVEL ANCHOR

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
BASIC SEAFLOOR TOPOGRAPHY
KELLY COVE SALMON LTD. / LIVERPOOL SITE
LOCATED AT:
COFFIN ISLAND, LIVERPOOL BAY (ATLANTIC OCEAN),
QUEENS COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.
Dated this 9th day of January, 2019.

Jeff Nickerson

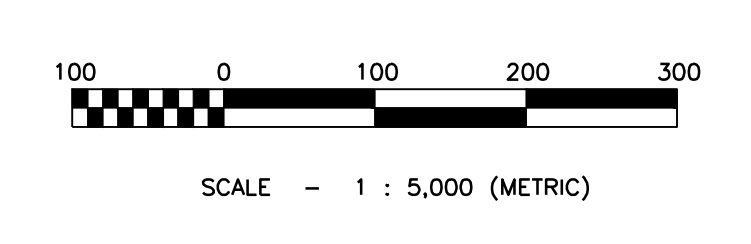
A&D JOB #300-18-1205

SHEET 2 OF 6 | DATE: JAN. 9, 2019

- NOTES:**
- (1) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 - (2) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
 - (3) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
 - (4) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
 - (5) SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
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PURPOSE OF PLAN (SHEET 2 OF 6)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND BASIC SEAFLOOR TOPOGRAPHY, FOR ADDITIONAL ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1, 3-6.



Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

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Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0
Phone: (902) 875-2110
info@adsurveying.ca

- SHEET 3 OF 6 NOTES:**
- (1.) 14 PROPOSED CAGES IN A 2x10 SUNKEN GRID LAYOUT.
 - (2.) CAGE DIAMETER IS 31.83m.
 - (3.) GRID SIZE IS 60.96m x 60.96m (200'x200').
 - (4.) THIS PLAN SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
 - (5.) ANCHOR BLOCKS, ANCHORS, AND MOORING LINES ARE NOT DRAWN TO SCALE.
 - (6.) OFFSETS TO THE LEASE BOUNDARIES ARE HORIZONTAL DISTANCES FROM THE BACK OF THE SHOVEL ANCHOR.

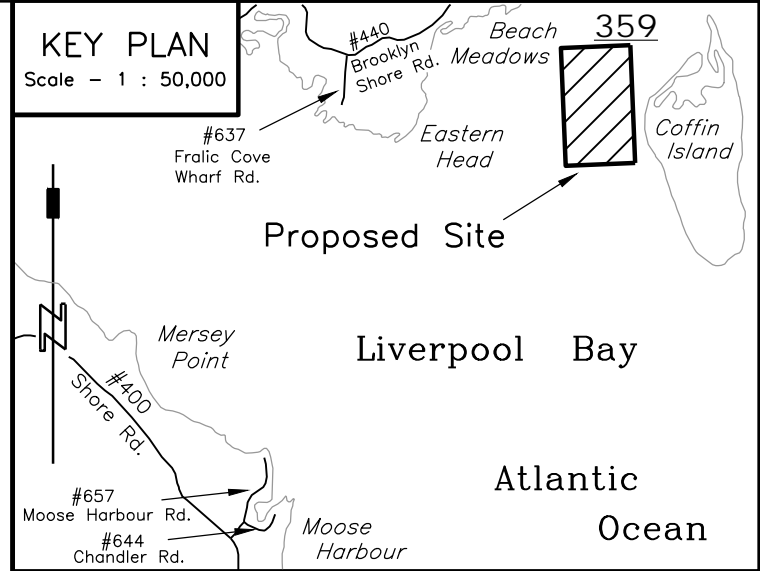
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Liverpool Aquaculture Site
 Kelly Cove Salmon Ltd.
 Area = 40.703

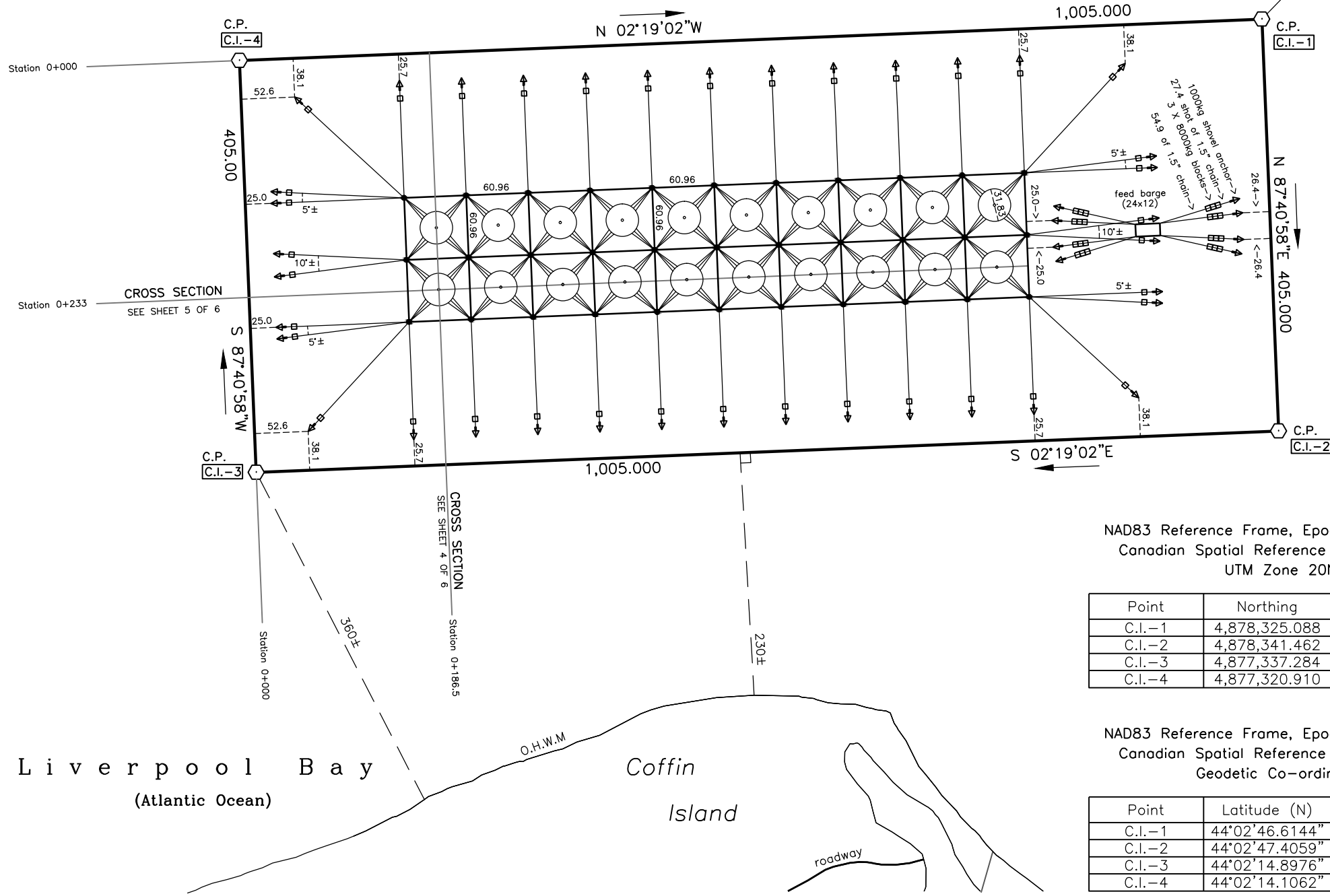
GRID NORTH
 NAD83 (CSRS) UTM zone 20N

KEY PLAN

Scale - 1 : 50,000



- Legend:**
- CALCULATED POINT C.P. ⊙
 - CALCULATED (c.)
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 - OTHER BOUNDARY
 - TIE LINES
 - NOT TO SCALE
 - MAJOR CONTOURS
 - MINOR CONTOURS
 - DEPTH SOUNDINGS + 00.0
 - CONCRETE MOORING □
 - SHOVEL ANCHOR ⚓



NAD83 Reference Frame, Epoch 2010.0 (Grid)
 Canadian Spatial Reference System (CSRS)
 UTM Zone 20N

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C.I.-4	44°02'14.1062"	64°38'31.0896"

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
 AQUACULTURE CAGE CONFIGURATION
KELLY COVE SALMON LTD. / LIVERPOOL SITE
 LOCATED AT:
 COFFIN ISLAND, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA

Client's Statement

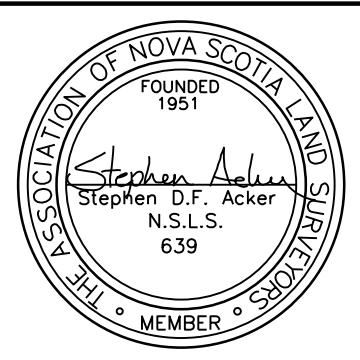
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Dated this 9th day of January, 2019.

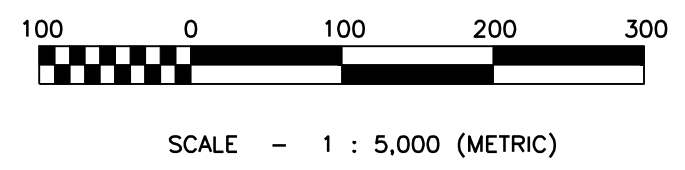
Jeff Nickerson

A&D JOB #300-18-1205
 SHEET 3 OF 6 | DATE: JAN. 9, 2019

- NOTES:**
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 - (2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
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PURPOSE OF PLAN (SHEET 3 OF 6)
 THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATIONS OF ALL ANCHORS, CAGES, AND THE GRID/MOORING CONFIGURATION RELATIVE TO THE LEASE BOUNDARIES.



Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors & Professional Engineers

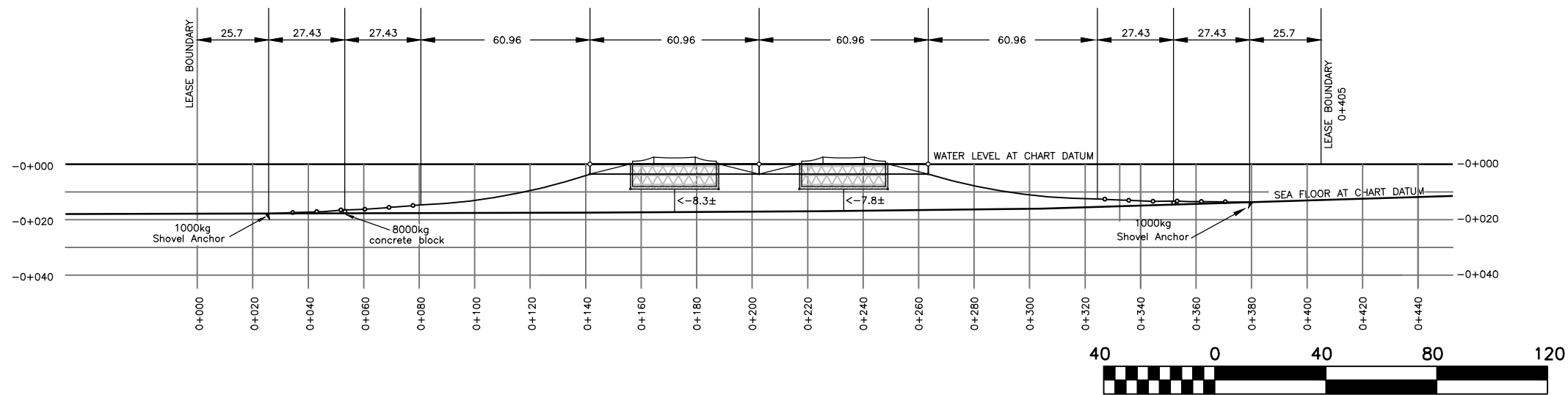
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 B0T 3M0

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 B0T 1W0

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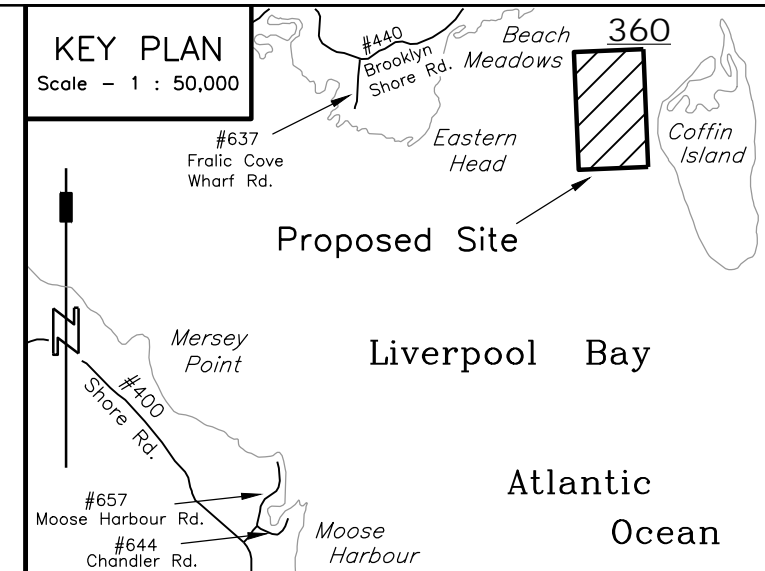
Phone: (902) 875-2110
 info@adsurveying.ca

CROSS SECTION - STATION 0+186.5
 HORIZONTAL SCALE - 1 : 2,000 (METRIC)
 VERTICAL SCALE - 1 : 2,000 (METRIC)



SCALE - 1 : 2,000 (METRIC)

KEY PLAN
 Scale - 1 : 50,000

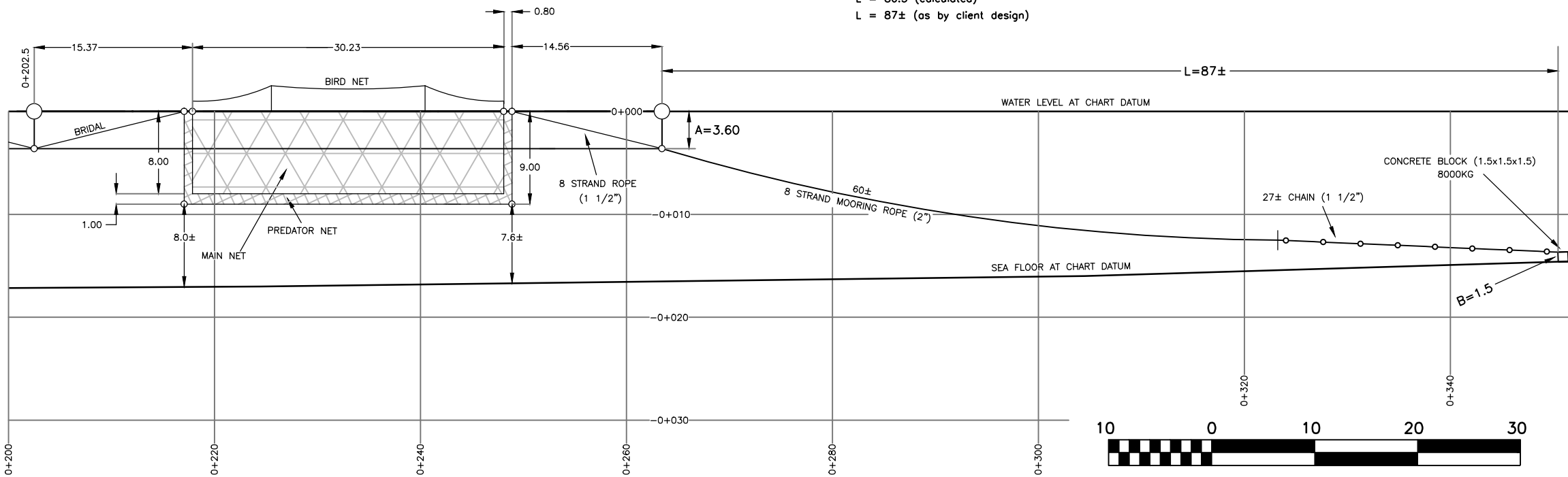


Legend:

CALCULATED POINT . . . . .	.C.P. (C)
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	_____
OTHER BOUNDARY	_____
TIE LINES	-----
NOT TO SCALE	~~~~~
MAJOR CONTOURS	_____
MINOR CONTOURS	_____
DEPTH SOUNDINGS	+ 00.0
CONCRETE MOORING	□
SHOVEL ANCHOR	▲

DETAILED CROSS SECTION - STATION 0+186.5
 HORIZONTAL SCALE - 1 : 500 (METRIC)
 VERTICAL SCALE - 1 : 500 (METRIC)

5:1 Mooring Scope Calculation
 $L = [(max\ depth + max\ tide\ range) - A - B] \times 5$
 $L = [(19\pm + 2.2) - 3.6 - 1.5] \times 5$
 $L = 80.5\ (calculated)$
 $L = 87\pm\ (as\ by\ client\ design)$



SCALE - 1 : 500 (METRIC)

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
 LATERAL CROSS-SECTION
 KELLY COVE SALMON LTD. / LIVERPOOL SITE
 LOCATED AT:
 COFFIN ISLAND, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 9th day of January, 2019.

Jeff Nickerson

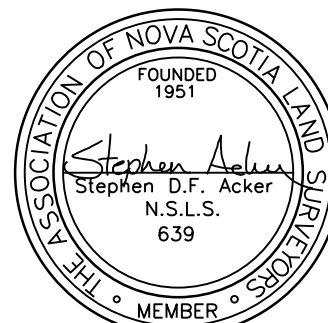
A&D JOB #300-18-1205

SHEET 4 OF 6

DATE: JAN. 9, 2019

NOTES:

- (1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
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- (3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
- (4.) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA.
- (5.) NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
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PURPOSE OF PLAN (SHEET 4 OF 6)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LATERAL CROSS SECTION AS SHOWN ON SHEET 3 OF 6, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

- (1.) THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
- (2.) FOR HORIZONTAL LOCATION OF EACH CROSS SECTION SEE SHEET 3 OF 6.
- (3.) DISTANCES FROM SEA FLOOR MAY VARY DEPENDING ON TIDE AND CURRENT.
- (4.) DISTANCES FROM SEA FLOOR ARE APPROXIMATE ONLY.
- (5.) DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).



Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors &
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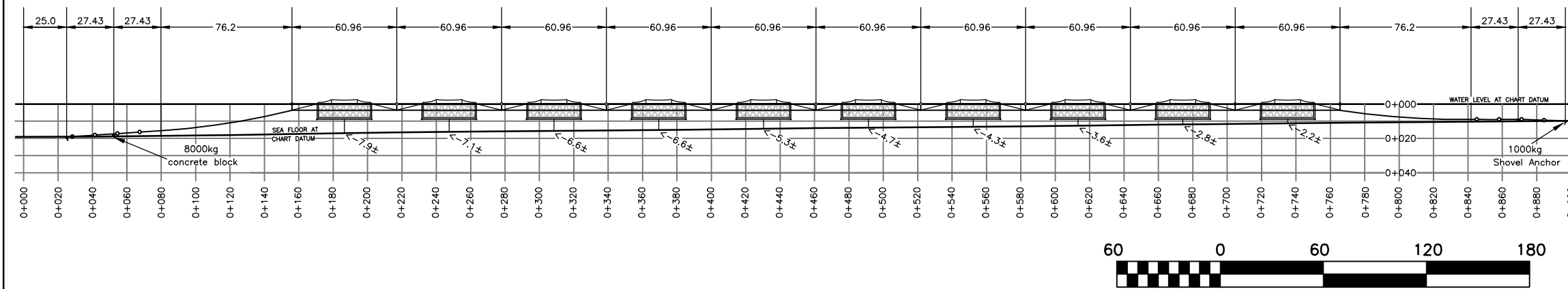
4083 Highway #308, P.O. Box 64
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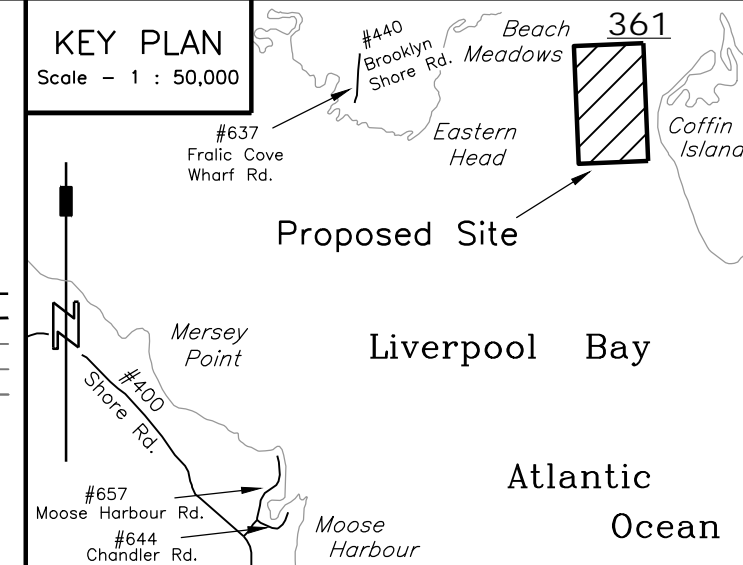
Phone: (902) 875-2110
 info@adsurveying.ca

CROSS SECTION - STATION 0+233
 HORIZONTAL SCALE - 1 : 3,000 (METRIC)
 VERTICAL SCALE - 1 : 3,000 (METRIC)

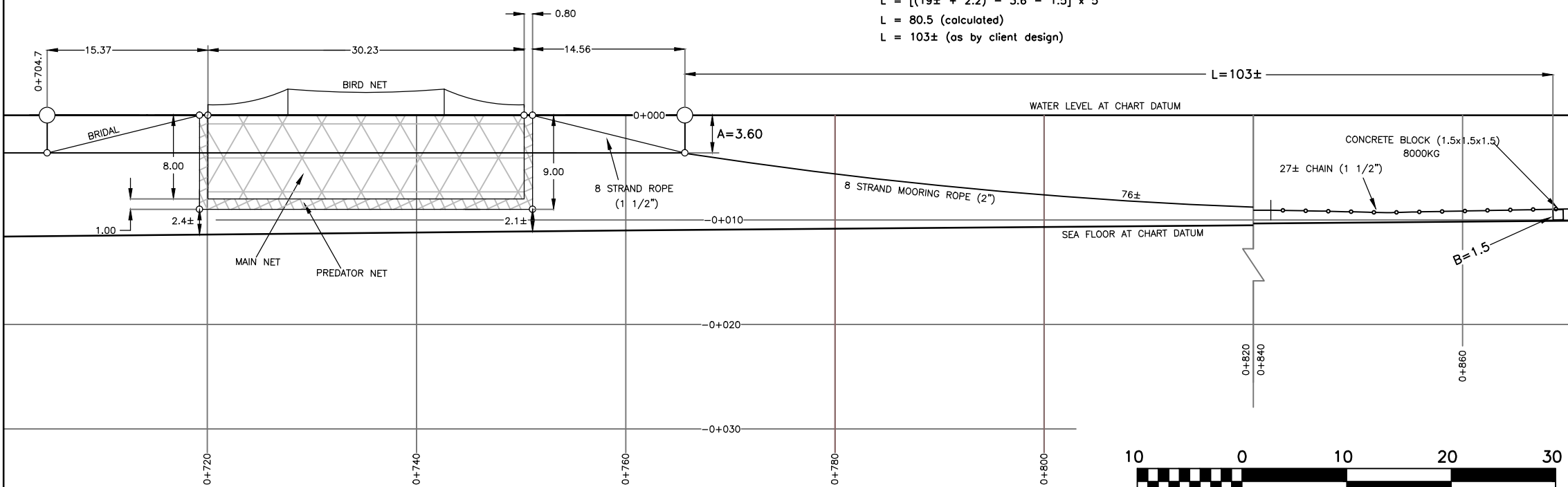


SCALE - 1 : 3,000 (METRIC)

KEY PLAN
 Scale - 1 : 50,000



DETAILED CROSS SECTION - STATION 0+233
 HORIZONTAL SCALE - 1 : 500 (METRIC)
 VERTICAL SCALE - 1 : 500 (METRIC)



SCALE - 1 : 500 (METRIC)

5:1 Mooring Scope Calculation
 $L = [(max\ depth + max\ tide\ range) - A - B] \times 5$
 $L = [(19\pm + 2.2) - 3.6 - 1.5] \times 5$
 $L = 80.5\ (calculated)$
 $L = 103\pm\ (as\ by\ client\ design)$

Legend:

CALCULATED POINT	.....	C.P. ○
CALCULATED	.....	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	.....	P.I.D. #00000000
NORTHING / EASTING	.....	N. / E.
LOCAL REGISTRY NUMBER	.....	Book: / Page:
ORDINARY HIGH WATER MARK	.....	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	.....	+ 00.0
CONCRETE MOORING	.....	□
SHOVEL ANCHOR	.....	⊠

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
 LONGITUDINAL CROSS-SECTION
KELLY COVE SALMON LTD. / LIVERPOOL SITE
 LOCATED AT:
 COFFIN ISLAND, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 9th day of January, 2019

Jeff Nickerson

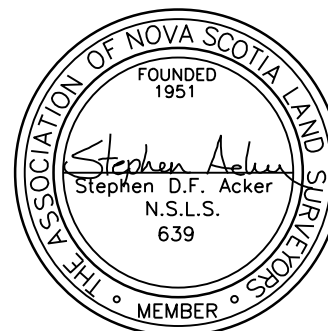
A&D JOB #300-18-1205

SHEET 5 OF 6

DATE: JAN. 9, 2019

NOTES:

- (1) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
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PURPOSE OF PLAN (SHEET 5 OF 6)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LONGITUDINAL CROSS SECTION AS SHOWN ON SHEET 3 OF 6, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

- (1) THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
- (2) FOR HORIZONTAL LOCATION OF EACH CROSS SECTION SEE SHEET 3 OF 6.
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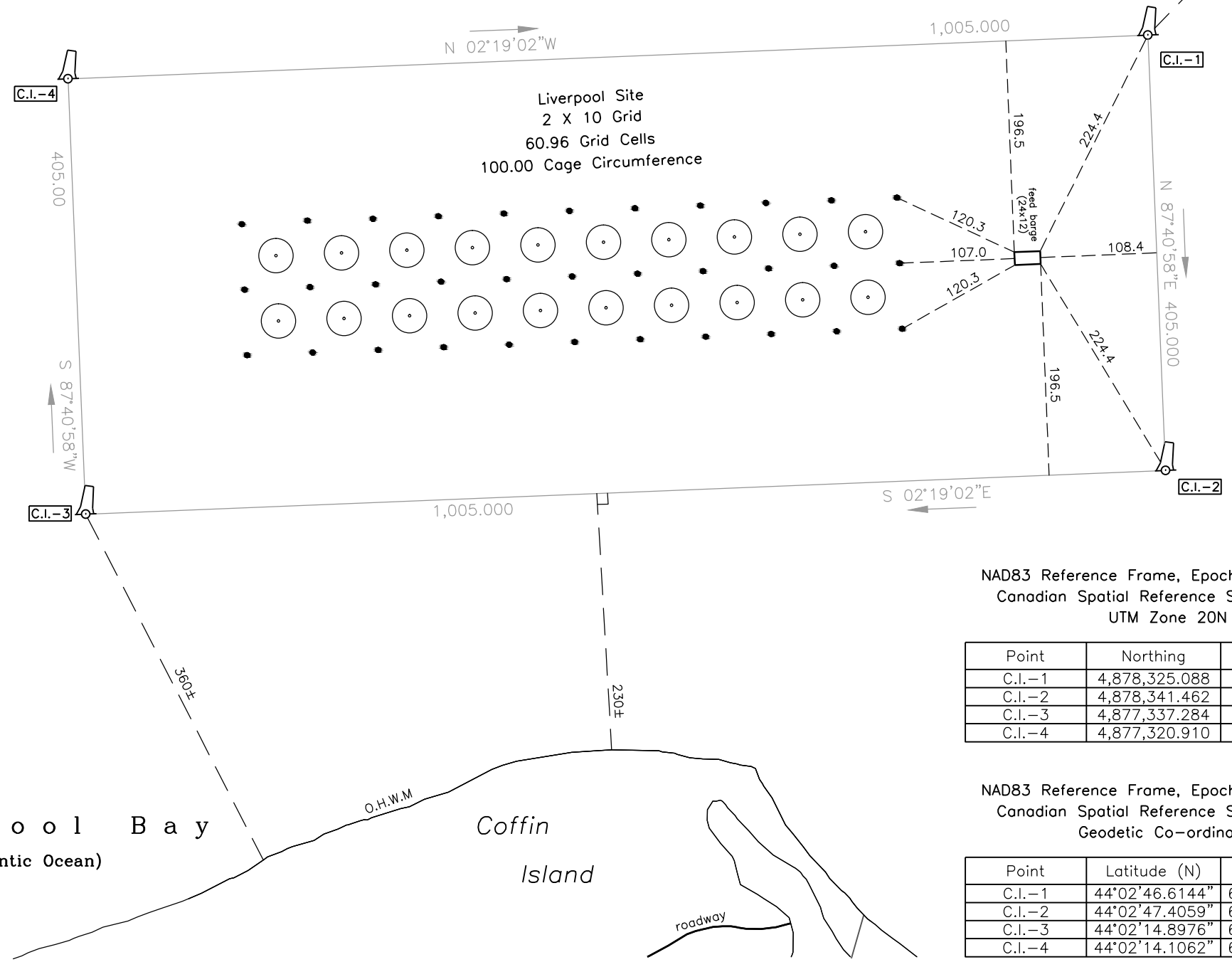
Phone: (902) 875-2110
 info@adsurveying.ca

Proposed Navigational Aids Marking

- = compensator buoys (yellow)
- = aquaculture cages (31.83m diameter)
- ⚓ = cautionary buoy (yellow)

Liverpool Aquaculture Site
 Kelly Cove Salmon Ltd.
 Area = 40.703

GRID NORTH
 NAD83 (CSRS) UTM zone 20N

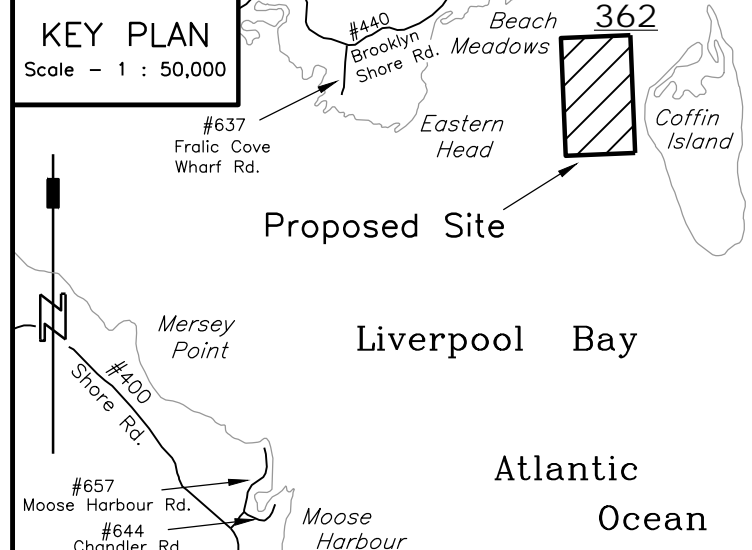


NAD83 Reference Frame, Epoch 2010.0 (Grid)
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- Legend:**
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 - P.I.D. #00000000
 - N. / E.
 - Book: / Page:
 - O.H.W.M.
 -
 -
 -
 -
 -
 - + 00.0
 -
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AQUACULTURE SITE DEVELOPMENT PLANS
 SHOWING
 PROPOSED NAVIGATIONAL AIDS MARKING PLAN
KELLY COVE SALMON LTD. / LIVERPOOL SITE
 LOCATED AT:
 COFFIN ISLAND, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA

Client's Statement

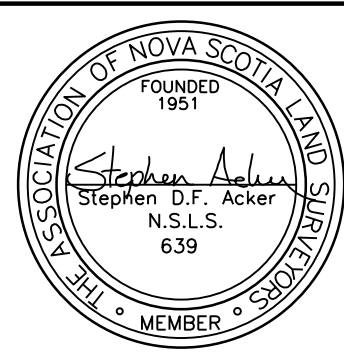
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Dated this 9th day of January, 2019.

Jeff Nickerson

A&D JOB #300-18-1205
 SHEET 6 OF 6 | DATE: JAN. 9, 2019

- NOTES:**
- (1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 - (2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
 - (3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
 - (4.) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA.
 - (5.) NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
 - (6.) ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
 - (7.) ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).



PURPOSE OF PLAN (SHEET 6 OF 6)
 THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATION AND TYPES OF ALL NAVIGATIONAL AIDS RELATIVE TO THE PROPOSED LEASE BOUNDARIES.

SCALE - 1 : 5,000 (METRIC)

Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors &
 Professional Engineers

4083 Highway #308, P.O. Box 64
 Tusket, Yarmouth County
 Nova Scotia, Canada
 B0T 3M0

80B Ohio Road, P.O. Box 367
 Shelburne, Shelburne County
 Nova Scotia, Canada
 B0T 1W0

Phone: (902) 648-2186
 www.adsurveying.ca

Phone: (902) 875-2110
 info@adsurveying.ca

NAVIGATION PROTECTION ACT (NPA) NOTICE OF WORKS FORM

WARNING: Any false or misleading statement with respect to this form and supporting documentation, including the misrepresentation of a material fact, may result in the refusal to authorize or issue Approval, or result in the suspension or cancellation of an Approval obtained through fraudulent means.

PRIOR TO COMPLETING THIS FORM:

1. Determine if your project is on a navigable water listed on the Schedule to the NPA. A *Notice to the Minister* is required for works on scheduled navigable waters. Works on non-scheduled navigable waters may be eligible to opt in; if requesting Opt-in, the Opt-in annex must be included with your *Notice to the Minister*.
2. Self assess your project against the *Minor Works Order* to determine if a *Notice to the Minister* is required. Links to the NPA Schedule, Order and Regulations can be accessed through the Navigation Protection Program (NPP) website at <http://www.tc.gc.ca/eng/programs-621.html>.

PURPOSE		
<p>This <i>Notice of Works Form</i> and its supporting documentation (as well as other relevant information) which may be required for a review by Transport Canada (TC), once completed and submitted, comprise the <i>Notice to the Minister</i> as required under the NPA. For assistance in completing your submission, refer to the guidance provided on the NPP website under "Apply to the NPP" including the <i>Guide to the Navigation Protection Program's Notification, Application and Review Requirements</i>.</p>		
SUPPORTING DOCUMENTATION REQUIREMENTS		
<p>Mandatory Information Checklist (incomplete information will be returned with no action)</p> <p><input checked="" type="checkbox"/> Completed and signed "Notice of Works Form" with all mandatory fields completed</p> <p><input checked="" type="checkbox"/> Map showing location of project¹</p> <p><input checked="" type="checkbox"/> Top/Plan drawing with dimensions¹</p> <p><input checked="" type="checkbox"/> Side/Profile drawing with dimensions¹</p> <p>¹ 6 copies if hard copy submission</p>	<p>Recommended Information (may expedite your review)</p> <p><input checked="" type="checkbox"/> Body of water details</p> <p><input checked="" type="checkbox"/> Land use/Ownership information</p> <p><input checked="" type="checkbox"/> Body of water use information</p> <p><input checked="" type="checkbox"/> Impacts, obstructions and mitigation plans</p> <p><input checked="" type="checkbox"/> Any environmental review information</p> <p><input checked="" type="checkbox"/> Operation, maintenance and marking plans</p> <p><input type="checkbox"/> Photographs of work site and body of water</p> <p><input type="checkbox"/> Aboriginal consultation results</p> <p><input checked="" type="checkbox"/> Other government agencies involved</p> <p><input type="checkbox"/> Water lot lease information</p> <p><input type="checkbox"/> Opt-in request annex (non-scheduled navigable waters only)</p>	
<p>When submitting a Notice to the Minister, owners should note:</p> <ul style="list-style-type: none"> All plans and drawings must be legible when printed on 11" x 17" paper For e-mail submissions, provide a scan of all relevant supporting documentation Your completed Notice to the Minister should be sent to the appropriate regional office as outlined below 		
TRANSPORT CANADA NAVIGATION PROTECTION PROGRAM REGIONAL OFFICE LOCATIONS		
<p>Pacific Region 820-800 Burrard Street Vancouver BC V6Z 2J8 Telephone: 604-775-8867 Email: NPPPAC-PPNPAC@tc.gc.ca</p>	<p>Prairie and Northern Region Canada Place 1100-9700 Jasper Ave Edmonton AB T5J 4E8 Telephone: 780-495-8215 Email: NPPPNR-PPNRPN@tc.gc.ca</p>	<p>Ontario Region 100 South Front Street, 1st Floor Sarnia ON N7T 2M4 Telephone: 519-383-1863 Email: NPPONT-PPNONT@tc.gc.ca</p>
<p>Headquarters (For info on the NPP and NPA ONLY) Notices not processed at this office Tower C, 330 Sparks Street, 18th Floor Ottawa ON K1A 0N5 Telephone: 613-991-3476 Email: NPPHQ-PPNAC@tc.gc.ca</p>	<p>Quebec Region 401-1550 d'Estimauville Avenue, 5th Floor Quebec QC G1J 0C8 Telephone: 877-646-6420 Email: PPNQUE-NPPQUE@tc.gc.ca</p>	<p>Atlantic Region 95 Foundry Street, 6th Floor P.O. Box 42 Moncton NB E1C 8K6 Telephone: 506-851-3113 Email: NPPATL-PPNATL@tc.gc.ca</p>

NAVIGATION PROTECTION ACT NOTICE OF WORKS FORM

 TC file number (if known): **8200-93-3054**

 Are you the riparian property owner? Yes No

GENERAL INFORMATION			
Official and/or local name(s) of the body of water (Required) Liverpool - Coffin Island, Liverpool Bay		Is the body of water listed on the schedule to the NPA? <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unknown	
Are you also requesting an Approval, if required? <input checked="" type="radio"/> Yes <input type="radio"/> No		Is this an Opt-in request? <input type="radio"/> Yes <input checked="" type="radio"/> No	
Are you representing an Aboriginal group? <input type="radio"/> Yes <input checked="" type="radio"/> No		Is the work near/on First Nations reserve or land claim? <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	
Does this project involve throwing or depositing materials in water? <input type="radio"/> Yes <input checked="" type="radio"/> No		Does this project involve dewatering a body of water? <input type="radio"/> Yes <input checked="" type="radio"/> No	
OWNER CONTACT INFORMATION ²			
Individual or company name (Required) Kelly Cove Salmon Ltd.		Contact name (Required) Jeff Nickerson	
Mailing address (Required) P.O.Box 33			
City/Town (Required) Bridgewater		Province/Territory (Required) Nova Scotia	Postal code (Required) B4V 2W6
Primary telephone number (Required) 902-275-7493	Other telephone number	E-mail jnickerson@cookeaque.com	
Owner's agent/mandatary (contractor/consultant/representative/co-proponent, if any)			
Company name Sweeney International Marine Corp.		Contact name Leah Lewis-McCrea	
Mailing address 46 Milltown Blvd.			
City/Town St. Stephen		Province/Territory NB	Postal code E3L 1G3
Primary telephone number 902-492-0359	Other telephone number	E-mail llewis@simcorp.ca	
WORK SITE INFORMATION			
Nearest municipality/county/district (Required) Liverpool, Queens County		Province/Territory (Required) Nova Scotia	
Site location such as lot, concession, section, township, range, meridian, 911 address, property identification, etc. (Required) Liverpool aquaculture site #1205 is located in Liverpool Bay, approximately 6.1 kilometers east of the town of Liverpool. Site #1205 is situated on the western side of Coffin Island.			
Site position Latitude North (Required) Degrees <u>44</u> Minutes <u>02</u> Seconds <u>30.7</u>		Site position Longitude West (Required) Degrees <u>64</u> Minutes <u>38</u> Seconds <u>23.3</u>	
Hydro chart number: <u>4211</u>		Topo map number: _____	

Body of water details, such as characteristics, bank/bottom features, biological components, flow/tides, etc.

Site #1205 is located on the western side of Coffin Island in Liverpool Bay, occupies a 40.703 ha parcel, and is located over waters ranging from 8 - 20 m in depth. The sediment composition of the seafloor is composed primarily of hard packed sand.

Potential obstructions, such as natural/man-made, other works, navigation aids, etc.

This site consists of plastic circular cages and compensator buoys. The outside corners of the lease are marked with a 0.6 m buoy equipped with a light and radar reflectors. Liverpool Bay also has a marked navigation channel.

Land use/Ownership, such as past/current, private/government, rural/suburban, coastal, environmental, etc.

Aquaculture site #1205 is owned by Kelly Cove Salmon Ltd.

BODY OF WATER USE INFORMATION

Navigation types (check all that apply) <input checked="" type="checkbox"/> Commercial <input checked="" type="checkbox"/> Recreational		Maximum vessel size Length _____ Width _____ Draft _____	
Traffic direction <input type="radio"/> One-way <input checked="" type="radio"/> Two-way		Manoeuvrability (check all that apply) <input type="checkbox"/> Poor <input type="checkbox"/> Good <input checked="" type="checkbox"/> Excellent	
Day/Night <input type="radio"/> Day <input type="radio"/> Night <input checked="" type="radio"/> Both	Volume <input type="radio"/> Low <input checked="" type="radio"/> Med <input type="radio"/> High	Navigation season(s) (check all that apply) <input checked="" type="checkbox"/> Winter <input checked="" type="checkbox"/> Spring <input checked="" type="checkbox"/> Summer <input checked="" type="checkbox"/> Fall	

Other uses such as cottagers, special events, fishing, etc

The area surrounding aquaculture site #1205 is used primarily by fishing vessels traveling in and out of the port of Liverpool. Recreational vessels also frequent this area. The primary vessel traffic around Liverpool #1205 would be from vessels servicing the site.

PROJECT INFORMATION

Name of work such as bridge, dam, marina, etc. (Required) Aquaculture site	Type of work (check all that apply) (Required) <input type="checkbox"/> Construct <input type="checkbox"/> Place <input checked="" type="checkbox"/> Alter <input type="checkbox"/> Repair <input type="checkbox"/> Decommission <input type="checkbox"/> Rebuild <input checked="" type="checkbox"/> Permanent <input type="checkbox"/> Temporary <input type="checkbox"/> Remove
---	---

Brief project description (or attach) such as status, structures, operation, etc. (Required)


The aquaculture site consists of two strings of 10 circular 100 m circumference cages. Cages are present on site all year round.

Method of construction such as temporary works, activities, etc. (Required)

Aquaculture site consists of anchored cage systems (see attached plans). Crews visit the site daily to feed and maintain cage system.

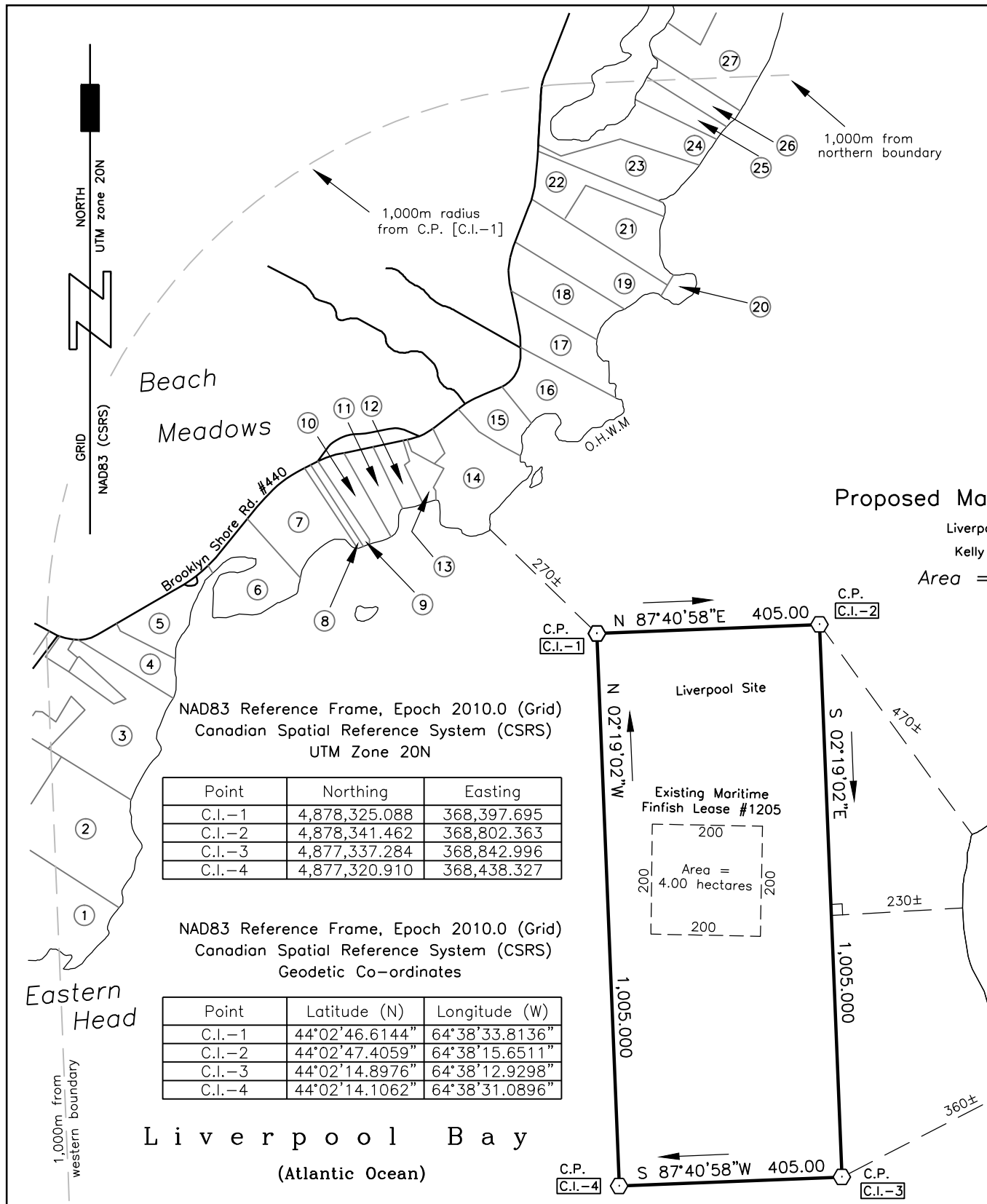
Anticipated impacts such as source, severity, mitigation, marking, waste/debris management, use, cumulative, etc.

Expected start date (dd-mm-yyyy) (Required) <p style="text-align: center;">Immediately</p>	Expected completion date (dd-mm-yyyy) (Required) <p style="text-align: center;">Ongoing</p>
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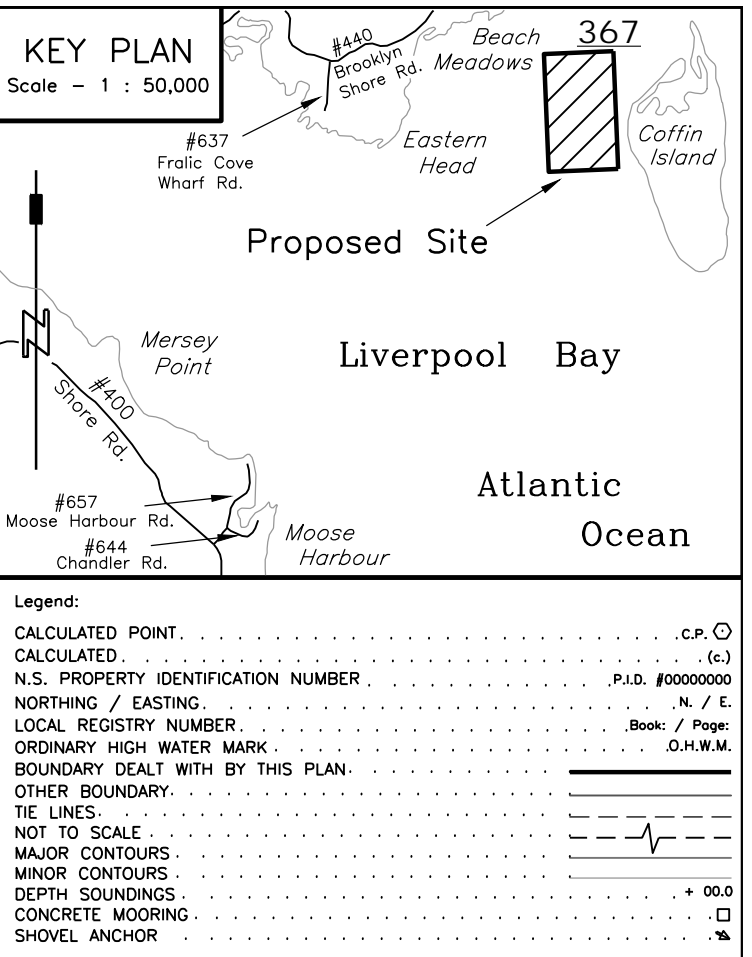
ENVIRONMENTAL REVIEW INFORMATION	
Is the work located on Federal lands? <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	Is the project a designated project under the <i>Regulations Designating Physical Activities</i> under the <i>Canadian Environmental Assessment Act, 2012</i> ? <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
Is the project subject to Northern Environmental Assessment (EA) Regime(s)? <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	If yes, identify the northern EA regime(s) that apply <input type="checkbox"/> Inuvialuit Final Agreement (IFA) <input type="checkbox"/> <i>Mackenzie Valley Resource Management Act</i> (MVRMA) <input type="checkbox"/> Nunavut Land Claims Agreement (NLCA) <input type="checkbox"/> <i>Yukon Environmental and Socio-economic Assessment Act</i> (YESAA)
Other Federal Organizations involved	
<input checked="" type="checkbox"/> Canadian Environmental Assessment Agency (CEAA) <input checked="" type="checkbox"/> Fisheries and Oceans Canada (DFO) <input type="checkbox"/> Major Projects Management Office (MPMO) <input type="checkbox"/> Aboriginal Affairs and Northern Development Canada (AANDC)	<input type="checkbox"/> Environment Canada (EC) <input type="checkbox"/> Natural Resources Canada (NRCan) <input type="checkbox"/> Northern Projects Management Office (NPMO) <input type="checkbox"/> Other: _____
OWNER AUTHORIZATION ²	
I hereby certify that the information contained herein and in any of the supporting documents is complete, true and accurate to the best of my knowledge and belief, and that I am authorized, as the owner, to submit this Notice to the Minister.	
 _____ Print Name (Required)	14/2/2019 _____ Date (dd-mm-yyyy) (Required)
FOR OFFICE USE ONLY	
	Date stamped (dd-mm-yyyy)

² "Owner", in relation to a work, means the actual or reputed owner of the work or that owner's agent or mandatary. It includes a person who is in possession or claiming ownership of the work and a person who is authorizing or otherwise responsible for the construction, placement, alteration, repair, rebuilding, removal, decommissioning, maintenance, operation, safety or use of the work. It also includes a person who proposes to construct or place a work.

The personal information provided on this Notice to the Minister is collected under the authority of the *Navigation Protection Act*, sections 4, 5, 6, 9, 21, 22, 23 and 24. This information is required for the purpose of processing applications made under the above-noted sections for proposed, commenced or existing works that are or will be constructed, placed, altered, repaired, rebuilt, removed or decommissioned in, on, over, under, through or across any navigable water in Canada. The personal information collected is described in a personal information bank entitled *Navigation Protection Program* (bank number TC PPU 086). Under the provisions of the *Privacy Act*, individuals have the right of access to, correction of and protection of their personal information. Instructions for obtaining personal information are provided in Info Source, a copy of which is available in major public and academic libraries or online at <http://www.infosource.gc.ca>



#	P.I.D. #	OWNER / ADDRESS	#	P.I.D. #	OWNER / ADDRESS
1	70100946	Dennis Conrad RR #1, Brooklyn, N.S. BOJ 1H0	9	70168976	Rosalie E. Fralic et.al. RR #1, Brooklyn, N.S. BOJ 1H0
2	70100672	Wilhelmina R. Conrad et.al. RR #1, Brooklyn, N.S. BOJ 1H0	10	70100532	John T. Cumber et.ux. 380 Old Chequessett Neck Rd. Wellfleet, MA., USA., 02667
3	70100656	Hazel M. Mouzar P.O. Box 173, Liverpool, N.S. BOT 1K0	11	70100524	Joel Gerrett Connor 4997 Prospect Lake Rd. Victoria, B.C., Can., V9E 1J5
4	70100599	Donald T. Fralic et.ux. RR #1, Brooklyn, N.S. BOJ 1H0	12	70167093	Thomas P. Marian 14759 Niagara Pky, RR #1 Niagara, ON., Can., L0S 1J0
5	70100086	Wilhelmina R. Conrad et.al. RR #1, Brooklyn, N.S. BOJ 1H0	13	70168984	Beach Meadows Cemetery RR #1, Brooklyn, N.S. BOJ 1H0
6	70100540	Andrew R. Godfrey et.al. RR #1, Brooklyn, N.S. BOJ 1H0	14	70100474	Patrick J. Smith 950 Brooklyn Shore Rd. Beach Meadows, N.S., BOJ 1H0
7	70100615	Rosalie E. Fralic et.al. RR #1, Brooklyn, N.S. BOJ 1H0	15	70100433	Stanley A. Wentzell et.ux. RR #1, Brooklyn Beach Meadows, N.S., BOJ 1H0
8	70231675	Owners Unknown	16	70100342	Stanley A. Wentzell 174 Pretoria Ave, Ottawa, Ont. K1S 1X2
			17	70100326	Ricardo A. Rendon et.al. 6265 Oakland Rd., Halifax, N.S. B3H 1P4
			18	70100318	Elizabeth D. Bush et.al. RR #1, Brooklyn, N.S. BOJ 1H0
			19	70100268	Mary L. White et al. 1022 Brooklyn Shore Rd. Beach Meadows, N.S., BOJ 1H0
			20	70100383	Region of Queens Mun. P.O. Box 1264 Liverpool, N.S., BOT 1K0
			21	70160288	Eric d. Goulden et.al. 7 Hutt Cre. Aurora, Ont., L4G 0T3
			22	70100201	Susan M. Smith 4 306 Sackville St. Toronto, Ont., M5A 3G2
			23	70100227	Susan M. Smith 4 306 Sackville St. Toronto, Ont., M5A 3G2
			24	70100219	Queens Condominium Corp. Liverpool, N.S., BOT 1K0
			25	70100102	Kenneth M. Hirsch 4807 42 Street, Beaumont AB, T4X 1H2
			26	70099965	Warren Wismer et.al. 931 Shawnee Dr. SW Calgary, AB T2Y 2G8
			27	70099759	Region of Queens Mun. P.O. Box 1264 Liverpool, N.S., BOT 1K0
			28	70268289	Owners Unknown
			29	70089354	Crown Land (D.N.R.) P.O. Box 698 Halifax, N.S., B3J 2T9
			30	70245832	Crown Land (D.N.R.) P.O. Box 698 Halifax, N.S., B3J 2T9

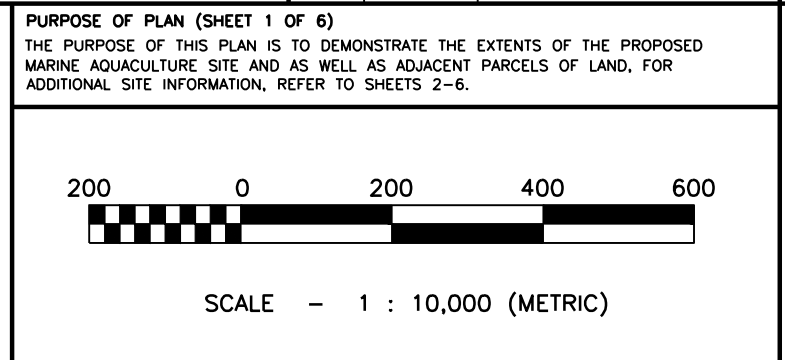
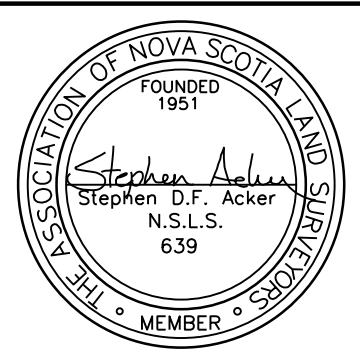


AQUACULTURE SITE DEVELOPMENT PLANS
 SHOWING
 PROPOSED BOUNDARY AMENDMENT TO LEASE #1205
KELLY COVE SALMON LTD. / LIVERPOOL SITE
 LOCATED AT:
**COFFIN ISLAND, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA**

Client's Statement
 I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.
 Dated this 9th day of January, 2019.
 Jeff Nickerson

A&D JOB #300-18-1205
SHEET 1 OF 6 **DATE: JAN. 9, 2019**

NOTES:
 (1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 (2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
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 (5.) SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
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4083 Highway #308, P.O. Box 64
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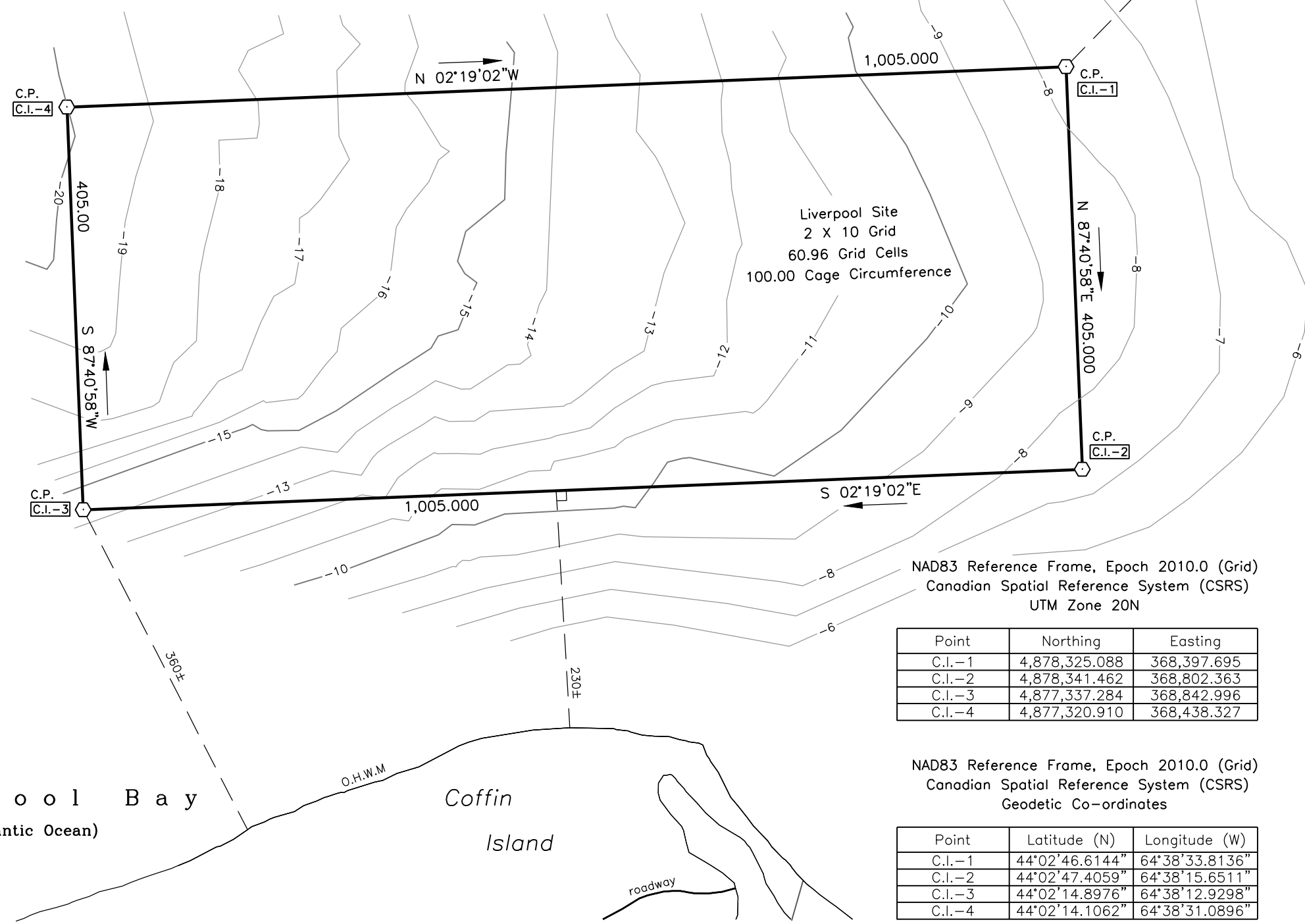
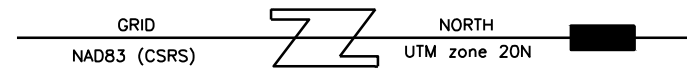
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 www.adsurveying.ca

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 info@adsurveying.ca

Proposed Marine Aquaculture Site

Liverpool Aquaculture Site
Kelly Cove Salmon Ltd.

Area = 40.703 hectares



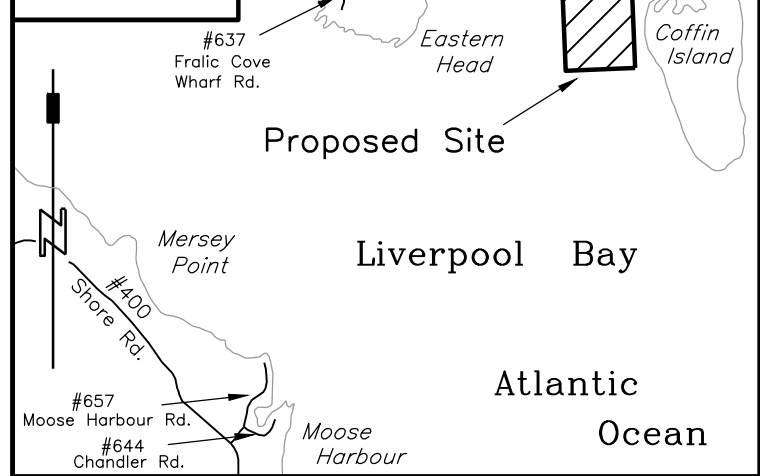
NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
C.I.-1	4,878,325.088	368,397.695
C.I.-2	4,878,341.462	368,802.363
C.I.-3	4,877,337.284	368,842.996
C.I.-4	4,877,320.910	368,438.327

NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
C.I.-1	44°02'46.6144"	64°38'33.8136"
C.I.-2	44°02'47.4059"	64°38'15.6511"
C.I.-3	44°02'14.8976"	64°38'12.9298"
C.I.-4	44°02'14.1062"	64°38'31.0896"

KEY PLAN
Scale - 1 : 50,000



Legend:

CALCULATED POINT	..... C.P. (c)
CALCULATED	..... (c.)
N.S. PROPERTY IDENTIFICATION NUMBER	..... P.I.D. #00000000
NORTHING / EASTING	..... N. / E.
LOCAL REGISTRY NUMBER	..... Book: / Page:
ORDINARY HIGH WATER MARK	..... O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	..... + 00.0
CONCRETE MOORING	.....
SHOVEL ANCHOR	.....

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
BASIC SEAFLOOR TOPOGRAPHY
KELLY COVE SALMON LTD. / LIVERPOOL SITE
LOCATED AT:
COFFIN ISLAND, LIVERPOOL BAY (ATLANTIC OCEAN),
QUEENS COUNTY, NOVA SCOTIA

Client's Statement

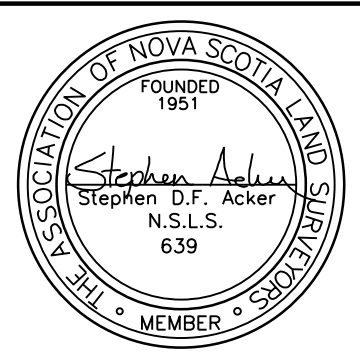
I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.
Dated this 9th day of January, 2019.

Jeff Nickerson

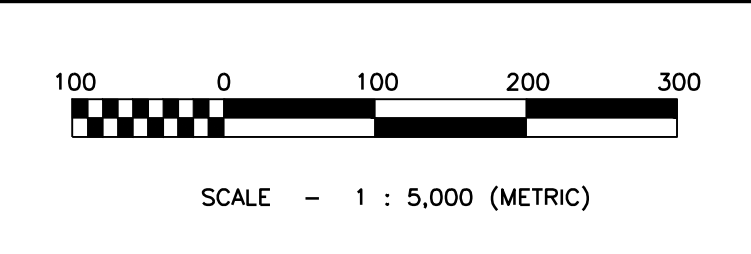
A&D JOB #300-18-1205

SHEET 2 OF 6 | DATE: JAN. 9, 2019

- NOTES:**
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PURPOSE OF PLAN (SHEET 2 OF 6)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND BASIC SEAFLOOR TOPOGRAPHY, FOR ADDITIONAL ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1, 3-6.



Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

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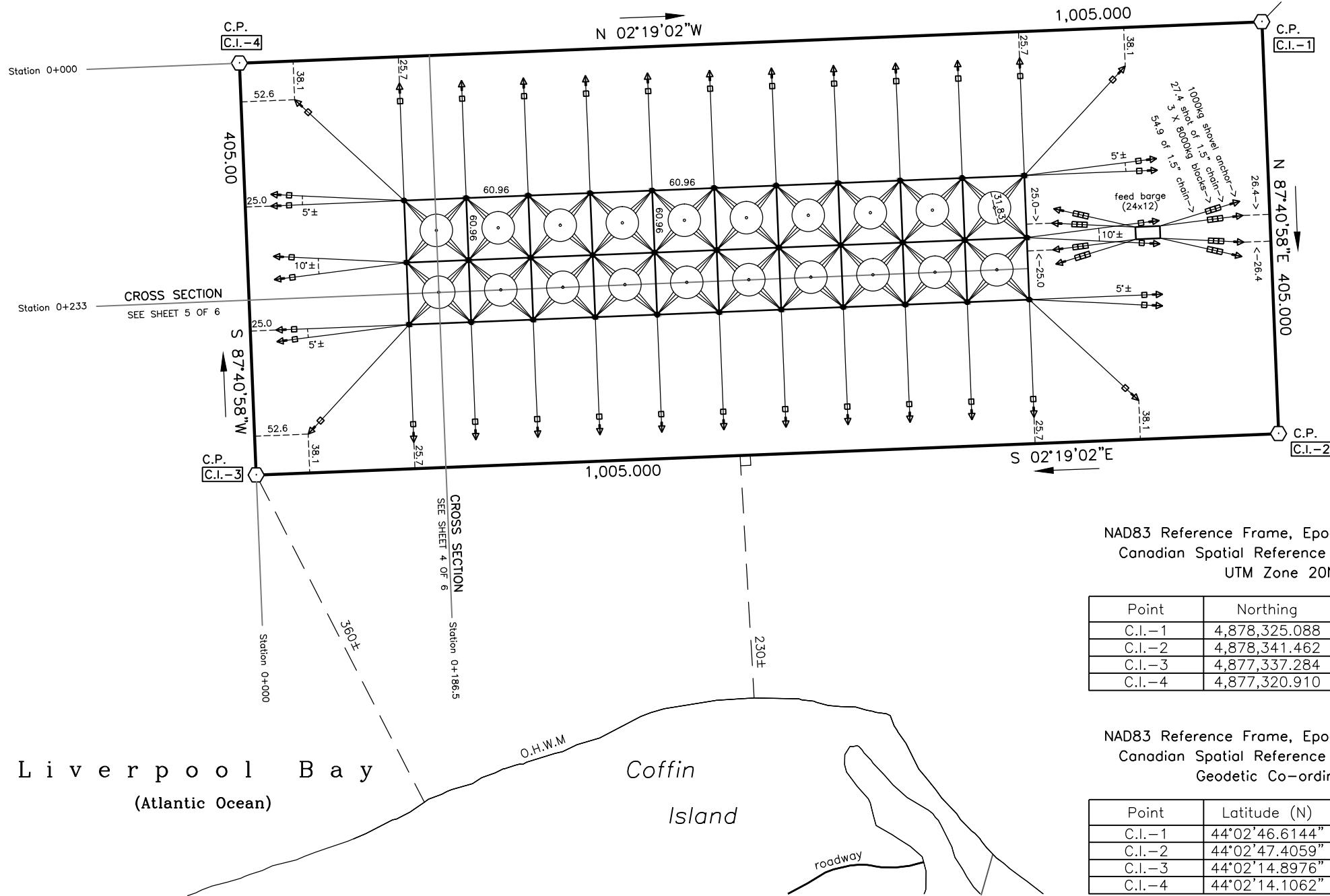
80B Ohio Road, P.O. Box 367
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0
Phone: (902) 875-2110
info@adsurveying.ca

- SHEET 3 OF 6 NOTES:**
- (1.) 14 PROPOSED CAGES IN A 2x10 SUNKEN GRID LAYOUT.
 - (2.) CAGE DIAMETER IS 31.83m.
 - (3.) GRID SIZE IS 60.96m x 60.96m (200'x200').
 - (4.) THIS PLAN SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
 - (5.) ANCHOR BLOCKS, ANCHORS, AND MOORING LINES ARE NOT DRAWN TO SCALE.
 - (6.) OFFSETS TO THE LEASE BOUNDARIES ARE HORIZONTAL DISTANCES FROM THE BACK OF THE SHOVEL ANCHOR.

Proposed Marine Aquaculture Site

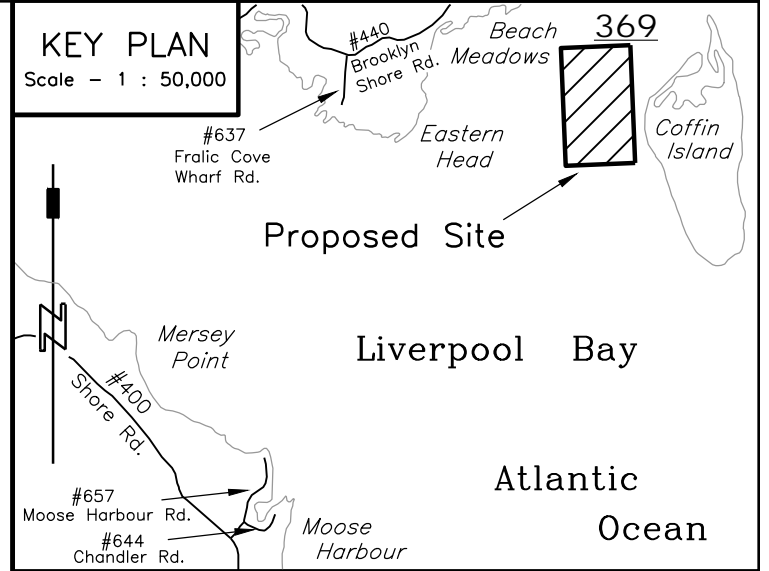
Liverpool Aquaculture Site
 Kelly Cove Salmon Ltd.
 Area = 40.703

GRID NORTH
 NAD83 (CSRS) UTM zone 20N



KEY PLAN

Scale - 1 : 50,000



- Legend:**
- CALCULATED POINT C.P. ⊙
 - CALCULATED (c.)
 - N.S. PROPERTY IDENTIFICATION NUMBER P.I.D. #00000000
 - NORTHING / EASTING N. / E.
 - LOCAL REGISTRY NUMBER Book: / Page:
 - ORDINARY HIGH WATER MARK O.H.W.M.
 - BOUNDARY DEALT WITH BY THIS PLAN
 - OTHER BOUNDARY
 - TIE LINES
 - NOT TO SCALE
 - MAJOR CONTOURS
 - MINOR CONTOURS
 - DEPTH SOUNDINGS + 00.0
 - CONCRETE MOORING □
 - SHOVEL ANCHOR ⚓

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
 AQUACULTURE CAGE CONFIGURATION
KELLY COVE SALMON LTD. / LIVERPOOL SITE
 LOCATED AT:
 COFFIN ISLAND, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA

Client's Statement

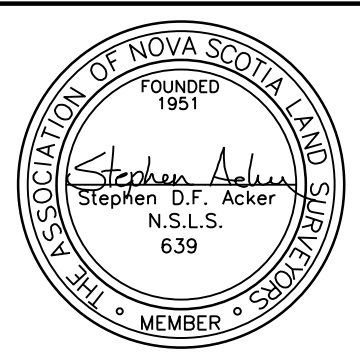
I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.
 Dated this 9th day of January, 2019.

Jeff Nickerson

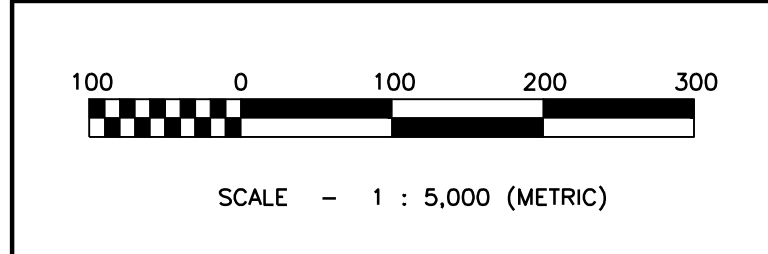
A&D JOB #300-18-1205

SHEET 3 OF 6 | DATE: JAN. 9, 2019

- NOTES:**
- (1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 - (2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
 - (3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
 - (4.) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA.
 - (5.) NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
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 - (7.) ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).



PURPOSE OF PLAN (SHEET 3 OF 6)
 THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATIONS OF ALL ANCHORS, CAGES, AND THE GRID/MOORING CONFIGURATION RELATIVE TO THE LEASE BOUNDARIES.



Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors & Professional Engineers

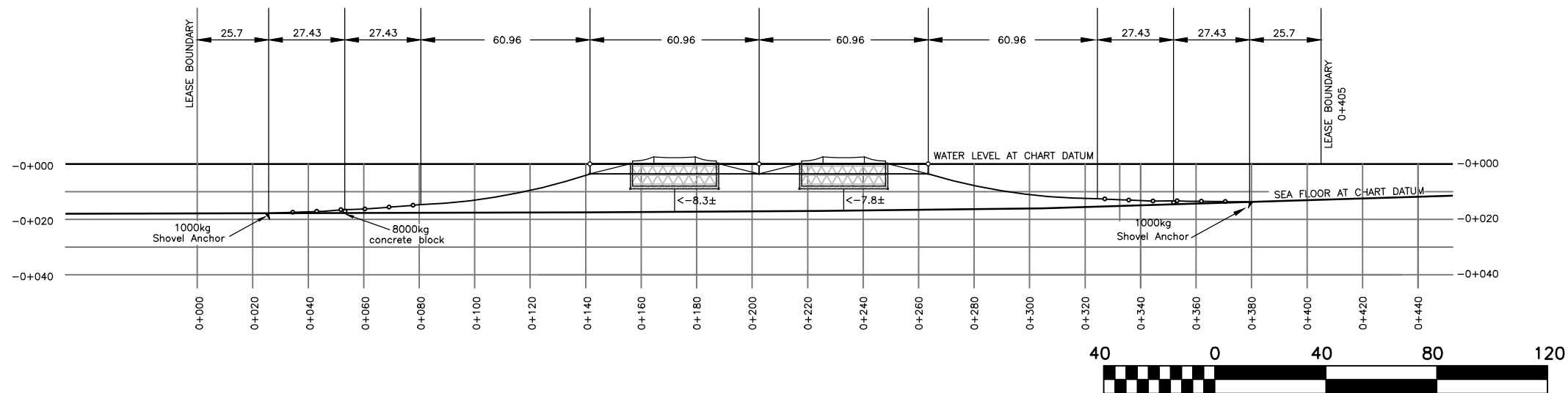
4083 Highway #308, P.O. Box 64
 Tusket, Yarmouth County
 Nova Scotia, Canada
 B0W 3M0

80B Ohio Road, P.O. Box 367
 Shelburne, Shelburne County
 Nova Scotia, Canada
 B0T 1W0

Phone: (902) 648-2186
 www.adsurveying.ca

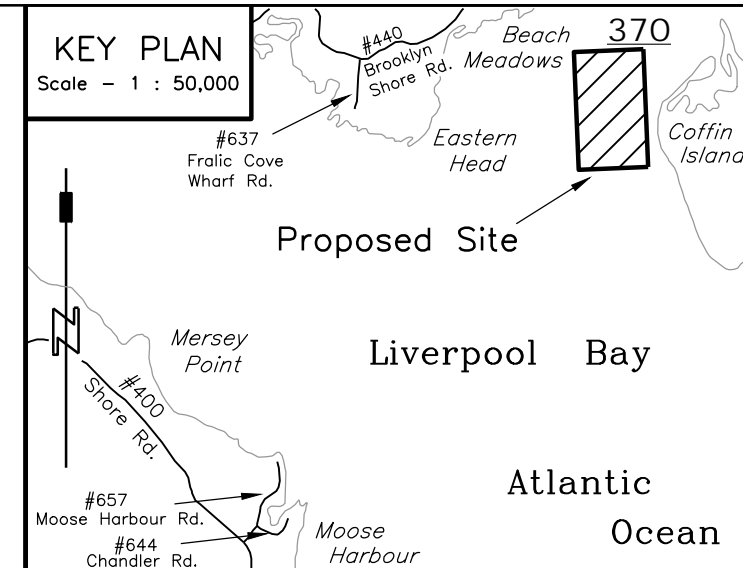
Phone: (902) 875-2110
 info@adsurveying.ca

CROSS SECTION - STATION 0+186.5
 HORIZONTAL SCALE - 1 : 2,000 (METRIC)
 VERTICAL SCALE - 1 : 2,000 (METRIC)



SCALE - 1 : 2,000 (METRIC)

KEY PLAN
 Scale - 1 : 50,000

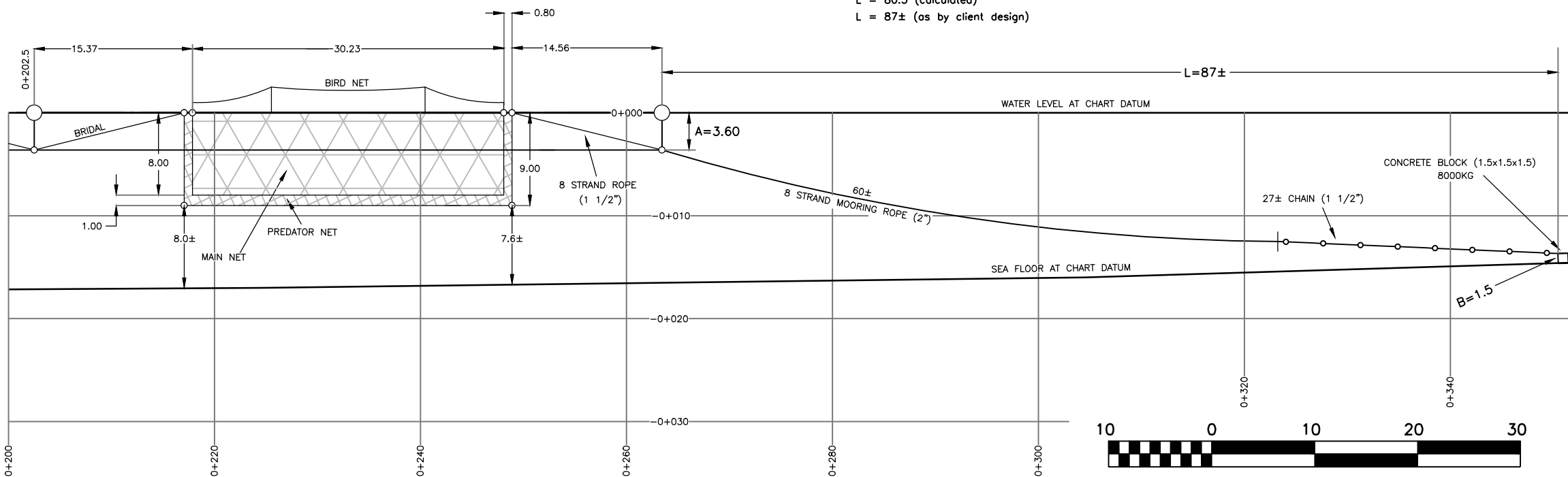


Legend:

CALCULATED POINT	.....	c.p. (c.)
CALCULATED	.....	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	.....	P.I.D. #00000000
NORTHING / EASTING	.....	N. / E.
LOCAL REGISTRY NUMBER	.....	Book: / Page:
ORDINARY HIGH WATER MARK	.....	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	.....	+ 00.0
CONCRETE MOORING	.....
SHOVEL ANCHOR	.....

DETAILED CROSS SECTION - STATION 0+186.5
 HORIZONTAL SCALE - 1 : 500 (METRIC)
 VERTICAL SCALE - 1 : 500 (METRIC)

5:1 Mooring Scope Calculation
 $L = [(max\ depth + max\ tide\ range) - A - B] \times 5$
 $L = [(19\pm + 2.2) - 3.6 - 1.5] \times 5$
 $L = 80.5\ (calculated)$
 $L = 87\pm\ (as\ by\ client\ design)$



SCALE - 1 : 500 (METRIC)

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
 LATERAL CROSS-SECTION
 KELLY COVE SALMON LTD. / LIVERPOOL SITE
 LOCATED AT:
 COFFIN ISLAND, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 9th day of January, 2019

Jeff Nickerson

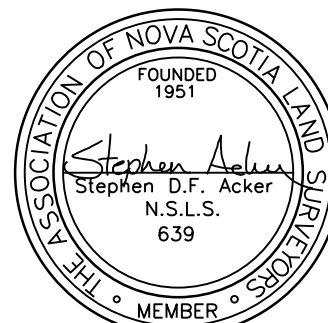
A&D JOB #300-18-1205

SHEET 4 OF 6

DATE: JAN. 9, 2019

NOTES:

- (1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
- (2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
- (3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
- (4.) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA.
- (5.) NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
- (6.) ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
- (7.) ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).



PURPOSE OF PLAN (SHEET 4 OF 6)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LATERAL CROSS SECTION AS SHOWN ON SHEET 3 OF 6, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

- (1.) THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
- (2.) FOR HORIZONTAL LOCATION OF EACH CROSS SECTION SEE SHEET 3 OF 6.
- (3.) DISTANCES FROM SEA FLOOR MAY VARY DEPENDING ON TIDE AND CURRENT.
- (4.) DISTANCES FROM SEA FLOOR ARE APPROXIMATE ONLY.
- (5.) DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).



Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors &
 Professional Engineers

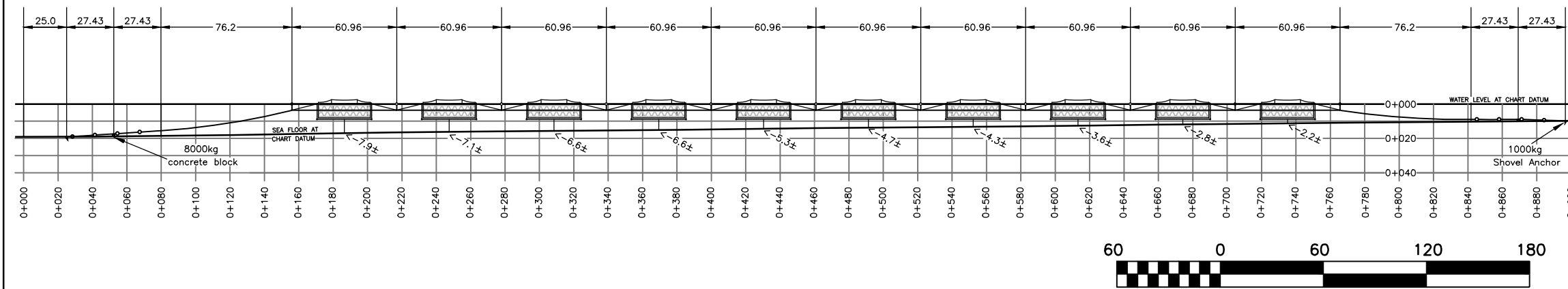
4083 Highway #308, P.O. Box 64
 Tusket, Yarmouth County
 Nova Scotia, Canada
 B0T 3M0

Phone: (902) 648-2186
 www.adsurveying.ca

80B Ohio Road, P.O. Box 367
 Shelburne, Shelburne County
 Nova Scotia, Canada
 B0T 1W0

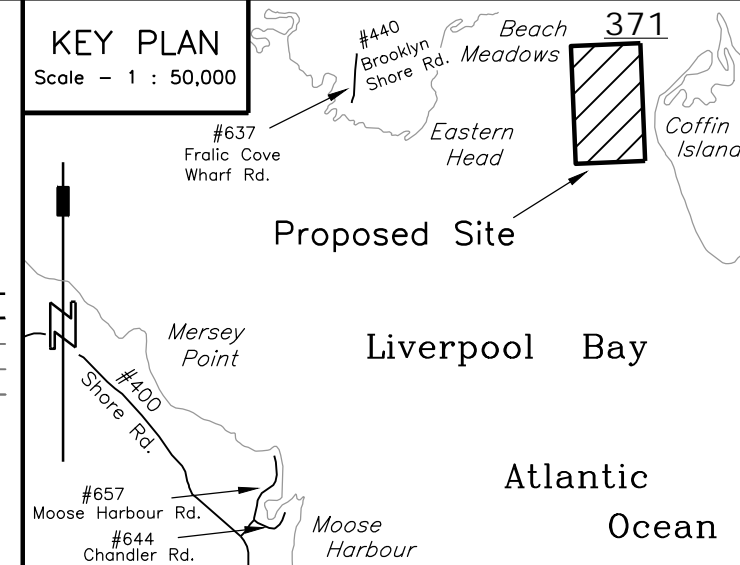
Phone: (902) 875-2110
 info@adsurveying.ca

CROSS SECTION - STATION 0+233
 HORIZONTAL SCALE - 1 : 3,000 (METRIC)
 VERTICAL SCALE - 1 : 3,000 (METRIC)

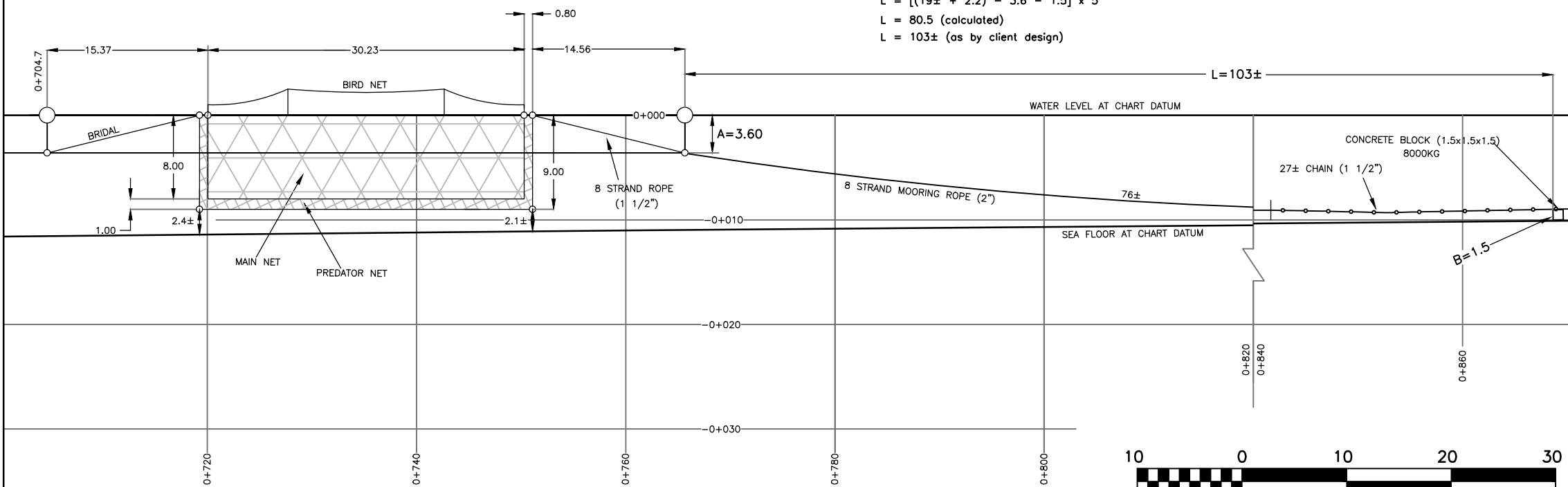


SCALE - 1 : 3,000 (METRIC)

KEY PLAN
 Scale - 1 : 50,000



DETAILED CROSS SECTION - STATION 0+233
 HORIZONTAL SCALE - 1 : 500 (METRIC)
 VERTICAL SCALE - 1 : 500 (METRIC)



5:1 Mooring Scope Calculation
 $L = [(max\ depth + max\ tide\ range) - A - B] \times 5$
 $L = [(19\pm + 2.2) - 3.6 - 1.5] \times 5$
 $L = 80.5\ (calculated)$
 $L = 103\pm\ (as\ by\ client\ design)$

Legend:

CALCULATED POINT	.....	C.P.	⊙
CALCULATED	.....	(c.)	
N.S. PROPERTY IDENTIFICATION NUMBER	.....	P.I.D.	#00000000
NORTHING / EASTING	.....	N. / E.	
LOCAL REGISTRY NUMBER	.....	Book: / Page:	
ORDINARY HIGH WATER MARK	.....	O.H.W.M.	
BOUNDARY DEALT WITH BY THIS PLAN	.....	
OTHER BOUNDARY	.....	
TIE LINES	.....	
NOT TO SCALE	.....	
MAJOR CONTOURS	.....	
MINOR CONTOURS	.....	
DEPTH SOUNDINGS	.....		+ 00.0
CONCRETE MOORING	.....		□
SHOVEL ANCHOR	.....		⊠

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
 LONGITUDINAL CROSS-SECTION
KELLY COVE SALMON LTD. / LIVERPOOL SITE
 LOCATED AT:
 COFFIN ISLAND, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 9th day of January, 2019

Jeff Nickerson

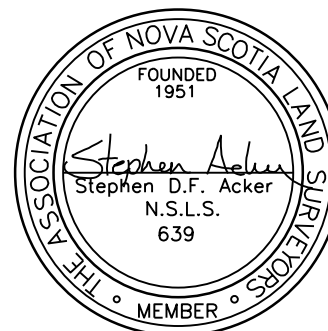
A&D JOB #300-18-1205

SHEET 5 OF 6

DATE: JAN. 9, 2019

NOTES:

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PURPOSE OF PLAN (SHEET 5 OF 6)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LONGITUDINAL CROSS SECTION AS SHOWN ON SHEET 3 OF 6, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

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- (5) DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).



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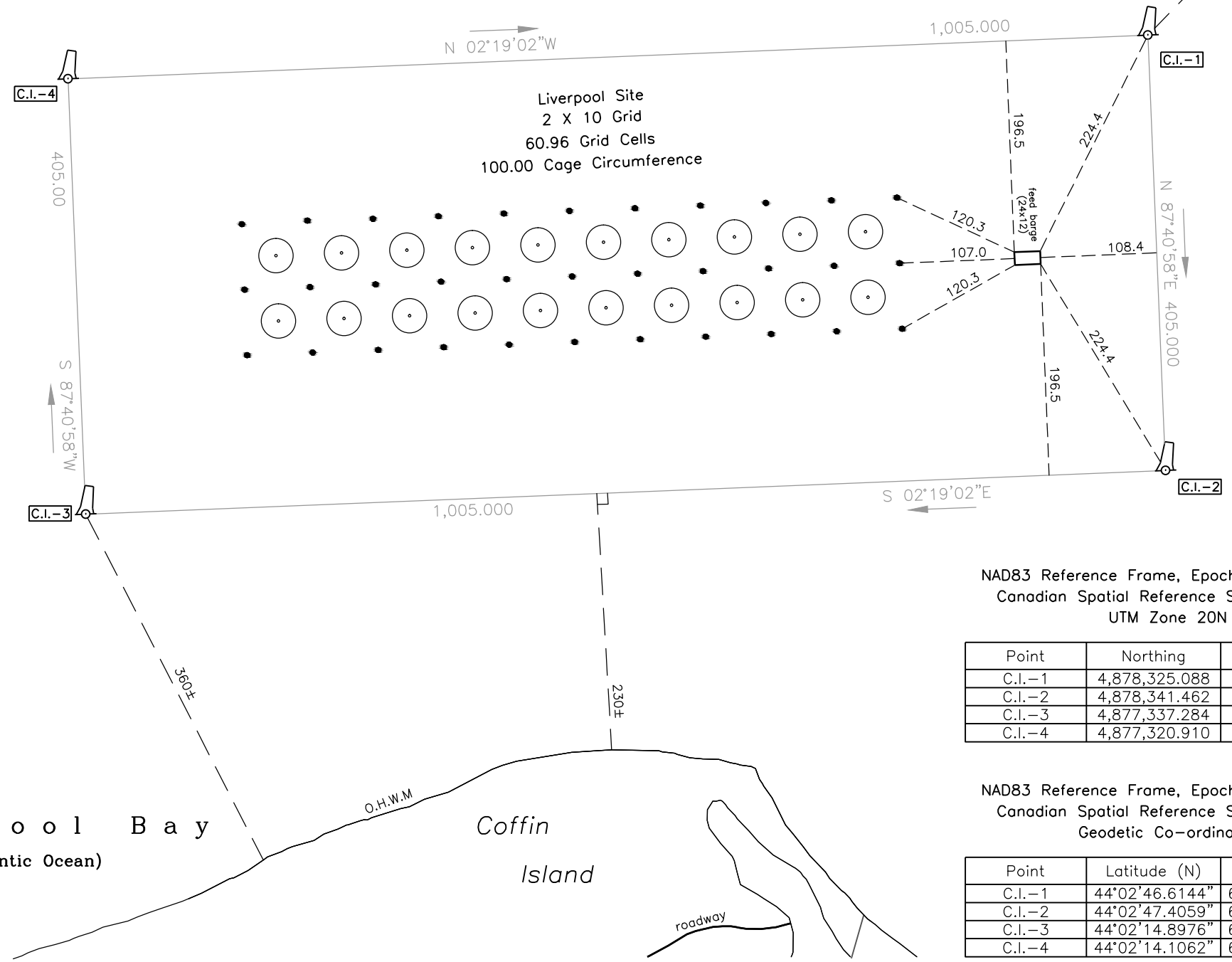
Phone: (902) 875-2110
 info@adsurveying.ca

Proposed Navigational Aids Marking

Liverpool Aquaculture Site
 Kelly Cove Salmon Ltd.
 Area = 40.703

- = compensator buoys (yellow)
- = aquaculture cages (31.83m diameter)
- ⚠ = cautionary buoy (yellow)

GRID NORTH
 NAD83 (CSRS) UTM zone 20N

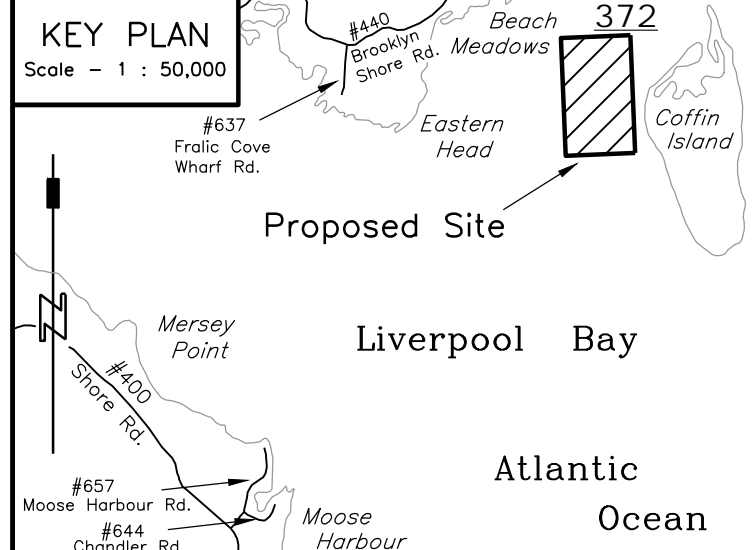


NAD83 Reference Frame, Epoch 2010.0 (Grid)
 Canadian Spatial Reference System (CSRS)
 UTM Zone 20N

Point	Northing	Easting
C.I.-1	4,878,325.088	368,397.695
C.I.-2	4,878,341.462	368,802.363
C.I.-3	4,877,337.284	368,842.996
C.I.-4	4,877,320.910	368,438.327

NAD83 Reference Frame, Epoch 2010.0 (Grid)
 Canadian Spatial Reference System (CSRS)
 Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
C.I.-1	44°02'46.6144"	64°38'33.8136"
C.I.-2	44°02'47.4059"	64°38'15.6511"
C.I.-3	44°02'14.8976"	64°38'12.9298"
C.I.-4	44°02'14.1062"	64°38'31.0896"



- Legend:**
- CALCULATED POINT c.p. ○
 - CALCULATED (c.)
 - N.S. PROPERTY IDENTIFICATION NUMBER P.I.D. #00000000
 - NORTHING / EASTING N. / E.
 - LOCAL REGISTRY NUMBER Book: / Page:
 - ORDINARY HIGH WATER MARK O.H.W.M.
 - BOUNDARY DEALT WITH BY THIS PLAN
 - OTHER BOUNDARY
 - TIE LINES
 - NOT TO SCALE
 - MAJOR CONTOURS
 - MINOR CONTOURS
 - DEPTH SOUNDINGS + 00.0
 - CONCRETE MOORING
 - SHOVEL ANCHOR

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
 PROPOSED NAVIGATIONAL AIDS MARKING PLAN
KELLY COVE SALMON LTD. / LIVERPOOL SITE
 LOCATED AT:
 COFFIN ISLAND, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 9th day of January, 2019.

Jeff Nickerson

A&D JOB #300-18-1205

SHEET 6 OF 6 | **DATE: JAN. 9, 2019**

- NOTES:**
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PURPOSE OF PLAN (SHEET 6 OF 6)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATION AND TYPES OF ALL NAVIGATIONAL AIDS RELATIVE TO THE PROPOSED LEASE BOUNDARIES.

SCALE - 1 : 5,000 (METRIC)

Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
 Tusket, Yarmouth County
 Nova Scotia, Canada
 B0W 3M0

80B Ohio Road, P.O. Box 367
 Shelburne, Shelburne County
 Nova Scotia, Canada
 B0T 1W0

Phone: (902) 648-2186
 www.adsurveying.ca

Phone: (902) 875-2110
 info@adsurveying.ca

MEMORANDUM

To: Transport Canada

From: Lynn Winfield, Licensing Coordinator, Aquaculture Division
Nova Scotia Department of Fisheries and Aquaculture

CC: Matthew King, GIS Analyst
Nathaniel Feindel, Manager of Aquaculture Development
Joe Hanrahan, Coastal Resource Coordinator

Date: June 27, 2019

RE: New Aquaculture Application No. 1432 (Brooklyn) – Queens County
Aquaculture Network Review

Attention Transport Canada, Kelly Cove Salmon Ltd. has submitted a new aquaculture application (AQ#1432) for the Marine Finfish cage cultivation of Atlantic salmon. The proposed site is located in Liverpool Bay, Queens County. Consider this correspondence as a formal request by the Nova Scotia Department of Fisheries and Aquaculture to process this application for Navigation Protection Act approval/authorization.

Please find attached information relating to the following aquaculture application:

Application No.: AQ#1432
Applicant: Kelly Cove Salmon Ltd.
Application Type: New Marine Aquaculture Site
Species: Atlantic salmon
Cultivation Type: Marine cage cultivation
Location: Liverpool Bay, Queens County

To facilitate the screening process, NSDFA offers the following points of information:

1. Following the review of the application by our Network Partners, this application will be provided to the Aquaculture Review Board for final decision;
2. The applicant is making application to Transport Canada for an authorization under the Navigation Protection Act for the placement of marine cages.

We request that you review and submit all components that pertain to this application and provide NSDFA with confirmation should an authorization be issued under the Navigation Protection Act.

Note: We require a written (mail/email) response from each of our review agencies in order to process this application. You may contact me at by phone at 902-875-7440 or email Lynn.Winfield@novascotia.ca if you have any questions.

Sincerely,



Lynn Winfield,
Licensing Coordinator

Aquaculture Licence/Lease Application
Brooklyn



Office Use Only

File Number: A01432Date: March 6, 2019Received By: Hyatt + Nathaniel

Aquaculture Licence/Lease Application

Applicant Information

Applicant: Kelly Cove Salmon Ltd.Phone: (902) 875-8603 Cell Phone: (902) 275-7493Fax Number: _____ Email Address: jnickerson@cookeaqua.comMailing Address: P.O. Box 33; Bridgewater, NS B4V 2W6Civic Address: 134 North St. Unit B; Bridgewater, NS B4V 2W6*Civic address in Nova Scotia where your daily records will be kept with respect to the Aquaculture operation.*Authorized Contact(s): Jeff NickersonContact Phone: (902) 275-7493 Email: jnickerson@cookeaqua.com

Company Information (if different from above)

Company Name: _____

Mailing Address: _____

Civic Address: _____

Civic address in Nova Scotia where your daily records will be kept with respect to the Aquaculture operation.

Business Phone: _____ Cell Phone: _____

Fax Number: _____ Email Address: _____

Registry of Joint Stocks Number: _____

Revenue Canada Business Number: 89709485

Shareholder's Registration (please attach)



Location Information

Location of Proposed Site

Civic (*land-based*): _____

Municipality/Town: Liverpool

County: Queens County

Waterbody (*if applicable*): Liverpool Bay

Operation Details

Species Cultured:

Finfish: Atlantic salmon (*Salmo salar*)

Shellfish: _____

Marine Plants _____

Other: _____

Term:

Experimental (1 year) Commercial land-based (*Licence - 10 years*)

Commercial marine (*Licence - 10 years; Lease 20 years*)

Landbased:

Fresh Water Salt Water Hatchery

U-Fish Nursery Grow-Out

Marine:

Finfish Operation Marine Plants Shellfish - Suspended

Shellfish - Bottom culture, without gear Shellfish - Bottom culture, with gear

For the purpose of assessing aquaculture applications, it is necessary to provide information to other government departments and interested public. Confidential business information is not released to the public. By signing this application, the applicant agrees to the Department releasing application information about the proposed development.

[Redacted Signature]

Signature of Applicant

[Redacted Signature]

Signature of Applicant

Feb 13/19

Date

March 6, 2019

Date

For additional information please visit:

<http://novascotia.ca/fish/programs-and-services/industry-support-services/aquaculture/>

Submit completed application and all required documentation to:

Nova Scotia Department of Fisheries and Aquaculture

Attention: Aquaculture Division

1575 Lake Road

Shelburne, Nova Scotia

B0T1W0

Telephone Number: 902 875-7439

Fax Number: 902 875-7429

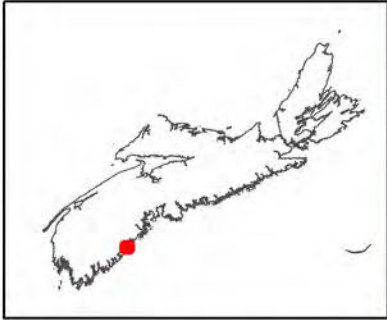
SCHEDULE A
GPS COORDINATE INFORMATION SHEET

Note: The coordinates and dimensions for this site have been taken a legal survey.

Application #:	1432		
Applicant:	Kelly Cove Salmon Ltd.		
Location:	Liverpool Bay	County:	Queens
Hydrographic Chart:	4211	Orthophoto #:	
Dimensions of site:	Approx. 405m x 1005m x 405m 1005m	Size:	Approx. 40.70 ha

Approximate Coordinates of Application:

Datum used:	NAD 83		
Centre coordinates (approx.)	Lat.	44° 02' 16.98"	
	Long.	-64° 39' 39.55"	
Corner #1	Lat.	44° 02' 28.73"	Corner #2
	Long.	-64° 39' 57.86"	Lat.
			Long.
			-64° 39' 15.52"
Corner #3	Lat.	44° 02' 05.12"	Corner #4
	Long.	-64° 39' 21.83"	Lat.
			Long.
			-64° 40' 04.17"



**Aquaculture Site
1432**

Centre
 Lat 44° 02' 16.98" Long -64° 39' 39.55"
 Corner 1
 Lat 44° 02' 28.73" Long -64° 39' 57.86"
 Corner 2
 Lat 44° 02' 17.42" Long -64° 39' 15.52"
 Corner 3
 Lat 44° 02' 05.12" Long -64° 39' 21.83"
 Corner 4
 Lat 44° 02' 16.42" Long -64° 40' 04.17"

DATUM NAD 83
 The above coordinates
 are from a legal survey



Application Information

Proponents : Kelly Cove Salmon Ltd.
 Site Location : Liverpool Bay
 Dimensions : Approx. 405m x 1005m x 405m x 1005m
 Area : Approx. 40.70 ha

- Proposed Application
- Other Issued Lease
- Other Proposed Lease
- OMHW Mark
- Low Water Mark

Species: Atlantic Salmon

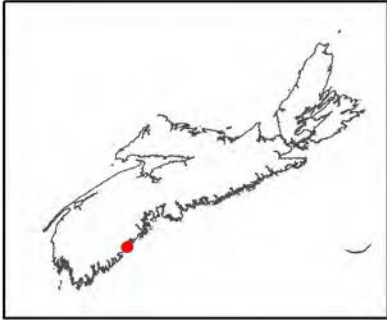
Chart No.
4211



Disclaimer

This map should not be used for navigation or legal purposes. It is intended for general reference use only.

MK-1432-APR-2019



**Aquaculture Site
1432**

Centre
 Lat 44° 02' 16.98" Long -64° 39' 39.55"
 Corner 1
 Lat 44° 02' 28.73" Long -64° 39' 57.86"
 Corner 2
 Lat 44° 02' 17.42" Long -64° 39' 15.52"
 Corner 3
 Lat 44° 02' 05.12" Long -64° 39' 21.83"
 Corner 4
 Lat 44° 02' 16.42" Long -64° 40' 04.17"

DATUM NAD 83
 The above coordinates
 are from a legal survey



Application Information

Proponents : Kelly Cove Salmon Ltd.
 Site Location : Liverpool Bay
 Dimensions : Approx. 405m x 1005m x 405m x 1005m
 Area : Approx. 40.70 ha

- Proposed Application
- Other Issued Lease
- Other Proposed Lease
- OMHW Mark
- NS Bathymetry
- Low Water Mark

Species: Atlantic Salmon

Chart No.
4211



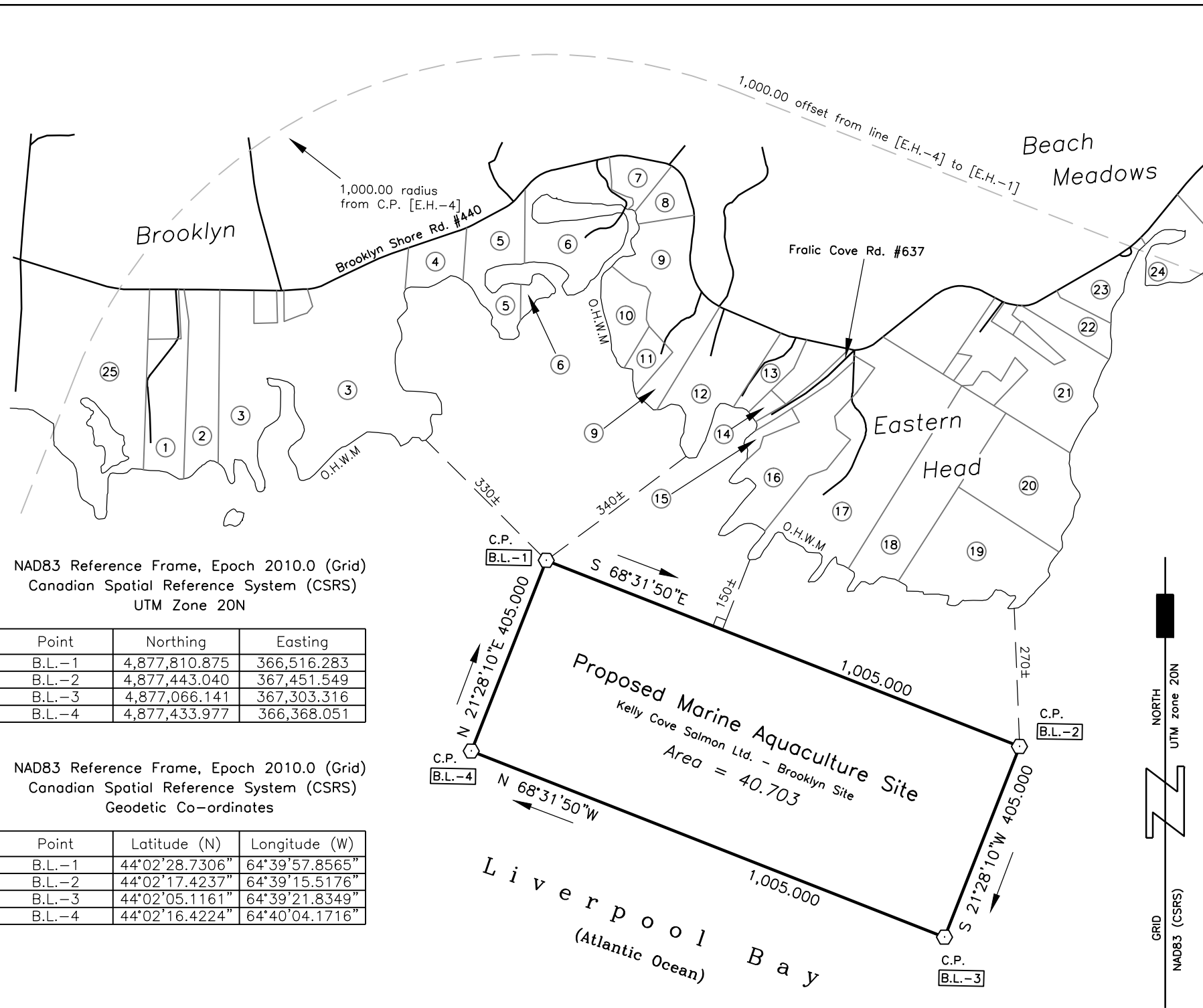
Disclaimer

This map should not be used for navigation or legal purposes. It is intended for general reference use only.

MK-1432-APR-2019

Brooklyn

#	P.I.D. #	OWNER / ADDRESS
1	70089073	Paul Shot et ux. RR #1, Brooklyn, N.S. BOJ 1H0
2	70089081	Krista C. Decker et al. 22 Odell Dr., Dartmouth, N.S. B2W 3T4
3	70089099	James F. Mitton et al. RR #1, Brooklyn, N.S. BOJ 1H0
4	70089131	Delphine Dexter 89 Shore Rd., Brooklyn, N.S. BOJ 1H0
5	70089164	Ian D. Kent et al. RR #1, Brooklyn, N.S. BOJ 1H0
6	70089172	Barry S. Anthony et ux. 532 Brooklyn Shore Rd., Brooklyn, N.S., BOJ 1H0
7	70089222	Jason Pendragon Finck 580 Brooklyn Shore Rd., Brooklyn, N.S., BOJ 1H0
8	70089255	Ryan Mullen 592 Brooklyn Shore Rd., RR #1 Brooklyn, N.S., BOJ 1H0
9	70089305	John E. Conrad et ux. P.O. Box 32, Brooklyn, N.S. BOJ 1H0
10	70089313	Allen Harrington P.O. Box 55, Brooklyn, N.S. BOJ 1H0
11	70089321	John E. Conrad et ux. P.O. Box 32, Brooklyn, N.S. BOJ 1H0
12	70089339	Gary P. Robertson et ux. 31 Oak Street, Oak Hill, N.S. B4V 0C5
13	70100797	Garry Marsh et al. P.O. Box 790, Liverpool, N.S. B0T 1K0
14	70205646	Garry Marsh et al. P.O. Box 790, Liverpool, N.S. B0T 1K0
15	70100755	Garry Marsh et al. P.O. Box 790, Liverpool, N.S. B0T 1K0
16	70100789	Gary Morash et ux. P.O. Box 790, Liverpool, N.S. B0T 1K0
17	70100748	Gary Morash et ux. P.O. Box 790, Liverpool, N.S. B0T 1K0
18	70100714	Reynold Fralic et al. RR #4, Site 19, Comp 10 New Glasgow, N.S., B2H 5C7
19	70100946	Dennis Conrad RR #1, Brooklyn, N.S. BOJ 1H0
20	70100672	Wilhelmina R. Conrad et al. RR #1, Brooklyn, N.S. BOJ 1H0
21	70100656	Hazel M. Mouzar P.O. Box 173, Liverpool, N.S. B0T 1K0
22	70100599	Donald T. Fralic et ux. RR #1, Brooklyn, N.S. BOJ 1H0
23	70100086	Wilhelmina R. Conrad et al. RR #1, Brooklyn, N.S. BOJ 1H0
24	70100540	Andrew R. Godfrey et ux. RR #1, Brooklyn, N.S. BOJ 1H0
25	70261698	Randall N. Fralic et al. RR #1, Brooklyn, N.S. BOJ 1H0



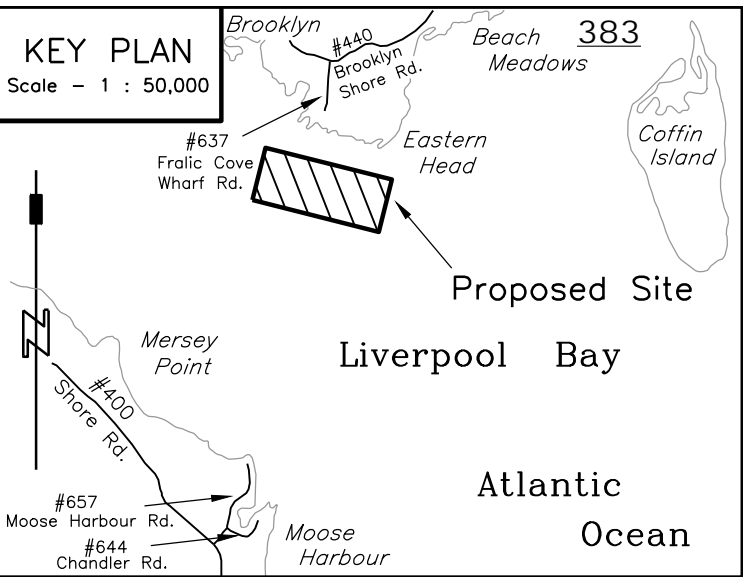
NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
B.L.-1	4,877,810.875	366,516.283
B.L.-2	4,877,443.040	367,451.549
B.L.-3	4,877,066.141	367,303.316
B.L.-4	4,877,433.977	366,368.051

NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
B.L.-1	44°02'28.7306"	64°39'57.8565"
B.L.-2	44°02'17.4237"	64°39'15.5176"
B.L.-3	44°02'05.1161"	64°39'21.8349"
B.L.-4	44°02'16.4224"	64°40'04.1716"

#	P.I.D. #	OWNER / ADDRESS
25	70261698	Randall N. Fralic et al. RR #1, Brooklyn, N.S. BOJ 1H0



Legend:

CALCULATED POINT	..... C.P. (c.)
CALCULATED	..... (c.)
N.S. PROPERTY IDENTIFICATION NUMBER	..... P.I.D. #00000000
NORTHING / EASTING	..... N. / E.
LOCAL REGISTRY NUMBER	..... Book: / Page:
ORDINARY HIGH WATER MARK	..... O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	..... + 00.0
CONCRETE MOORING	.....
SHOVEL ANCHOR	.....

AQUACULTURE SITE DEVELOPMENT PLANS
SHOWING
AQUACULTURE SITE APPLICATION
KELLY COVE SALMON LTD. / BROOKLYN SITE
LOCATED AT:
BROOKLYN (EASTERN HEAD), LIVERPOOL BAY
(ATLANTIC OCEAN), QUEENS COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

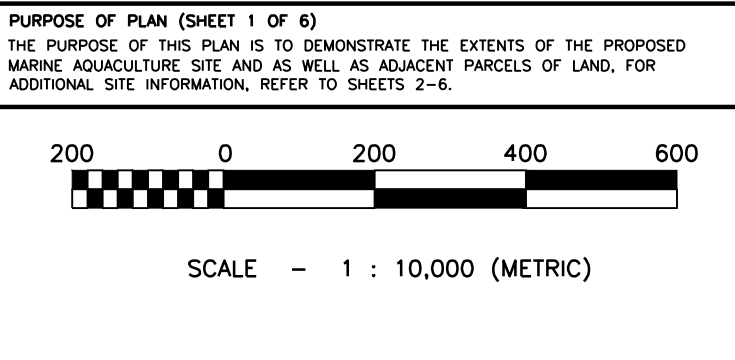
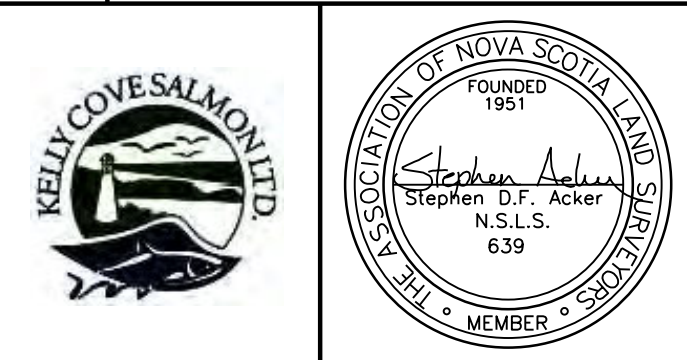
Dated this 14th day of January, 2019.

Jeff Nickerson

A&D JOB #300-18-BROOKLYN
SHEET 1 OF 6 | DATE: JAN. 14, 2019

NOTES:

- ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
- THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
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- SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
- NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
- ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
- ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).



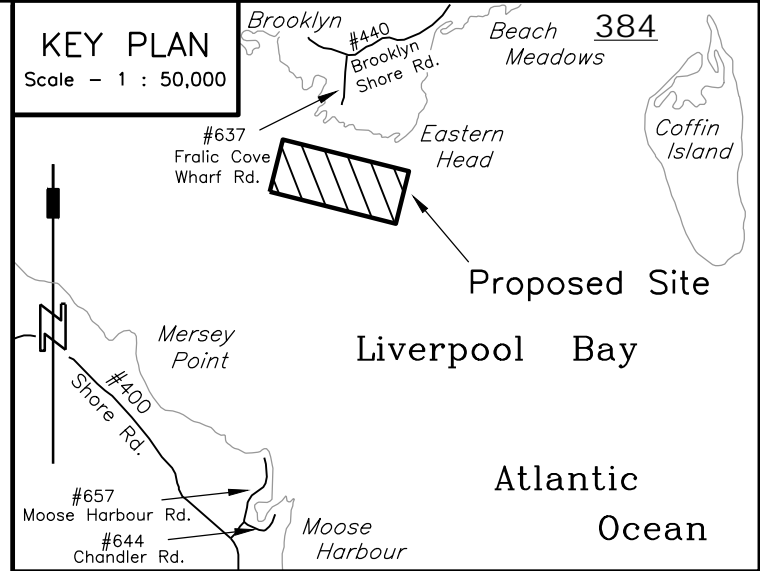
Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
B0W 3M0

80B Ohio Road, P.O. Box 387
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Phone: (902) 848-2188
www.adsurveying.ca

Phone: (902) 875-2110
info@adsurveying.ca



Legend:

CALCULATED POINT	..... C.P. ○
CALCULATED	..... (c.)
N.S. PROPERTY IDENTIFICATION NUMBER	..... P.I.D. #00000000
NORTHING / EASTING	..... N. / E.
LOCAL REGISTRY NUMBER	..... Book / Page
ORDINARY HIGH WATER MARK	..... O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	..... + 00.0
CONCRETE MOORING □
SHOVEL ANCHOR ⚓

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
BASIC SEAFLOOR TOPOGRAPHY
KELLY COVE SALMON LTD. / BROOKLYN SITE
 LOCATED AT:
BROOKLYN (EASTERN HEAD), LIVERPOOL BAY
(ATLANTIC OCEAN), QUEENS COUNTY, NOVA SCOTIA

Client's Statement

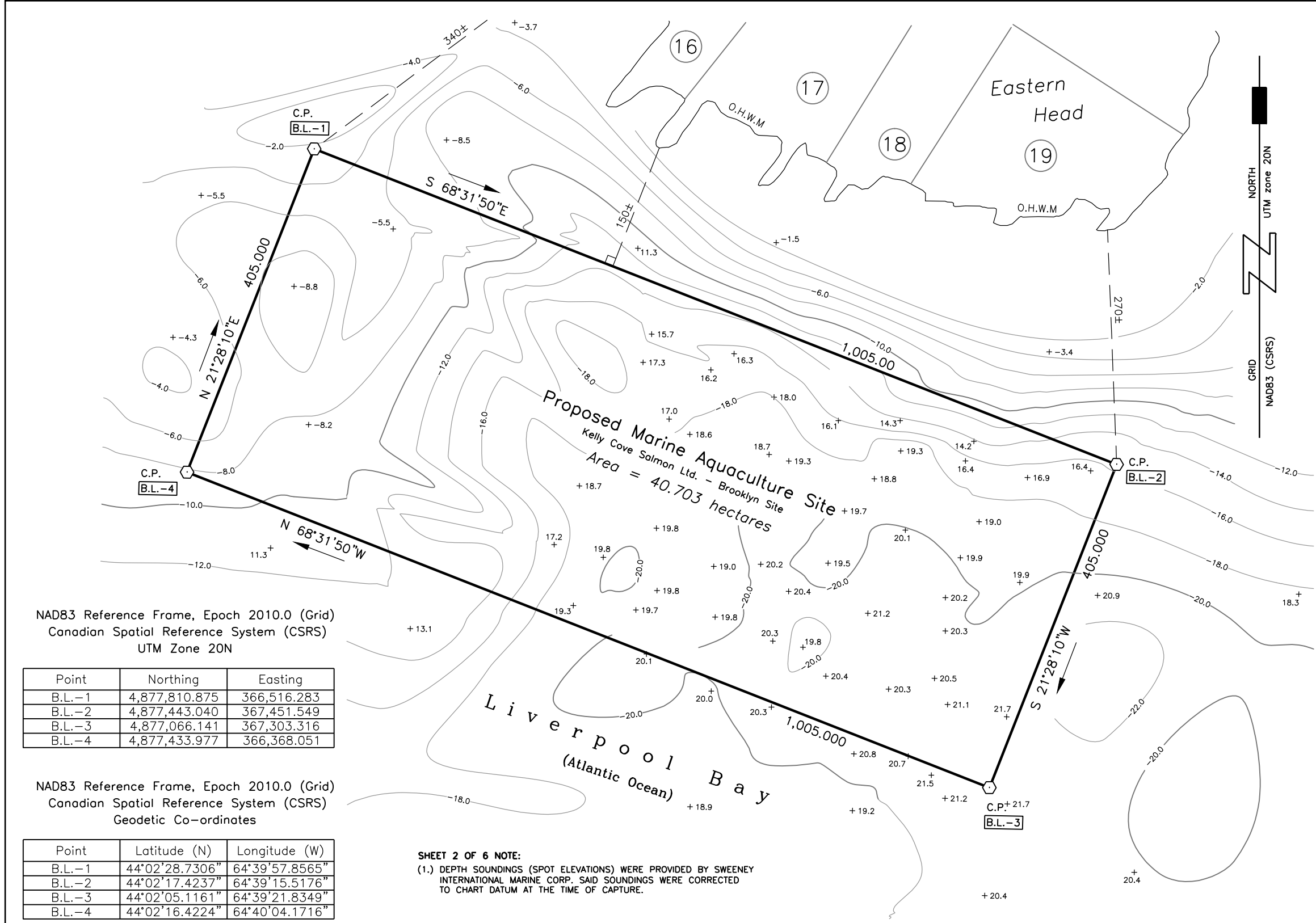
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Dated this 14th day of January, 2019.

 Jeff Nickerson

A&D JOB #300-18-BROOKLYN

SHEET 2 OF 6 | DATE: JAN. 14, 2019



NAD83 Reference Frame, Epoch 2010.0 (Grid)
 Canadian Spatial Reference System (CSRS)
 UTM Zone 20N

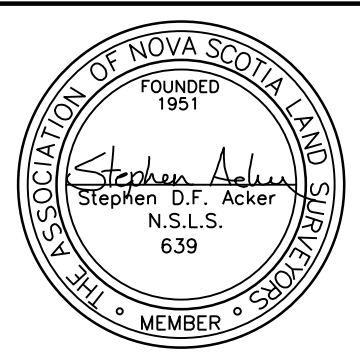
Point	Northing	Easting
B.L.-1	4,877,810.875	366,516.283
B.L.-2	4,877,443.040	367,451.549
B.L.-3	4,877,066.141	367,303.316
B.L.-4	4,877,433.977	366,368.051

NAD83 Reference Frame, Epoch 2010.0 (Grid)
 Canadian Spatial Reference System (CSRS)
 Geodetic Co-ordinates

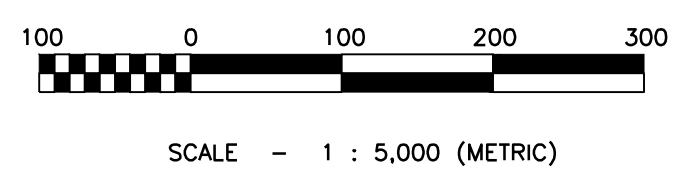
Point	Latitude (N)	Longitude (W)
B.L.-1	44°02'28.7306"	64°39'57.8565"
B.L.-2	44°02'17.4237"	64°39'15.5176"
B.L.-3	44°02'05.1161"	64°39'21.8349"
B.L.-4	44°02'16.4224"	64°40'04.1716"

SHEET 2 OF 6 NOTE:
 (1.) DEPTH SOUNDINGS (SPOT ELEVATIONS) WERE PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM AT THE TIME OF CAPTURE.

- NOTES:**
- ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 - THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
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 - SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
 - NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
 - ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
 - ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).



PURPOSE OF PLAN (SHEET 2 OF 6)
 THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND BASIC SEAFLOOR TOPOGRAPHY, FOR ADDITIONAL ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1, 3-6.



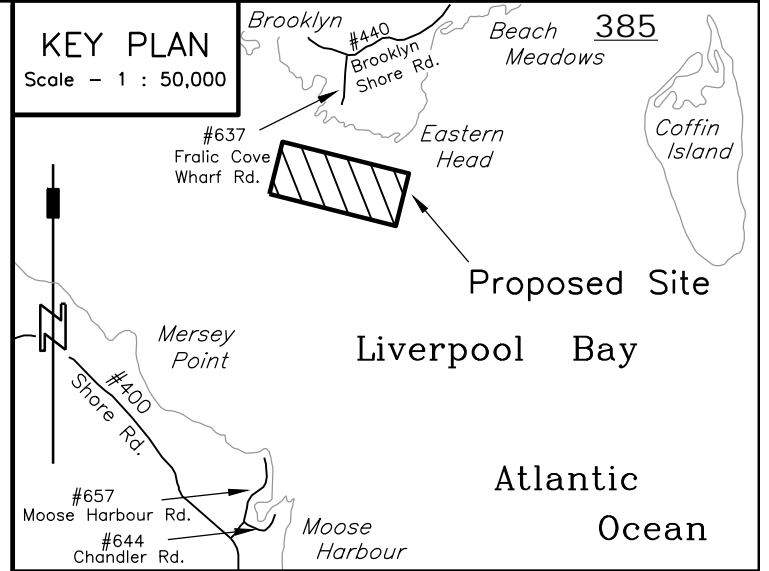
Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
 Tusket, Yarmouth County
 Nova Scotia, Canada
 B0W 3M0

80B Ohio Road, P.O. Box 367
 Shelburne, Shelburne County
 Nova Scotia, Canada
 B0T 1W0

Phone: (902) 648-2186
 www.adsurveying.ca

Phone: (902) 875-2110
 info@adsurveying.ca



Legend:

CALCULATED POINT	..... C.P. ○
CALCULATED	..... (c.)
N.S. PROPERTY IDENTIFICATION NUMBER	..... P.I.D. #00000000
NORTHING / EASTING	..... N. / E.
LOCAL REGISTRY NUMBER	..... Book: / Page:
ORDINARY HIGH WATER MARK	..... O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	..... + 00.0
CONCRETE MOORING □
SHOVEL ANCHOR ▽

AQUACULTURE SITE DEVELOPMENT PLANS
 SHOWING
 AQUACULTURE CAGE CONFIGURATION
KELLY COVE SALMON LTD. / BROOKLYN SITE
 LOCATED AT:
 BROOKLYN (EASTERN HEAD), LIVERPOOL BAY
 (ATLANTIC OCEAN), QUEENS COUNTY, NOVA SCOTIA

Client's Statement

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Dated this 14th day of January, 2019.

Jeff Nickerson

A&D JOB #300-18-BROOKLYN
SHEET 3 OF 6 | DATE: JAN. 14, 2019

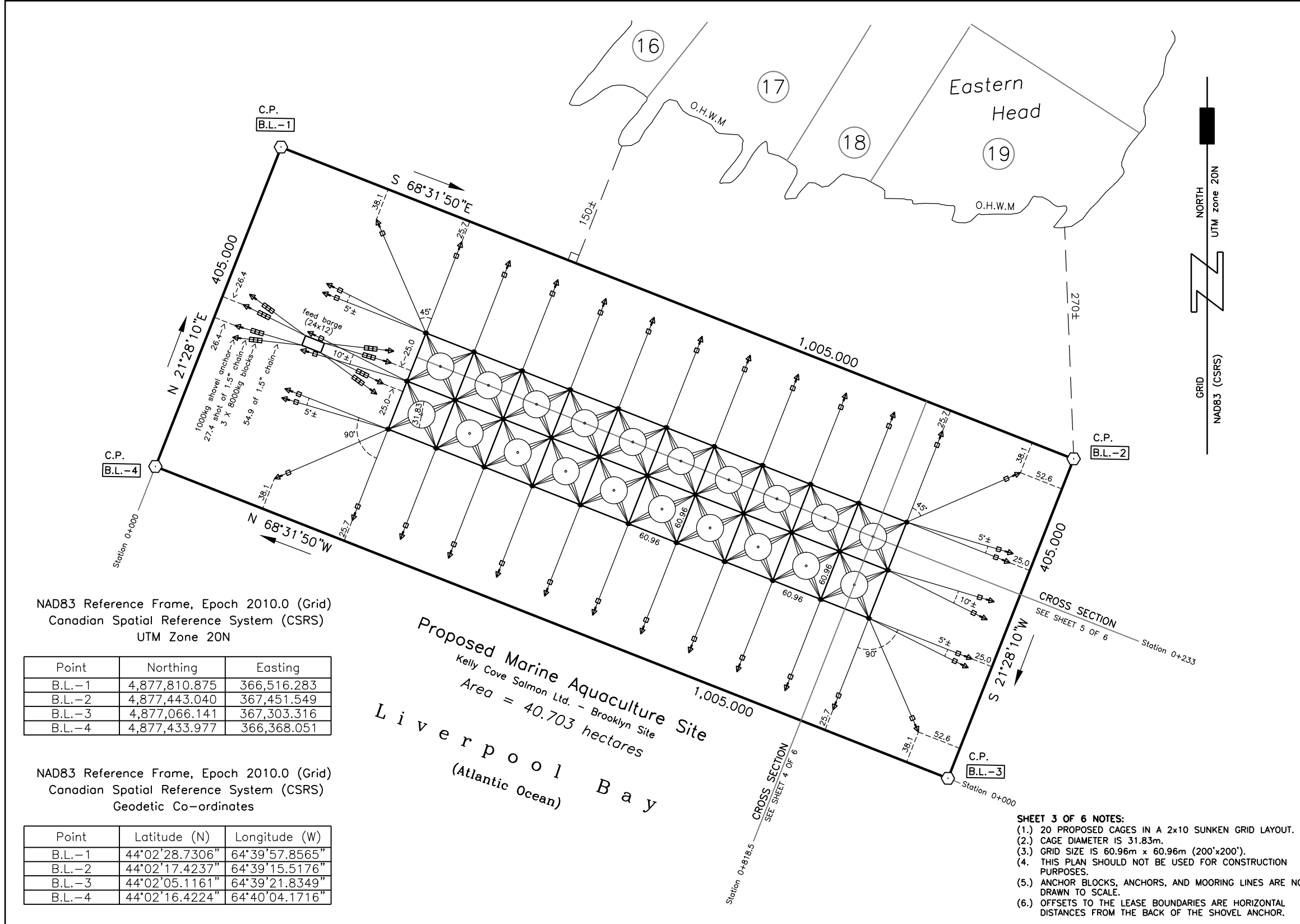
Acker & Doucette Surveying Inc.
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NAD83 Reference Frame, Epoch 2010.0 (Grid)
 Canadian Spatial Reference System (CSRS)
 UTM Zone 20N

Point	Northing	Easting
B.L.-1	4,877,810.875	366,516.283
B.L.-2	4,877,443.040	367,451.549
B.L.-3	4,877,066.141	367,303.316
B.L.-4	4,877,433.977	366,368.051

Proposed Marine Aquaculture Site
 Kelly Cove Salmon Ltd. - Brooklyn Site
 Area = 40.703 hectares
Liverpool Bay
 (Atlantic Ocean)

NAD83 Reference Frame, Epoch 2010.0 (Grid)
 Canadian Spatial Reference System (CSRS)
 Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
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B.L.-2	44°02'17.4237"	64°39'15.5176"
B.L.-3	44°02'05.1161"	64°39'21.8349"
B.L.-4	44°02'16.4224"	64°40'04.1716"

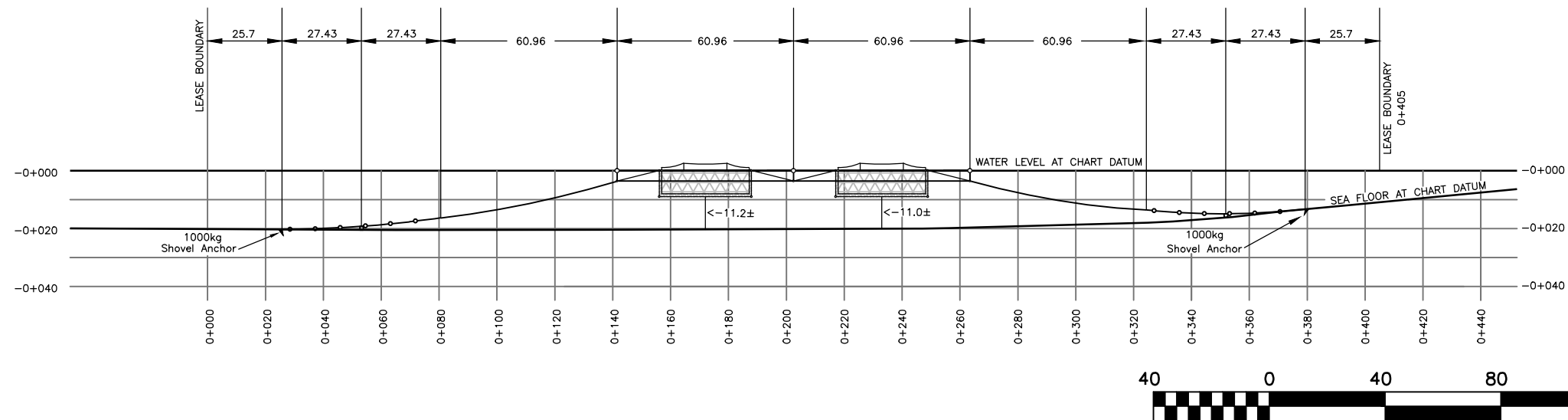
- SHEET 3 OF 6 NOTES:**
- (1.) 20 PROPOSED CAGES IN A 2x10 SUNKEN GRID LAYOUT.
 - (2.) CAGE DIAMETER IS 31.83m.
 - (3.) GRID SIZE IS 60.96m x 60.96m (200'x200').
 - (4.) THIS PLAN SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
 - (5.) ANCHOR BLOCKS, ANCHORS, AND MOORING LINES ARE NOT DRAWN TO SCALE.
 - (6.) OFFSETS TO THE LEASE BOUNDARIES ARE HORIZONTAL DISTANCES FROM THE BACK OF THE SHOVEL ANCHOR.

- NOTES:**
- (1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 - (2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
 - (3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
 - (4.) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
 - (5.) SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
 - (6.) NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
 - (7.) ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
 - (8.) ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).

PURPOSE OF PLAN (SHEET 3 OF 6)
 THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATIONS OF ALL ANCHORS, CAGES, AND THE GRID/MOORING CONFIGURATION RELATIVE TO THE LEASE BOUNDARIES.

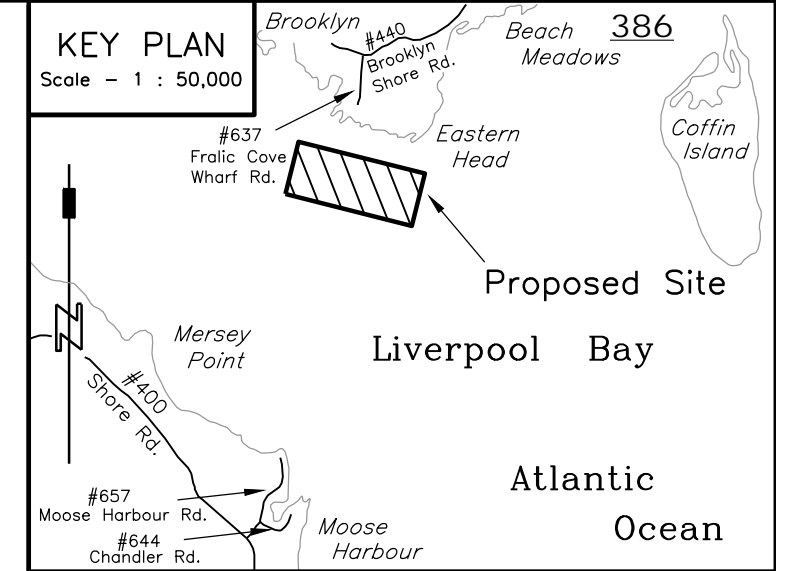
SCALE - 1 : 5,000 (METRIC)

CROSS SECTION - STATION 0+818.5
 HORIZONTAL SCALE - 1 : 2,000 (METRIC)
 VERTICAL SCALE - 1 : 2,000 (METRIC)



SCALE - 1 : 2,000 (METRIC)

KEY PLAN
 Scale - 1 : 50,000

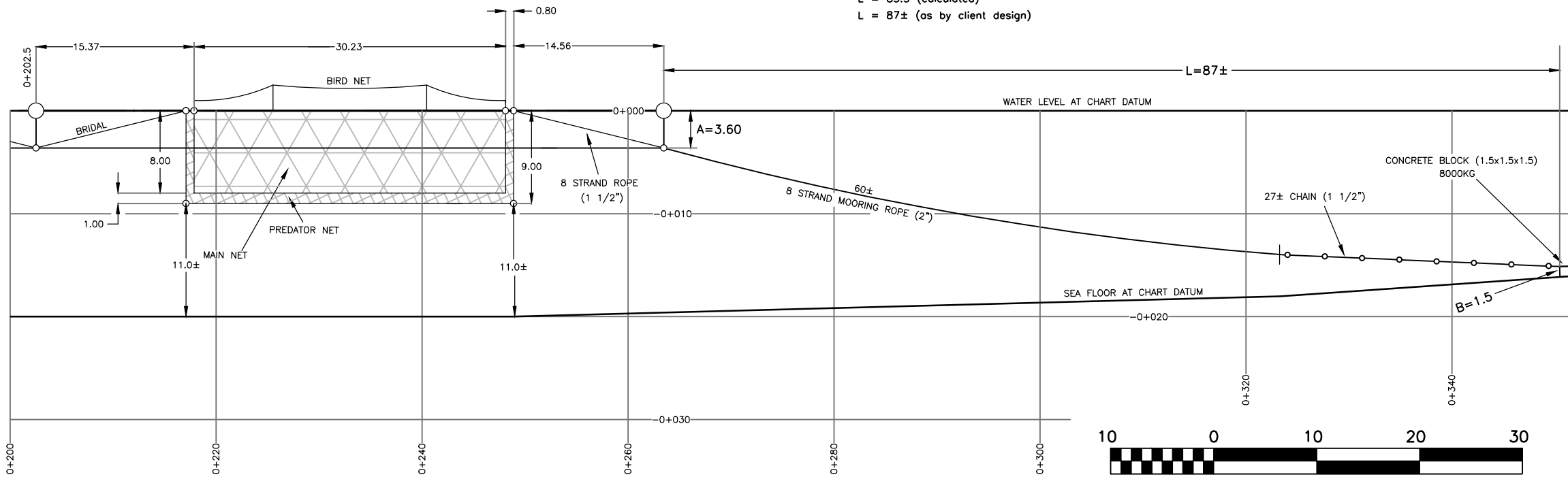


Legend:

CALCULATED POINT	.....	.C.P. (C)
CALCULATED	.....	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	.....	P.I.D. #00000000
NORTHING / EASTING	.....	N. / E.
LOCAL REGISTRY NUMBER	.....	Book: / Page:
ORDINARY HIGH WATER MARK	.....	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	.....	+ 00.0
CONCRETE MOORING	.....
SHOVEL ANCHOR	.....

DETAILED CROSS SECTION - STATION 0+818.5
 HORIZONTAL SCALE - 1 : 500 (METRIC)
 VERTICAL SCALE - 1 : 500 (METRIC)

5:1 Mooring Scope Calculation
 $L = [(max\ depth + max\ tide\ range) - A - B] \times 5$
 $L = [(20\pm + 2.2) - 3.6 - 1.5] \times 5$
 $L = 85.5\ (calculated)$
 $L = 87\pm\ (as\ by\ client\ design)$



SCALE - 1 : 500 (METRIC)

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
 LATERAL CROSS-SECTION
KELLY COVE SALMON LTD. / BROOKLYN SITE
 LOCATED AT:
 BROOKLYN (EASTERN HEAD), LIVERPOOL BAY
 (ATLANTIC OCEAN), QUEENS COUNTY, NOVA SCOTIA

Client's Statement

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Dated this 14th day of January, 2019.

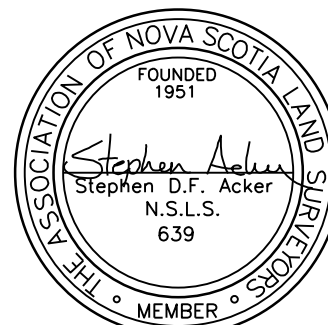
Jeff Nickerson

A&D JOB #300-18-BROOKLYN

SHEET 4 OF 6 | DATE: JAN. 14, 2019

NOTES:

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PURPOSE OF PLAN (SHEET 4 OF 6)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LATERAL CROSS SECTION AS SHOWN ON SHEET 3 OF 6, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

- THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
- FOR HORIZONTAL LOCATION OF EACH CROSS SECTION SEE SHEET 3 OF 5.
- DISTANCES FROM SEA FLOOR MAY VARY DEPENDING ON TIDE AND CURRENT.
- DISTANCES FROM SEA FLOOR ARE APPROXIMATE ONLY.
- DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).



Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors &
 Professional Engineers

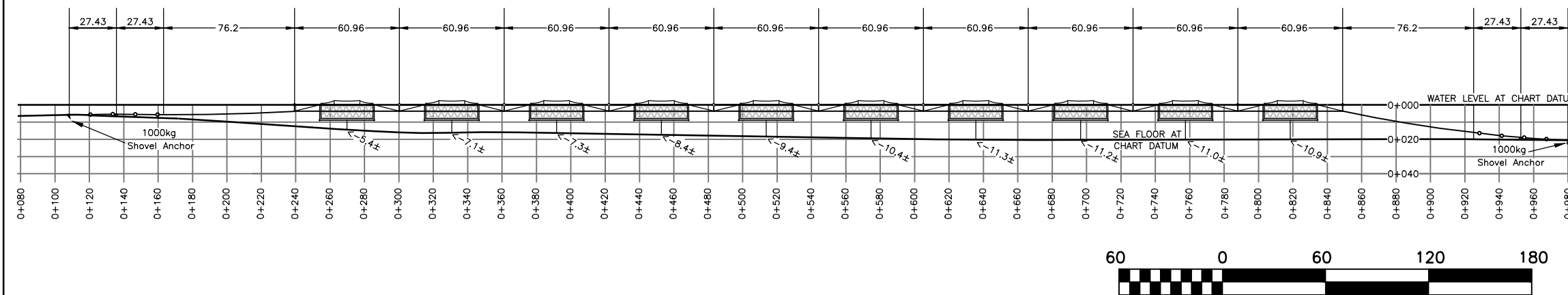
4083 Highway #308, P.O. Box 64
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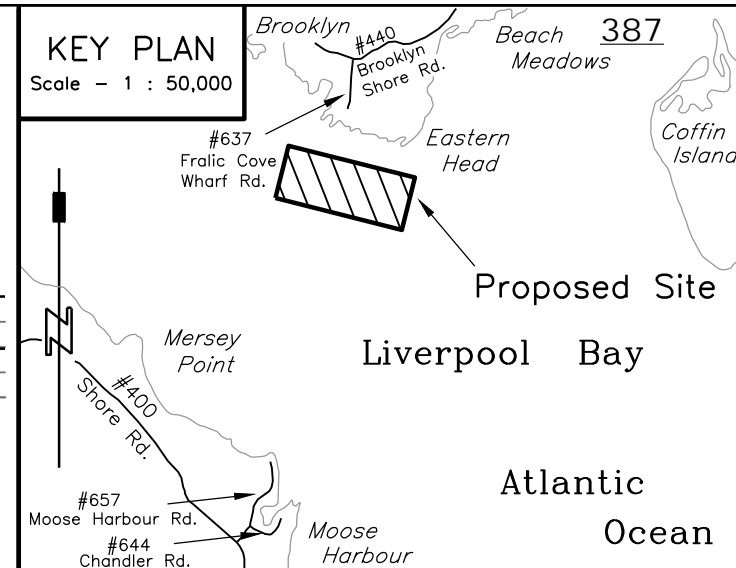
Phone: (902) 875-2110
 info@adsurveying.ca

CROSS SECTION - STATION 0+233
 HORIZONTAL SCALE - 1 : 3,000 (METRIC)
 VERTICAL SCALE - 1 : 3,000 (METRIC)

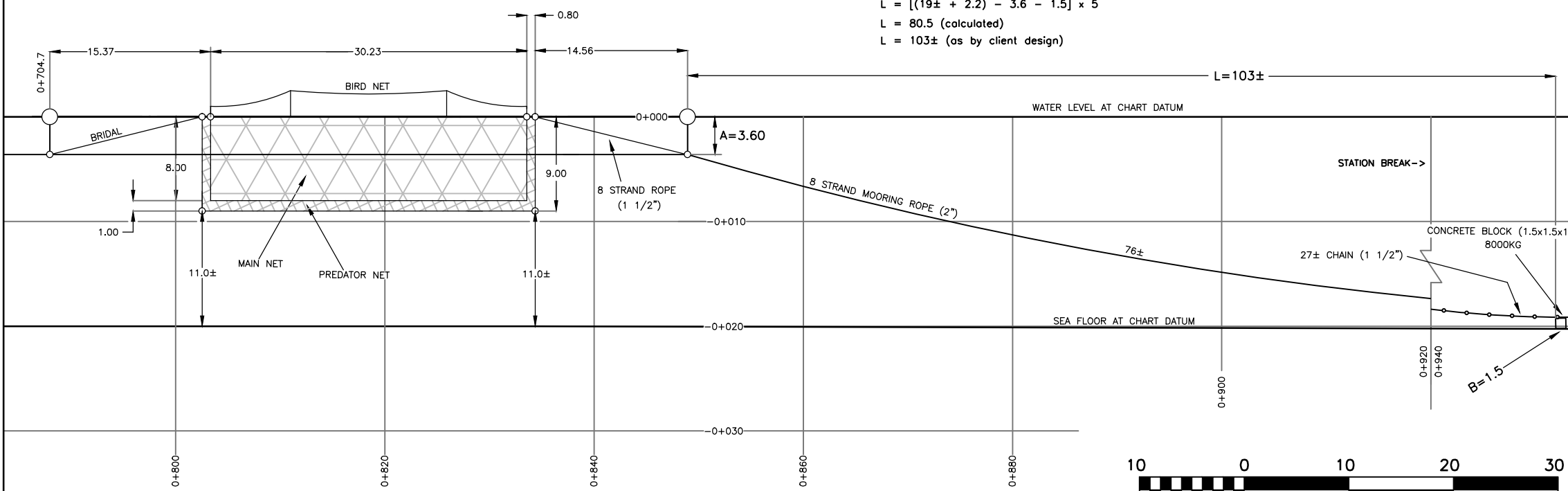


SCALE - 1 : 3,000 (METRIC)

KEY PLAN
 Scale - 1 : 50,000



DETAILED CROSS SECTION - STATION 0+233
 HORIZONTAL SCALE - 1 : 500 (METRIC)
 VERTICAL SCALE - 1 : 500 (METRIC)



SCALE - 1 : 500 (METRIC)

5:1 Mooring Scope Calculation
 $L = [(max\ depth + max\ tide\ range) - A - B] \times 5$
 $L = [(19\pm + 2.2) - 3.6 - 1.5] \times 5$
 $L = 80.5\ (calculated)$
 $L = 103\pm\ (as\ by\ client\ design)$

Legend:

CALCULATED POINT	.....	C.P. ○
CALCULATED	.....	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	.....	P.I.D. #00000000
NORTHING / EASTING	.....	N. / E.
LOCAL REGISTRY NUMBER	.....	Book: / Page:
ORDINARY HIGH WATER MARK	.....	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	.....	+ 00.0
CONCRETE MOORING	.....	□
SHOVEL ANCHOR	.....	⚓

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
 LONGITUDINAL CROSS-SECTION
 KELLY COVE SALMON LTD. / BROOKLYN SITE
 LOCATED AT:
 BROOKLYN (EASTERN HEAD), LIVERPOOL BAY
 (ATLANTIC OCEAN), QUEENS COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 14th day of January, 2019.

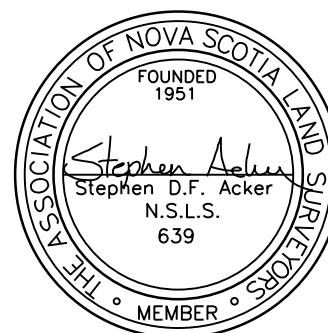
Jeff Nickerson

A&D JOB #300-18-BROOKLYN

SHEET 5 OF 6 | DATE: JAN. 14, 2019

NOTES:

- ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
- THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
- ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
- DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
- SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
- NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
- ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
- ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).



PURPOSE OF PLAN (SHEET 5 OF 6)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LONGITUDINAL CROSS SECTION AS SHOWN ON SHEET 3 OF 6, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

- THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
- FOR HORIZONTAL LOCATION OF EACH CROSS SECTION SEE SHEET 3 OF 5.
- DISTANCES FROM SEA FLOOR MAY VARY DEPENDING ON TIDE AND CURRENT.
- DISTANCES FROM SEA FLOOR ARE APPROXIMATE ONLY.
- DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).



Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors &
 Professional Engineers

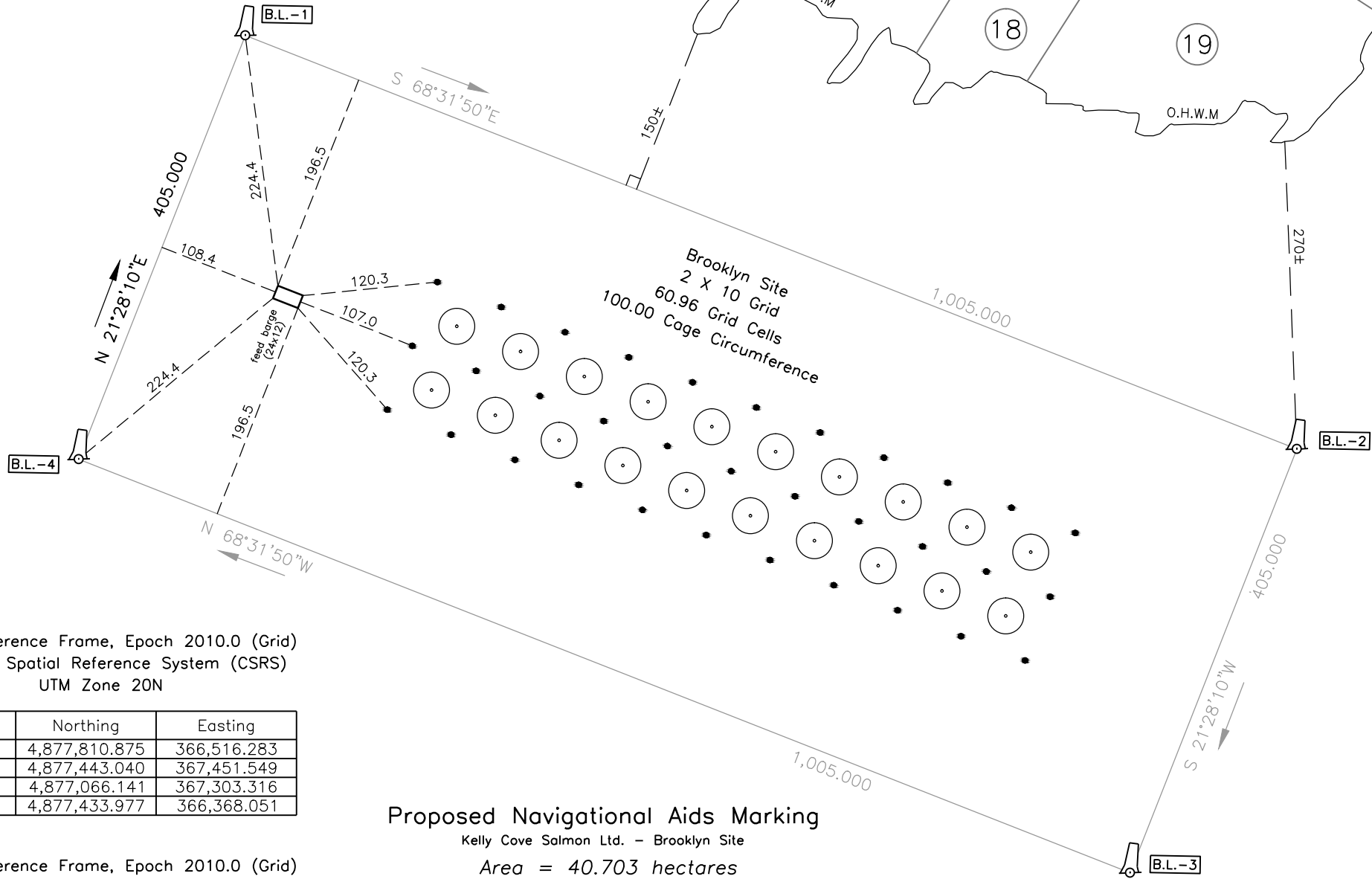
4083 Highway #308, P.O. Box 64
 Tusket, Yarmouth County
 Nova Scotia, Canada
 B0T 3M0

Phone: (902) 648-2186
 www.adsurveying.ca

80B Ohio Road, P.O. Box 367
 Shelburne, Shelburne County
 Nova Scotia, Canada
 B0T 1W0

Phone: (902) 875-2110
 info@adsurveying.ca

- = compensator buoys (yellow)
- = aquaculture cages (31.83m diameter)
- ⚓ = cautionary buoy (yellow)



NORTH
 UTM zone 20N
 GRID
 NAD83 (CSRS)

NAD83 Reference Frame, Epoch 2010.0 (Grid)
 Canadian Spatial Reference System (CSRS)
 UTM Zone 20N

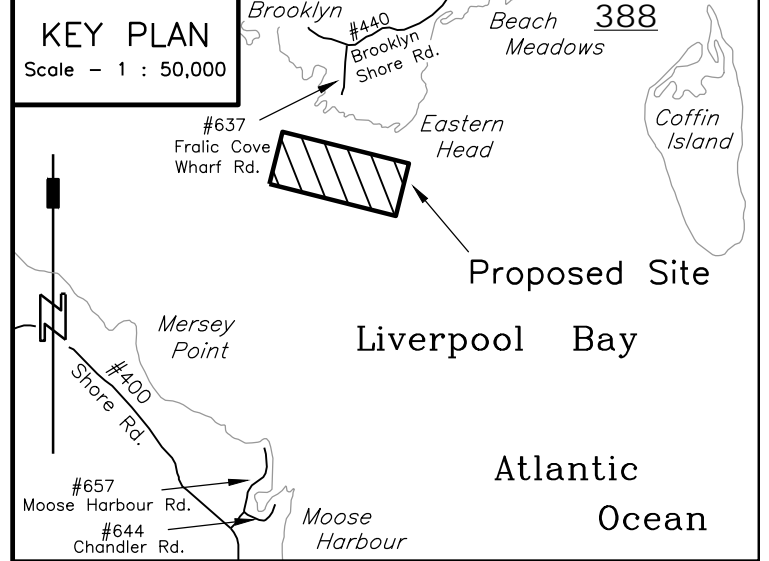
Point	Northing	Easting
B.L.-1	4,877,810.875	366,516.283
B.L.-2	4,877,443.040	367,451.549
B.L.-3	4,877,066.141	367,303.316
B.L.-4	4,877,433.977	366,368.051

Proposed Navigational Aids Marking
 Kelly Cove Salmon Ltd. - Brooklyn Site
 Area = 40.703 hectares

NAD83 Reference Frame, Epoch 2010.0 (Grid)
 Canadian Spatial Reference System (CSRS)
 Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
B.L.-1	44°02'28.7306"	64°39'57.8565"
B.L.-2	44°02'17.4237"	64°39'15.5176"
B.L.-3	44°02'05.1161"	64°39'21.8349"
B.L.-4	44°02'16.4224"	64°40'04.1716"

Liverpool Bay
 (Atlantic Ocean)



- Legend:**
- CALCULATED POINT c.p. ○
 - CALCULATED (c.)
 - N.S. PROPERTY IDENTIFICATION NUMBER P.I.D. #00000000
 - NORTHING / EASTING N. / E.
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 - ORDINARY HIGH WATER MARK O.H.W.M.
 - BOUNDARY DEALT WITH BY THIS PLAN
 - OTHER BOUNDARY
 - TIE LINES
 - NOT TO SCALE
 - MAJOR CONTOURS
 - MINOR CONTOURS
 - DEPTH SOUNDINGS + 00.0
 - CONCRETE MOORING □
 - SHOVEL ANCHOR ⚓

AQUACULTURE SITE DEVELOPMENT PLANS
 SHOWING
 PROPOSED NAVIGATIONAL AIDS MARKING PLAN
KELLY COVE SALMON LTD. / BROOKLYN SITE
 LOCATED AT:
 BROOKLYN (EASTERN HEAD), LIVERPOOL BAY
 (ATLANTIC OCEAN), QUEENS COUNTY, NOVA SCOTIA

Client's Statement

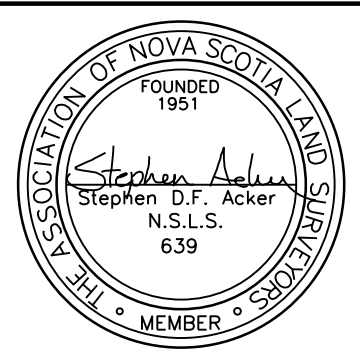
I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 14th day of January, 2019.

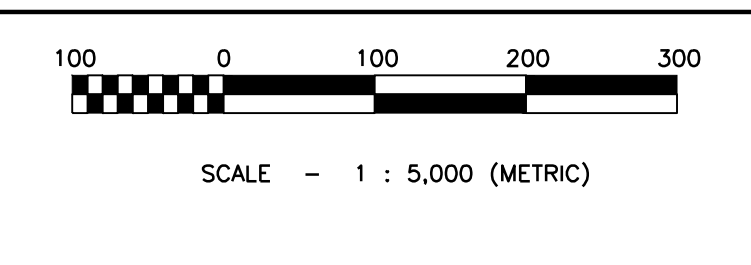
Jeff Nickerson

A&D JOB #300-18-BROOKLYN
SHEET 6 OF 6 | **DATE: JAN. 14, 2019**

- NOTES:**
- (1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 - (2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
 - (3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
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 - (7.) ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
 - (8.) ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).



PURPOSE OF PLAN (SHEET 6 OF 6)
 THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATION AND TYPES OF ALL NAVIGATIONAL AIDS RELATIVE TO THE PROPOSED LEASE BOUNDARIES.



Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
 Tusket, Yarmouth County
 Nova Scotia, Canada
 B0W 3M0

80B Ohio Road, P.O. Box 367
 Shelburne, Shelburne County
 Nova Scotia, Canada
 B0T 1W0

Phone: (902) 648-2186
 www.adsurveying.ca

Phone: (902) 875-2110
 info@adsurveying.ca

NAVIGATION PROTECTION ACT (NPA) NOTICE OF WORKS FORM

WARNING: Any false or misleading statement with respect to this form and supporting documentation, including the misrepresentation of a material fact, may result in the refusal to authorize or issue Approval, or result in the suspension or cancellation of an Approval obtained through fraudulent means.

PRIOR TO COMPLETING THIS FORM:

1. Determine if your project is on a navigable water listed on the Schedule to the NPA. A *Notice to the Minister* is required for works on scheduled navigable waters. Works on non-scheduled navigable waters may be eligible to opt in; if requesting Opt-in, the Opt-in annex must be included with your *Notice to the Minister*.
2. Self assess your project against the *Minor Works Order* to determine if a *Notice to the Minister* is required. Links to the NPA Schedule, Order and Regulations can be accessed through the Navigation Protection Program (NPP) website at <http://www.tc.gc.ca/eng/programs-621.html>.

PURPOSE	
<p>This <i>Notice of Works Form</i> and its supporting documentation (as well as other relevant information) which may be required for a review by Transport Canada (TC), once completed and submitted, comprise the <i>Notice to the Minister</i> as required under the NPA. For assistance in completing your submission, refer to the guidance provided on the NPP website under "Apply to the NPP" including the <i>Guide to the Navigation Protection Program's Notification, Application and Review Requirements</i>.</p>	
SUPPORTING DOCUMENTATION REQUIREMENTS	
<p>Mandatory Information Checklist (incomplete information will be returned with no action)</p> <p><input checked="" type="checkbox"/> Completed and signed "Notice of Works Form" with all mandatory fields completed</p> <p><input checked="" type="checkbox"/> Map showing location of project¹</p> <p><input checked="" type="checkbox"/> Top/Plan drawing with dimensions¹</p> <p><input checked="" type="checkbox"/> Side/Profile drawing with dimensions¹</p> <p>¹ 6 copies if hard copy submission</p>	<p>Recommended Information (may expedite your review)</p> <p><input checked="" type="checkbox"/> Body of water details</p> <p><input checked="" type="checkbox"/> Land use/Ownership information</p> <p><input checked="" type="checkbox"/> Body of water use information</p> <p><input checked="" type="checkbox"/> Impacts, obstructions and mitigation plans</p> <p><input checked="" type="checkbox"/> Any environmental review information</p> <p><input checked="" type="checkbox"/> Operation, maintenance and marking plans</p> <p><input type="checkbox"/> Photographs of work site and body of water</p> <p><input type="checkbox"/> Aboriginal consultation results</p> <p><input checked="" type="checkbox"/> Other government agencies involved</p> <p><input type="checkbox"/> Water lot lease information</p> <p><input type="checkbox"/> Opt-in request annex (non-scheduled navigable waters only)</p>
<p>When submitting a Notice to the Minister, owners should note:</p> <ul style="list-style-type: none"> All plans and drawings must be legible when printed on 11" x 17" paper For e-mail submissions, provide a scan of all relevant supporting documentation Your completed Notice to the Minister should be sent to the appropriate regional office as outlined below 	
TRANSPORT CANADA NAVIGATION PROTECTION PROGRAM REGIONAL OFFICE LOCATIONS	
<p>Pacific Region 820-800 Burrard Street Vancouver BC V6Z 2J8 Telephone: 604-775-8867 Email: NPPPAC-PPNPAC@tc.gc.ca</p>	<p>Prairie and Northern Region Canada Place 1100-9700 Jasper Ave Edmonton AB T5J 4E6 Telephone: 780-495-8215 Email: NPPPNR-PPNRPN@tc.gc.ca</p>
<p>Headquarters (For info on the NPP and NPA ONLY) Notices not processed at this office Tower C, 330 Sparks Street, 18th Floor Ottawa ON K1A 0N5 Telephone: 613-991-3476 Email: NPPHQ-PPNAC@tc.gc.ca</p>	<p>Quebec Region 401-1550 d'Estimauville Avenue, 5th Floor Quebec QC G1J 0C8 Telephone: 877-646-6420 Email: PPNQUE-NPPQUE@tc.gc.ca</p>
<p>Ontario Region 100 South Front Street, 1st Floor Sarnia ON N7T 2M4 Telephone: 519-383-1863 Email: NPPONT-PPNONT@tc.gc.ca</p>	
<p>Atlantic Region 95 Foundry Street, 6th Floor P.O. Box 42 Moncton NB E1C 8K6 Telephone: 506-851-3113 Email: NPPATL-PPNATL@tc.gc.ca</p>	

NAVIGATION PROTECTION ACT NOTICE OF WORKS FORM

TC file number (if known):

 Are you the riparian property owner? Yes No

GENERAL INFORMATION			
Official and/or local name(s) of the body of water (Required) Liverpool Bay		Is the body of water listed on the schedule to the NPA? <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unknown	
Are you also requesting an Approval, if required? <input checked="" type="radio"/> Yes <input type="radio"/> No		Is this an Opt-in request? <input type="radio"/> Yes <input checked="" type="radio"/> No	
Are you representing an Aboriginal group? <input type="radio"/> Yes <input checked="" type="radio"/> No		Is the work near/on First Nations reserve or land claim? <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	
Does this project involve throwing or depositing materials in water? <input type="radio"/> Yes <input checked="" type="radio"/> No		Does this project involve dewatering a body of water? <input type="radio"/> Yes <input checked="" type="radio"/> No	
OWNER CONTACT INFORMATION ²			
Individual or company name (Required) Kelly Cove Salmon Ltd.		Contact name (Required) Jeff Nickerson	
Mailing address (Required) P.O.Box 33			
City/Town (Required) Bridgewater		Province/Territory (Required) Nova Scotia	Postal code (Required) B4V 2W6
Primary telephone number (Required) 902-275-7493	Other telephone number	E-mail jnickerson@cookeaque.com	
Owner's agent/mandatary (contractor/consultant/representative/co-proponent, if any)			
Company name Sweeney International Marine Corp.		Contact name Leah Lewis-McCrea	
Mailing address 46 Milltown Blvd.			
City/Town St. Stephen		Province/Territory NB	Postal code E3L 1G3
Primary telephone number 902-492-0359	Other telephone number	E-mail llewis@simcorp.ca	
WORK SITE INFORMATION			
Nearest municipality/county/district (Required) Liverpool, Queens County		Province/Territory (Required) Nova Scotia	
Site location such as lot, concession, section, township, range, meridian, 911 address, property identification, etc. (Required) Brooklyn aquaculture site is located in Liverpool Bay, approximately 4.1 kilometers east of the town of Liverpool. The site is south of Eastern Head.			
Site position Latitude North (Required) Degrees <u>44</u> Minutes <u>02</u> Seconds <u>17.0</u>		Site position Longitude West (Required) Degrees <u>64</u> Minutes <u>39</u> Seconds <u>40.0</u>	
Hydro chart number: <u>4211</u>		Topo map number: _____	

Body of water details, such as characteristics, bank/bottom features, biological components, flow/tides, etc.

The Brooklyn site is located south of Eastern Head in Liverpool Bay, occupies a 40.703 ha parcel, and is located over waters ranging from 6 - 20 m in depth. The sediment composition of the seafloor is composed primarily of boulders, bedrock and hard packed sand, with a ledge and infrequent cobble/rubble.

Potential obstructions, such as natural/man-made, other works, navigation aids, etc.

This site consists of plastic circular cages and compensator buoys. The outside corners of the lease are marked with a 0.6 m buoy equipped with a light and radar reflectors. Liverpool Bay also has a marked navigation channel.

Land use/Ownership, such as past/current, private/government, rural/suburban, coastal, environmental, etc.

Kelly Cove Salmon Ltd. has submitted an application for the Brooklyn site, as described in this document.

BODY OF WATER USE INFORMATION

Navigation types (check all that apply) <input checked="" type="checkbox"/> Commercial <input checked="" type="checkbox"/> Recreational		Maximum vessel size Length _____ Width _____ Draft _____	
Traffic direction <input type="radio"/> One-way <input checked="" type="radio"/> Two-way		Manoeuvrability (check all that apply) <input type="checkbox"/> Poor <input type="checkbox"/> Good <input checked="" type="checkbox"/> Excellent	
Day/Night <input type="radio"/> Day <input type="radio"/> Night <input checked="" type="radio"/> Both	Volume <input type="radio"/> Low <input checked="" type="radio"/> Med <input type="radio"/> High	Navigation season(s) (check all that apply) <input checked="" type="checkbox"/> Winter <input checked="" type="checkbox"/> Spring <input checked="" type="checkbox"/> Summer <input checked="" type="checkbox"/> Fall	

Other uses such as cottagers, special events, fishing, etc

The area surrounding the proposed Brooklyn site is used primarily by fishing vessels traveling in and out of the port of Liverpool. Recreational vessels also frequent this area. The primary vessel traffic around the proposed site will be from vessels servicing the site.

PROJECT INFORMATION

Name of work such as bridge, dam, marina, etc. (Required) Aquaculture site	Type of work (check all that apply) (Required) <input checked="" type="checkbox"/> Construct <input type="checkbox"/> Place <input checked="" type="checkbox"/> Alter <input type="checkbox"/> Repair <input type="checkbox"/> Decommission <input type="checkbox"/> Rebuild <input checked="" type="checkbox"/> Permanent <input type="checkbox"/> Temporary <input type="checkbox"/> Remove
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Brief project description (or attach) such as status, structures, operation, etc. (Required)

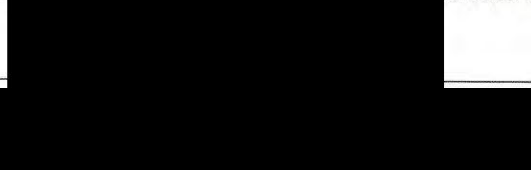
The aquaculture site consists of two strings of 10 circular 100 m circumference cages. Cages will be present on site all year round.

Method of construction such as temporary works, activities, etc. (Required)

Aquaculture site consists of anchored cage systems (see attached plans). Crews will visit the site daily to feed and maintain cage system.

Anticipated impacts such as source, severity, mitigation, marking, waste/debris management, use, cumulative, etc.

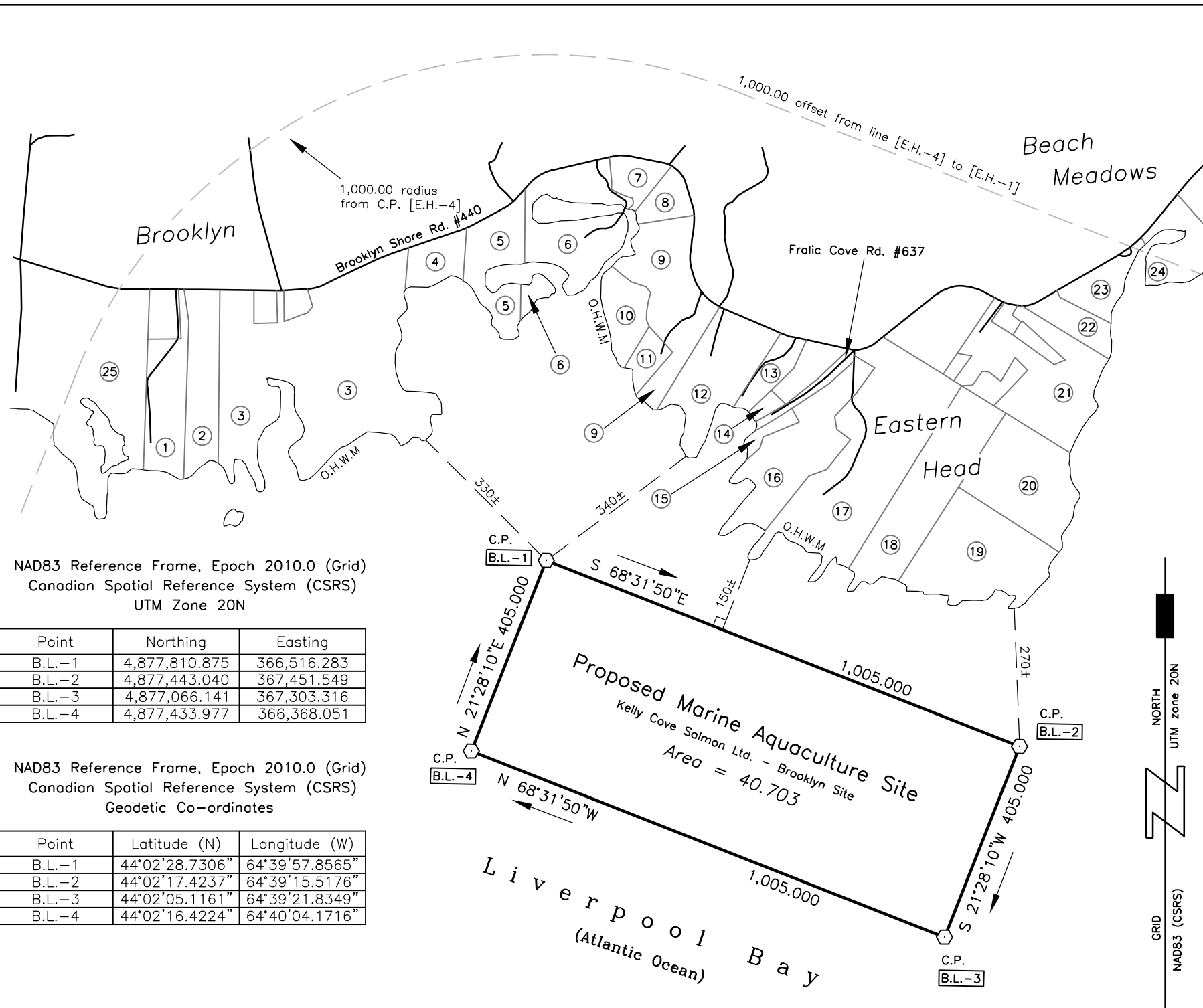
Expected start date (dd-mm-yyyy) (Required) Spring 2021	Expected completion date (dd-mm-yyyy) (Required) Ongoing
--	---

ENVIRONMENTAL REVIEW INFORMATION	
Is the work located on Federal lands? <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	Is the project a designated project under the <i>Regulations Designating Physical Activities</i> under the <i>Canadian Environmental Assessment Act, 2012</i> ? <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
Is the project subject to Northern Environmental Assessment (EA) Regime(s)? <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	If yes, identify the northern EA regime(s) that apply <input type="checkbox"/> Inuvialuit Final Agreement (IFA) <input type="checkbox"/> <i>Mackenzie Valley Resource Management Act</i> (MVRMA) <input type="checkbox"/> Nunavut Land Claims Agreement (NLCA) <input type="checkbox"/> <i>Yukon Environmental and Socio-economic Assessment Act</i> (YESAA)
Other Federal Organizations involved	
<input checked="" type="checkbox"/> Canadian Environmental Assessment Agency (CEAA) <input checked="" type="checkbox"/> Fisheries and Oceans Canada (DFO) <input type="checkbox"/> Major Projects Management Office (MPMO) <input type="checkbox"/> Aboriginal Affairs and Northern Development Canada (AANDC)	<input type="checkbox"/> Environment Canada (EC) <input type="checkbox"/> Natural Resources Canada (NRCan) <input type="checkbox"/> Northern Projects Management Office (NPMO) <input type="checkbox"/> Other: _____
OWNER AUTHORIZATION ²	
I hereby certify that the information contained herein and in any of the supporting documents is complete, true and accurate to the best of my knowledge and belief, and that I am authorized, as the owner, to submit this Notice to the Minister.	
 _____ Print Name (Required)	14/2/2019 _____ Date (dd-mm-yyyy) (Required)
FOR OFFICE USE ONLY	
	Date stamped (dd-mm-yyyy)

² "Owner", in relation to a work, means the actual or reputed owner of the work or that owner's agent or mandatary. It includes a person who is in possession or claiming ownership of the work and a person who is authorizing or otherwise responsible for the construction, placement, alteration, repair, rebuilding, removal, decommissioning, maintenance, operation, safety or use of the work. It also includes a person who proposes to construct or place a work.

The personal information provided on this Notice to the Minister is collected under the authority of the *Navigation Protection Act*, sections 4, 5, 6, 9, 21, 22, 23 and 24. This information is required for the purpose of processing applications made under the above-noted sections for proposed, commenced or existing works that are or will be constructed, placed, altered, repaired, rebuilt, removed or decommissioned in, on, over, under, through or across any navigable water in Canada. The personal information collected is described in a personal information bank entitled *Navigation Protection Program* (bank number TC PPU 086). Under the provisions of the *Privacy Act*, individuals have the right of access to, correction of and protection of their personal information. Instructions for obtaining personal information are provided in Info Source, a copy of which is available in major public and academic libraries or online at <http://www.infosource.gc.ca>

#	P.I.D. #	OWNER / ADDRESS
1	70089073	Paul Shot et ux. RR #1, Brooklyn, N.S. BOJ 1H0
2	70089081	Krista C. Decker et al. 22 Odell Dr., Dartmouth, N.S. B2W 3T4
3	70089099	James F. Mitton et al. RR #1, Brooklyn, N.S. BOJ 1H0
4	70089131	Delphine Dexter 89 Shore Rd., Brooklyn, N.S. BOJ 1H0
5	70089164	Ian D. Kent et al. RR #1, Brooklyn, N.S. BOJ 1H0
6	70089172	Barry S. Anthony et ux. 532 Brooklyn Shore Rd., Brooklyn, N.S., BOJ 1H0
7	70089222	Jason Pendragon Finck 580 Brooklyn Shore Rd., Brooklyn, N.S., BOJ 1H0
8	70089255	Ryan Mullen 592 Brooklyn Shore Rd., RR #1 Brooklyn, N.S., BOJ 1H0
9	70089305	John E. Conrad et ux. P.O. Box 32, Brooklyn, N.S. BOJ 1H0
10	70089313	Allen Harrington P.O. Box 55, Brooklyn, N.S. BOJ 1H0
11	70089321	John E. Conrad et ux. P.O. Box 32, Brooklyn, N.S. BOJ 1H0
12	70089339	Gary P. Robertson et ux. 31 Oak Street, Oak Hill, N.S. B4V 0C5
13	70100797	Garry Marsh et al. P.O. Box 790, Liverpool, N.S. B0T 1K0
14	70205646	Garry Marsh et al. P.O. Box 790, Liverpool, N.S. B0T 1K0
15	70100755	Garry Marsh et al. P.O. Box 790, Liverpool, N.S. B0T 1K0
16	70100789	Gary Morash et ux. P.O. Box 790, Liverpool, N.S. B0T 1K0
17	70100748	Gary Morash et ux. P.O. Box 790, Liverpool, N.S. B0T 1K0
18	70100714	Reynold Fralic et al. RR #4, Site 19, Comp 10 New Glasgow, N.S., B2H 5C7
19	70100946	Dennis Conrad RR #1, Brooklyn, N.S. BOJ 1H0
20	70100672	Wilhelmina R. Conrad et al. RR #1, Brooklyn, N.S. BOJ 1H0
21	70100656	Hazel M. Mouzar P.O. Box 173, Liverpool, N.S. B0T 1K0
22	70100599	Donald T. Fralic et ux. RR #1, Brooklyn, N.S. BOJ 1H0
23	70100086	Wilhelmina R. Conrad et al. RR #1, Brooklyn, N.S. BOJ 1H0
24	70100540	Andrew R. Godfrey et ux. RR #1, Brooklyn, N.S. BOJ 1H0
25	70261698	Randall N. Fralic et al. RR #1, Brooklyn, N.S. BOJ 1H0



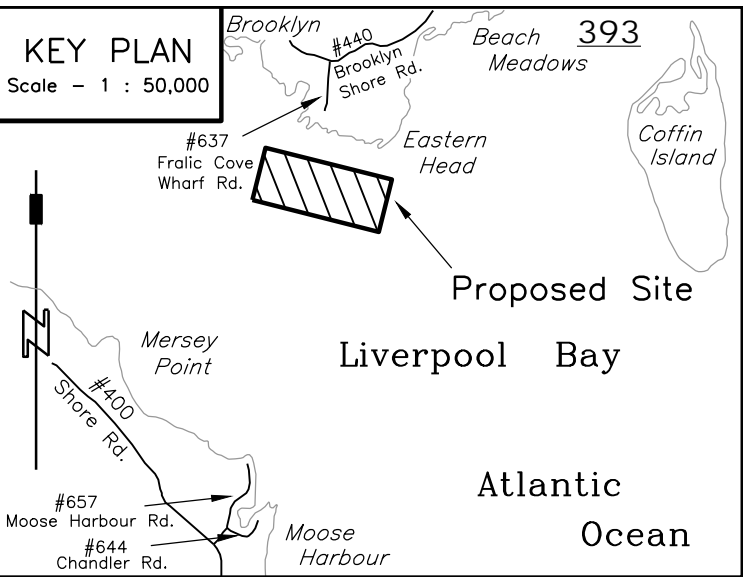
NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
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B.L.-2	4,877,443.040	367,451.549
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B.L.-4	4,877,433.977	366,368.051

NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co-ordinates

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B.L.-3	44°02'05.1161"	64°39'21.8349"
B.L.-4	44°02'16.4224"	64°40'04.1716"

#	P.I.D. #	OWNER / ADDRESS
25	70261698	Randall N. Fralic et al. RR #1, Brooklyn, N.S. BOJ 1H0



Legend:

CALCULATED POINT	..... C.P. (c.)
CALCULATED	..... (c.)
N.S. PROPERTY IDENTIFICATION NUMBER	..... P.I.D. #00000000
NORTHING / EASTING	..... N. / E.
LOCAL REGISTRY NUMBER	..... Book: / Page:
ORDINARY HIGH WATER MARK	..... O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	..... + 00.0
CONCRETE MOORING	.....
SHOVEL ANCHOR	.....

AQUACULTURE SITE DEVELOPMENT PLANS
SHOWING
AQUACULTURE SITE APPLICATION
KELLY COVE SALMON LTD. / BROOKLYN SITE
LOCATED AT:
BROOKLYN (EASTERN HEAD), LIVERPOOL BAY
(ATLANTIC OCEAN), QUEENS COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

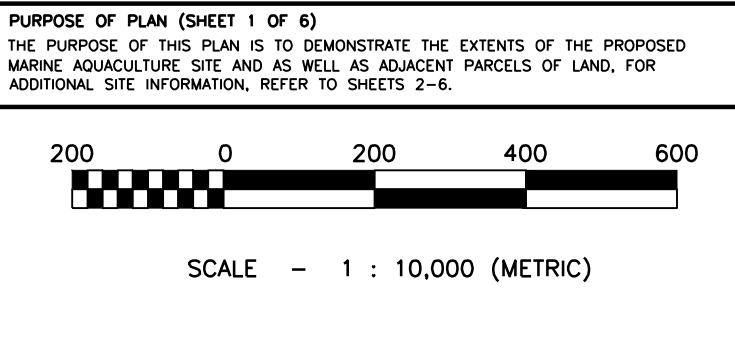
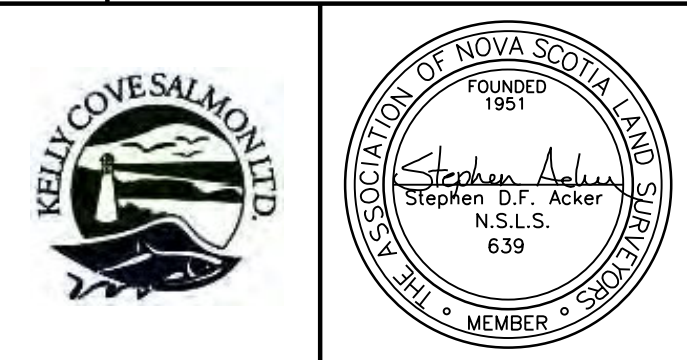
Dated this 14th day of January, 2019

Jeff Nickerson

A&D JOB #300-18-BROOKLYN
SHEET 1 OF 6 | DATE: JAN. 14, 2019

NOTES:

- ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
- THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
- ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
- DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
- SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
- NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
- ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
- ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).



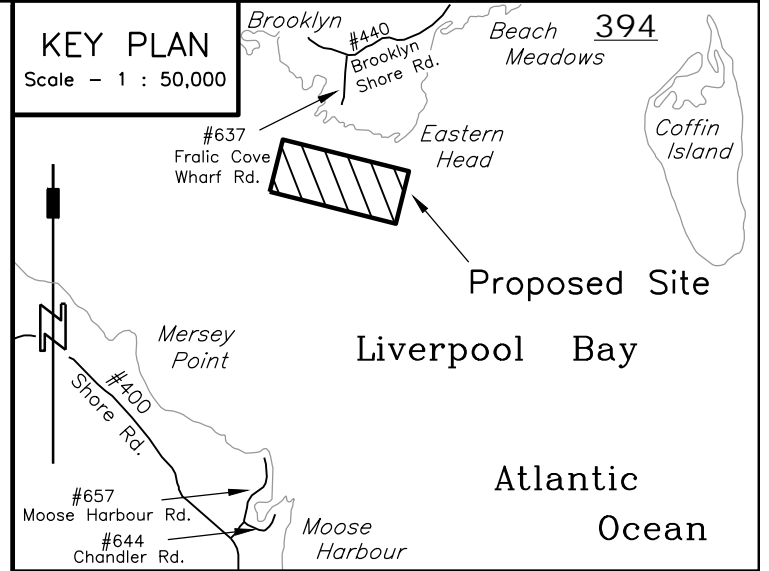
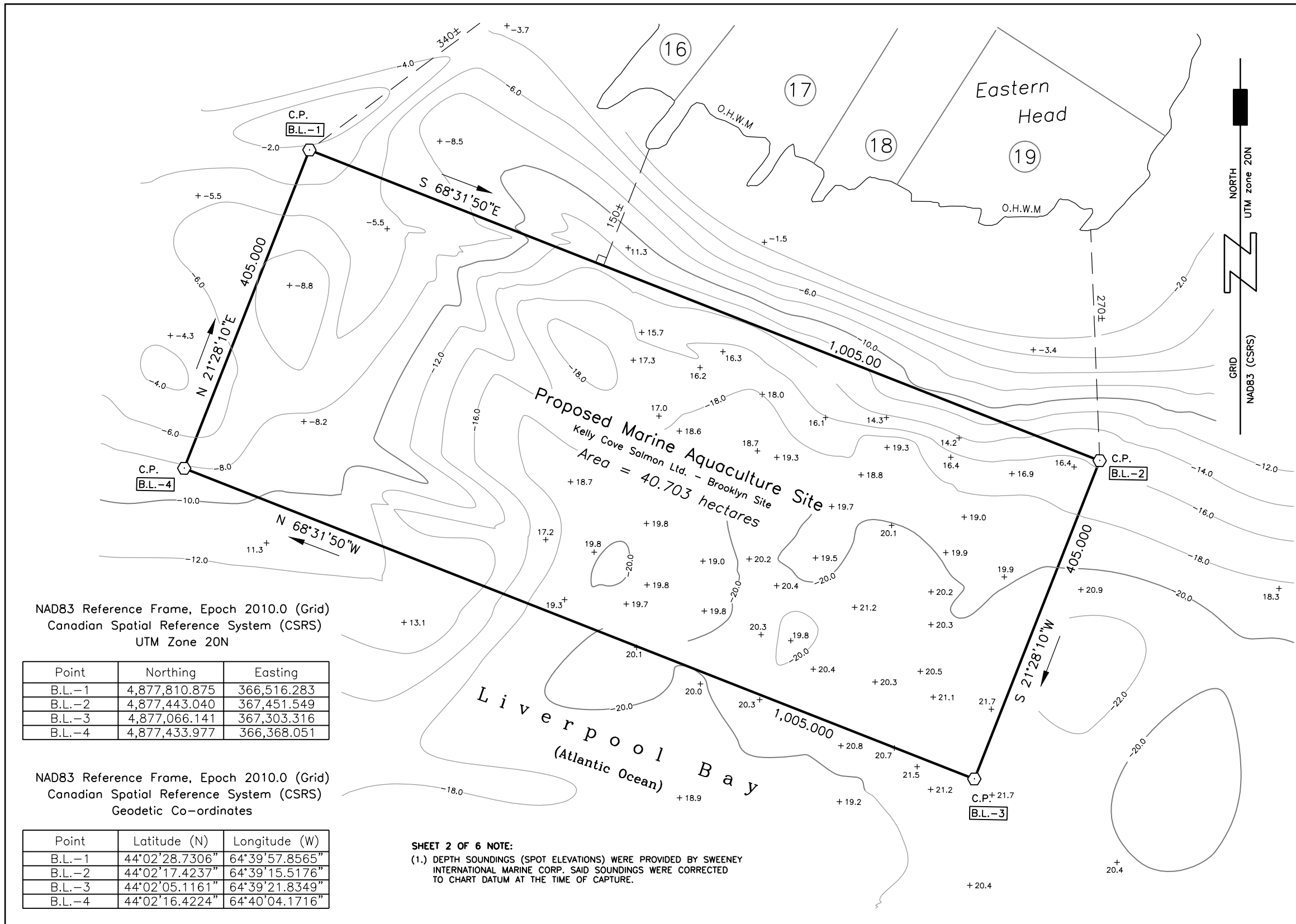
Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
B0W 3M0

80B Ohio Road, P.O. Box 387
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Phone: (902) 648-2186
www.adsurveying.ca

Phone: (902) 875-2110
info@adsurveying.ca



Legend:

CALCULATED POINT	.....	C.P. ○
CALCULATED	.....	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	.....	P.I.D. #00000000
NORTHING / EASTING	.....	N. / E.
LOCAL REGISTRY NUMBER	.....	Book / Page
ORDINARY HIGH WATER MARK	.....	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	.....	+ 00.0
CONCRETE MOORING	.....	□
SHOVEL ANCHOR	.....	⚓

AQUACULTURE SITE DEVELOPMENT PLANS
 SHOWING
 BASIC SEAFLOOR TOPOGRAPHY
KELLY COVE SALMON LTD. / BROOKLYN SITE
 LOCATED AT:
 BROOKLYN (EASTERN HEAD), LIVERPOOL BAY
 (ATLANTIC OCEAN), QUEENS COUNTY, NOVA SCOTIA

Client's Statement

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Dated this 14th day of January, 2019.

Jeff Nickerson

A&D JOB #300-18-BROOKLYN
SHEET 2 OF 6 | DATE: JAN. 14, 2019

NAD83 Reference Frame, Epoch 2010.0 (Grid)
 Canadian Spatial Reference System (CSRS)
 UTM Zone 20N

Point	Northing	Easting
B.L.-1	4,877,810.875	366,516.283
B.L.-2	4,877,443.040	367,451.549
B.L.-3	4,877,066.141	367,303.316
B.L.-4	4,877,433.977	366,368.051

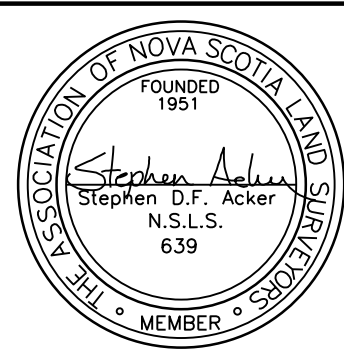
NAD83 Reference Frame, Epoch 2010.0 (Grid)
 Canadian Spatial Reference System (CSRS)
 Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
B.L.-1	44°02'28.7306"	64°39'57.8565"
B.L.-2	44°02'17.4237"	64°39'15.5176"
B.L.-3	44°02'05.1161"	64°39'21.8349"
B.L.-4	44°02'16.4224"	64°40'04.1716"

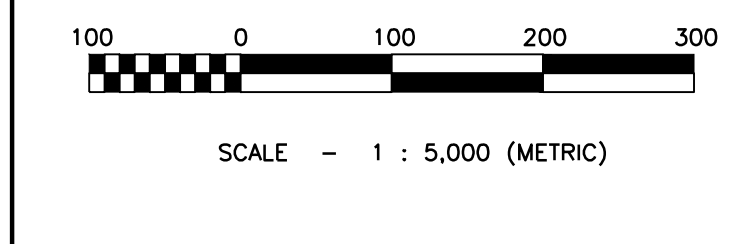
SHEET 2 OF 6 NOTE:
 (1.) DEPTH SOUNDINGS (SPOT ELEVATIONS) WERE PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM AT THE TIME OF CAPTURE.

NOTES:

- ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
- THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
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PURPOSE OF PLAN (SHEET 2 OF 6)
 THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND BASIC SEAFLOOR TOPOGRAPHY, FOR ADDITIONAL ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1, 3-6.



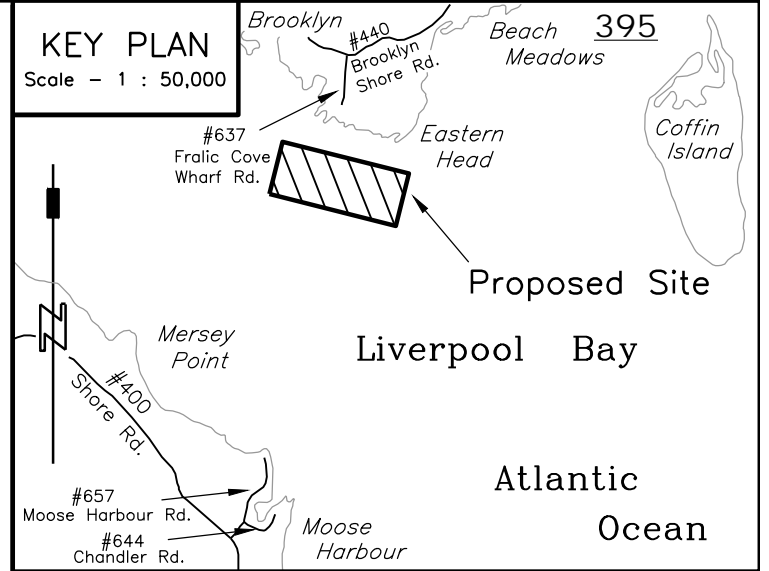
Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors & Professional Engineers

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Phone: (902) 648-2186
 www.adsurveying.ca

Phone: (902) 875-2110
 info@adsurveying.ca



Legend:

CALCULATED POINT	..... C.P. ○
CALCULATED	..... (c.)
N.S. PROPERTY IDENTIFICATION NUMBER	..... P.I.D. #00000000
NORTHING / EASTING	..... N. / E.
LOCAL REGISTRY NUMBER	..... Book: / Page:
ORDINARY HIGH WATER MARK	..... O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	..... + 00.0
CONCRETE MOORING □
SHOVEL ANCHOR ▽

AQUACULTURE SITE DEVELOPMENT PLANS
 SHOWING
AQUACULTURE CAGE CONFIGURATION
KELLY COVE SALMON LTD. / BROOKLYN SITE
 LOCATED AT:
BROOKLYN (EASTERN HEAD), LIVERPOOL BAY
(ATLANTIC OCEAN), QUEENS COUNTY, NOVA SCOTIA

Client's Statement

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Dated this 14th day of January, 2019.

Jeff Nickerson

A&D JOB #300-18-BROOKLYN

SHEET 3 OF 6 | DATE: JAN. 14, 2019

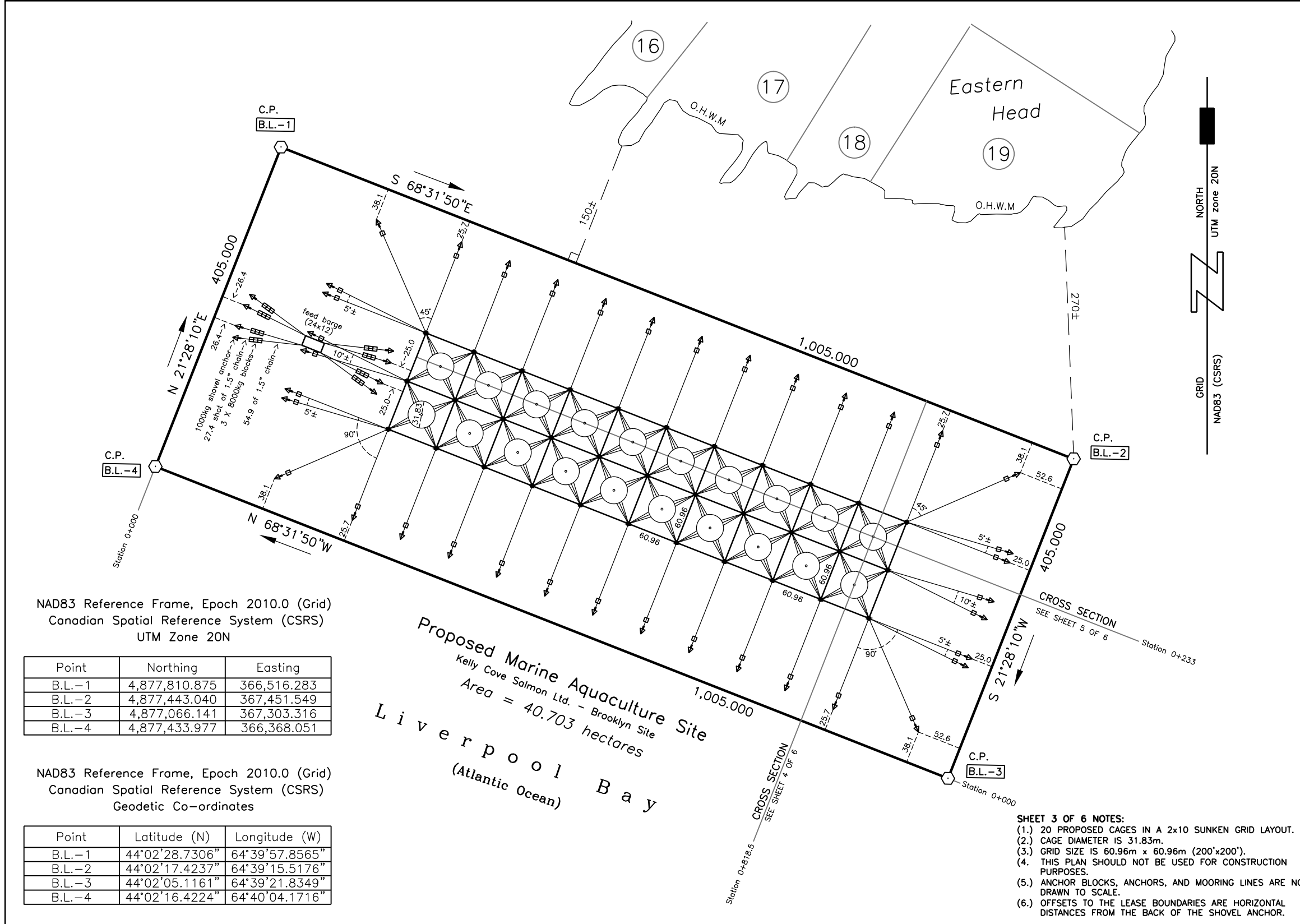
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NAD83 Reference Frame, Epoch 2010.0 (Grid)
 Canadian Spatial Reference System (CSRS)
 UTM Zone 20N

Point	Northing	Easting
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B.L.-3	44°02'05.1161"	64°39'21.8349"
B.L.-4	44°02'16.4224"	64°40'04.1716"

- SHEET 3 OF 6 NOTES:**
- (1.) 20 PROPOSED CAGES IN A 2x10 SUNKEN GRID LAYOUT.
 - (2.) CAGE DIAMETER IS 31.83m.
 - (3.) GRID SIZE IS 60.96m x 60.96m (200'x200').
 - (4.) THIS PLAN SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
 - (5.) ANCHOR BLOCKS, ANCHORS, AND MOORING LINES ARE NOT DRAWN TO SCALE.
 - (6.) OFFSETS TO THE LEASE BOUNDARIES ARE HORIZONTAL DISTANCES FROM THE BACK OF THE SHOVEL ANCHOR.

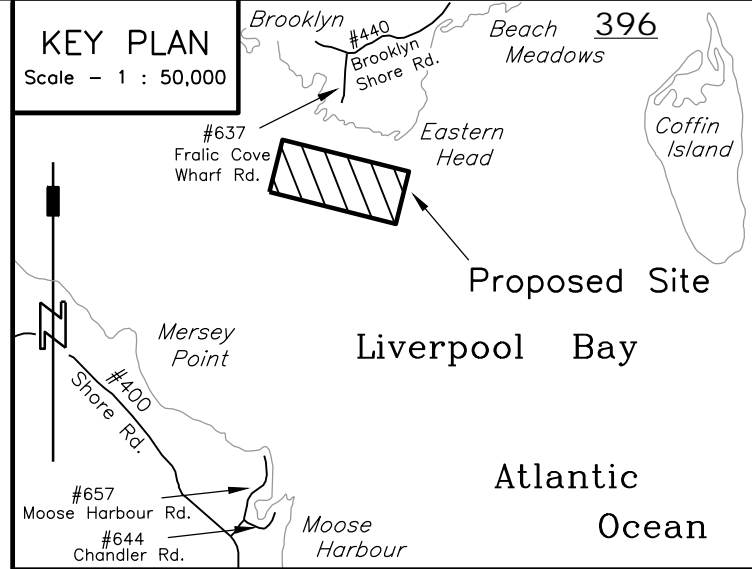
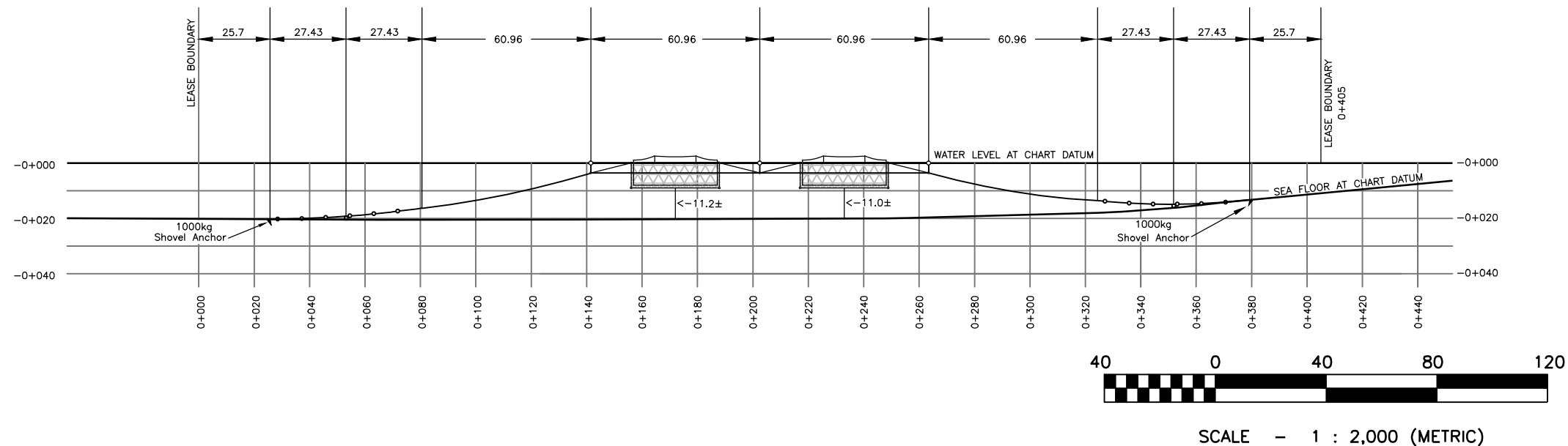
- NOTES:**
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 - (2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
 - (3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
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 - (7.) ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
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PURPOSE OF PLAN (SHEET 3 OF 6)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATIONS OF ALL ANCHORS, CAGES, AND THE GRID/MOORING CONFIGURATION RELATIVE TO THE LEASE BOUNDARIES.

SCALE - 1 : 5,000 (METRIC)

CROSS SECTION - STATION 0+818.5
 HORIZONTAL SCALE - 1 : 2,000 (METRIC)
 VERTICAL SCALE - 1 : 2,000 (METRIC)

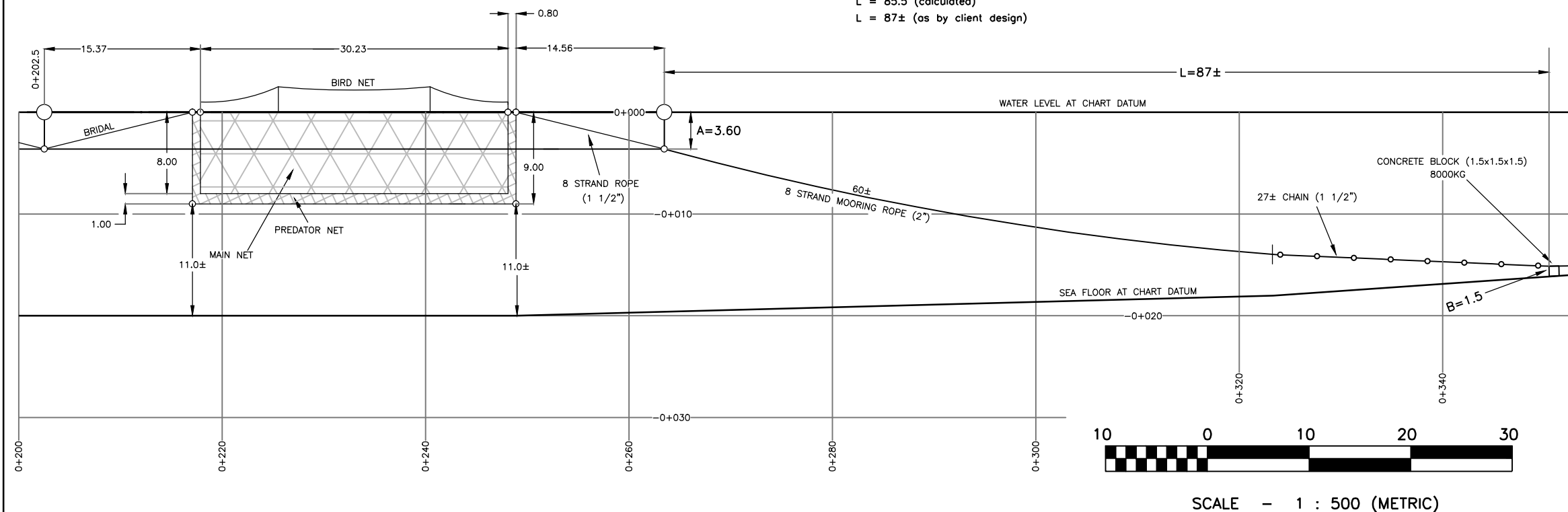


Legend:

CALCULATED POINT	.....	.C.P. (C)
CALCULATED	.....	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	.....	P.I.D. #00000000
NORTHING / EASTING	.....	N. / E.
LOCAL REGISTRY NUMBER	.....	Book: / Page:
ORDINARY HIGH WATER MARK	.....	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	.....	+ 00.0
CONCRETE MOORING	.....	□
SHOVEL ANCHOR	.....	⊕

DETAILED CROSS SECTION - STATION 0+818.5
 HORIZONTAL SCALE - 1 : 500 (METRIC)
 VERTICAL SCALE - 1 : 500 (METRIC)

5:1 Mooring Scope Calculation
 $L = [(max\ depth + max\ tide\ range) - A - B] \times 5$
 $L = [(20\pm + 2.2) - 3.6 - 1.5] \times 5$
 $L = 85.5\ (calculated)$
 $L = 87\pm\ (as\ by\ client\ design)$

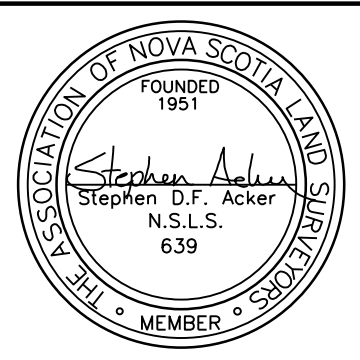


AQUACULTURE SITE DEVELOPMENT PLANS
 SHOWING
 LATERAL CROSS-SECTION
KELLY COVE SALMON LTD. / BROOKLYN SITE
 LOCATED AT:
 BROOKLYN (EASTERN HEAD), LIVERPOOL BAY
 (ATLANTIC OCEAN), QUEENS COUNTY, NOVA SCOTIA

Client's Statement
 I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.
 Dated this 14th day of January, 2019.
 Jeff Nickerson

A&D JOB #300-18-BROOKLYN
SHEET 4 OF 6 | DATE: JAN. 14, 2019

- NOTES:**
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PURPOSE OF PLAN (SHEET 4 OF 6)
 THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LATERAL CROSS SECTION AS SHOWN ON SHEET 3 OF 6, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

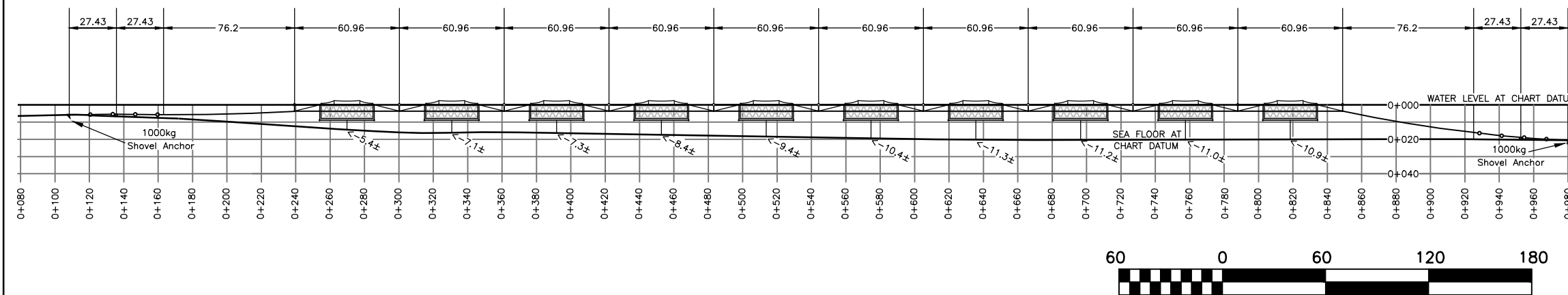
- (1.) THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
- (2.) FOR HORIZONTAL LOCATION OF EACH CROSS SECTION SEE SHEET 3 OF 5.
- (3.) DISTANCES FROM SEA FLOOR MAY VARY DEPENDING ON TIDE AND CURRENT.
- (4.) DISTANCES FROM SEA FLOOR ARE APPROXIMATE ONLY.
- (5.) DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).

Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors & Professional Engineers

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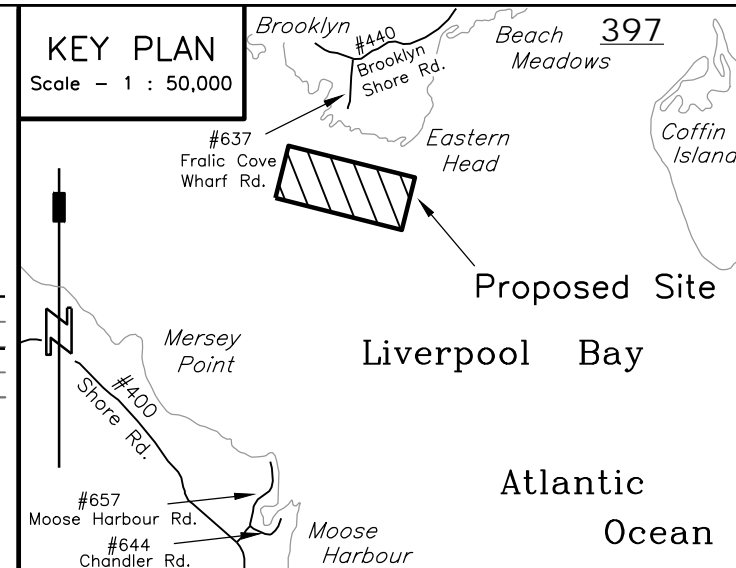
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 info@adsurveying.ca

CROSS SECTION - STATION 0+233
 HORIZONTAL SCALE - 1 : 3,000 (METRIC)
 VERTICAL SCALE - 1 : 3,000 (METRIC)

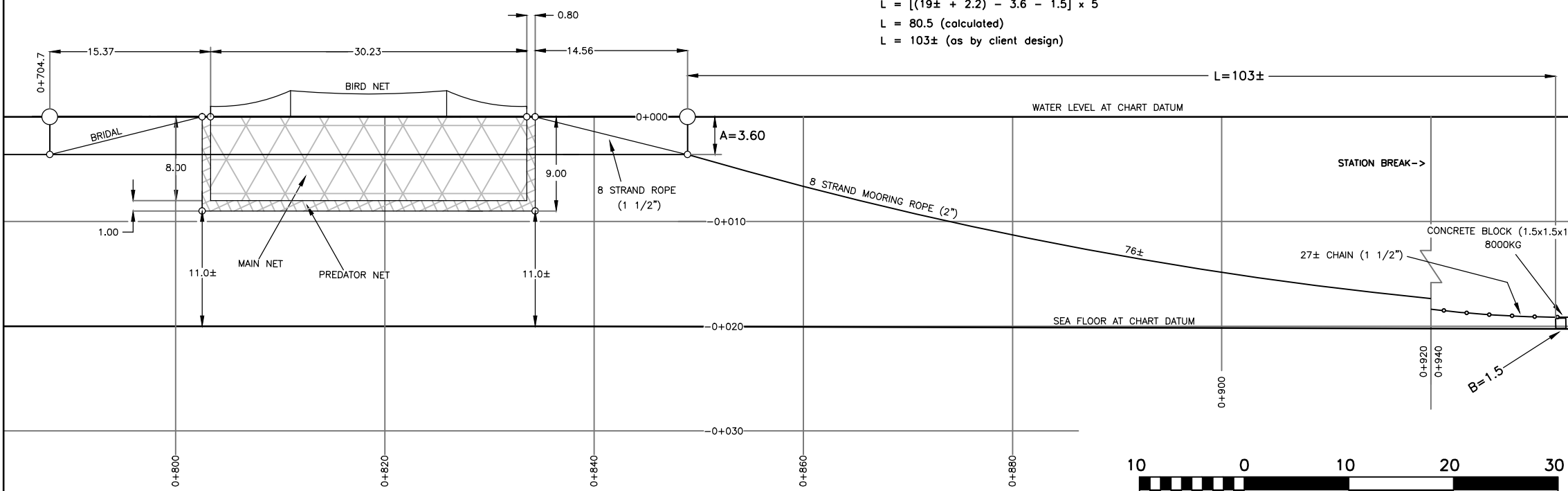


SCALE - 1 : 3,000 (METRIC)

KEY PLAN
 Scale - 1 : 50,000



DETAILED CROSS SECTION - STATION 0+233
 HORIZONTAL SCALE - 1 : 500 (METRIC)
 VERTICAL SCALE - 1 : 500 (METRIC)



SCALE - 1 : 500 (METRIC)

5:1 Mooring Scope Calculation
 $L = [(max\ depth + max\ tide\ range) - A - B] \times 5$
 $L = [(19\pm + 2.2) - 3.6 - 1.5] \times 5$
 $L = 80.5\ (calculated)$
 $L = 103\pm\ (as\ by\ client\ design)$

Legend:

CALCULATED POINT	.....	C.P. ○
CALCULATED	.....	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	.....	P.I.D. #00000000
NORTHING / EASTING	.....	N. / E.
LOCAL REGISTRY NUMBER	.....	Book: / Page:
ORDINARY HIGH WATER MARK	.....	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	.....	+ 00.0
CONCRETE MOORING	.....	□
SHOVEL ANCHOR	.....	⚓

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
 LONGITUDINAL CROSS-SECTION
KELLY COVE SALMON LTD. / BROOKLYN SITE
 LOCATED AT:
 BROOKLYN (EASTERN HEAD), LIVERPOOL BAY
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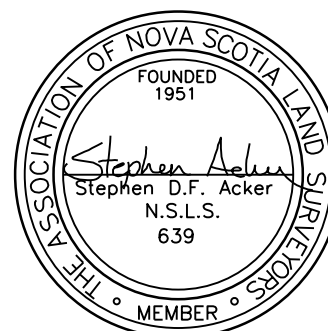
Jeff Nickerson

A&D JOB #300-18-BROOKLYN

SHEET 5 OF 6 | DATE: JAN. 14, 2019

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PURPOSE OF PLAN (SHEET 5 OF 6)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LONGITUDINAL CROSS SECTION AS SHOWN ON SHEET 3 OF 6, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

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- FOR HORIZONTAL LOCATION OF EACH CROSS SECTION SEE SHEET 3 OF 5.
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Acker & Doucette Surveying Inc.
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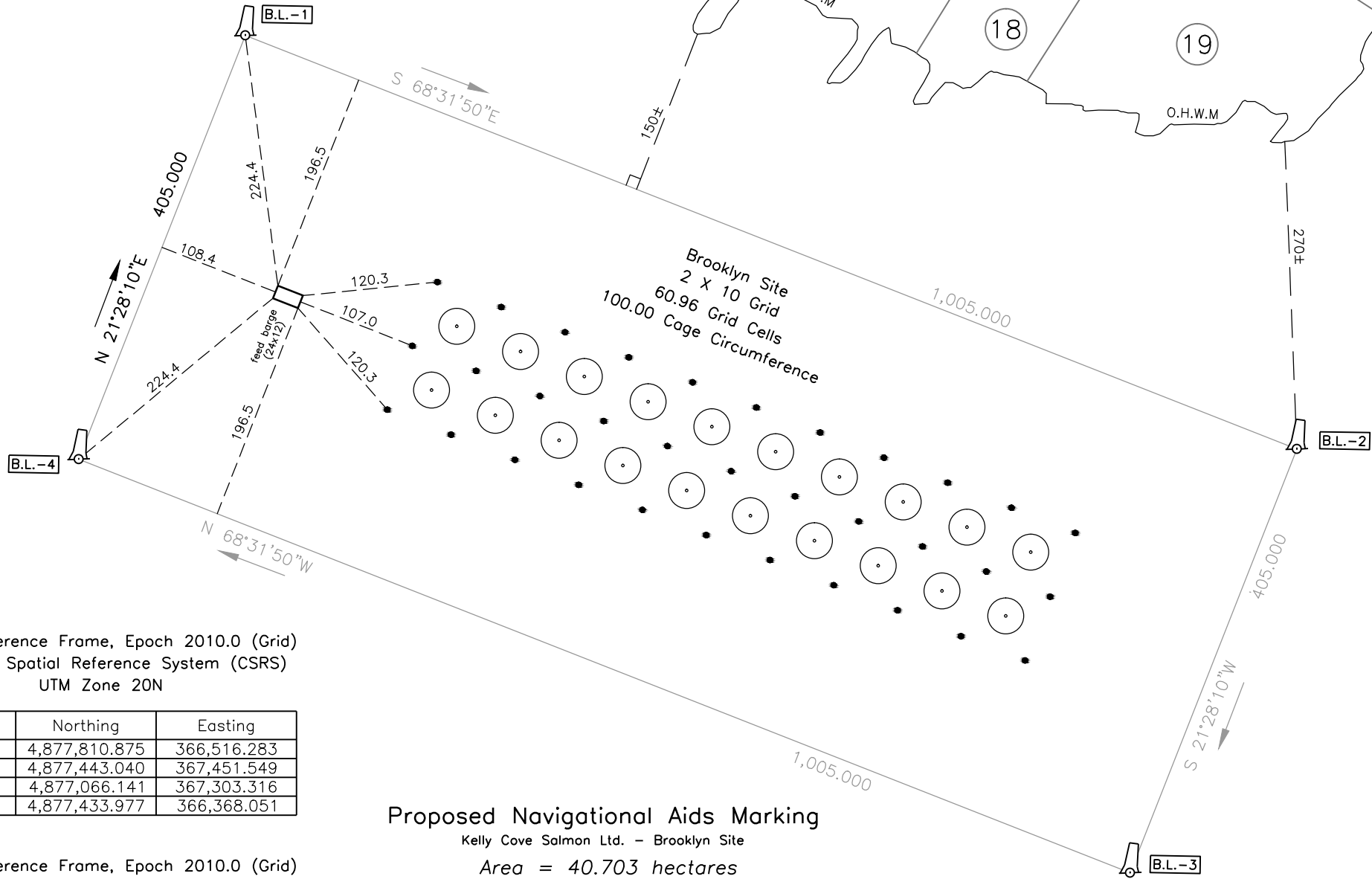
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Phone: (902) 875-2110
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- = compensator buoys (yellow)
- = aquaculture cages (31.83m diameter)
- ⚓ = cautionary buoy (yellow)



NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

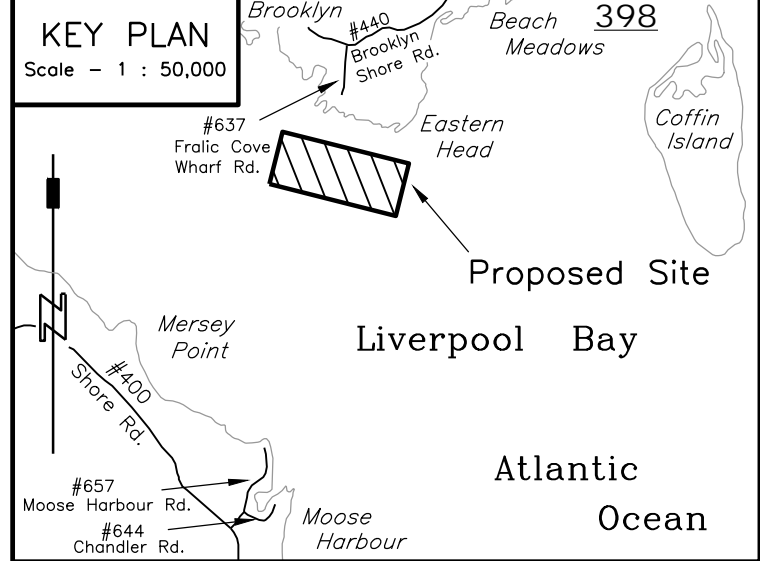
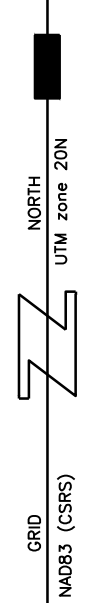
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B.L.-2	4,877,443.040	367,451.549
B.L.-3	4,877,066.141	367,303.316
B.L.-4	4,877,433.977	366,368.051

Proposed Navigational Aids Marking
Kelly Cove Salmon Ltd. - Brooklyn Site
Area = 40.703 hectares

NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
B.L.-1	44°02'28.7306"	64°39'57.8565"
B.L.-2	44°02'17.4237"	64°39'15.5176"
B.L.-3	44°02'05.1161"	64°39'21.8349"
B.L.-4	44°02'16.4224"	64°40'04.1716"

Liverpool Bay
(Atlantic Ocean)



- Legend:**
- CALCULATED POINT c.p. ○
 - CALCULATED (c.)
 - N.S. PROPERTY IDENTIFICATION NUMBER P.I.D. #00000000
 - NORTHING / EASTING N. / E.
 - LOCAL REGISTRY NUMBER Book: / Page:
 - ORDINARY HIGH WATER MARK O.H.W.M.
 - BOUNDARY DEALT WITH BY THIS PLAN
 - OTHER BOUNDARY
 - TIE LINES
 - NOT TO SCALE
 - MAJOR CONTOURS
 - MINOR CONTOURS
 - DEPTH SOUNDINGS + 00.0
 - CONCRETE MOORING
 - SHOVEL ANCHOR

AQUACULTURE SITE DEVELOPMENT PLANS
SHOWING
PROPOSED NAVIGATIONAL AIDS MARKING PLAN
KELLY COVE SALMON LTD. / BROOKLYN SITE
LOCATED AT:
BROOKLYN (EASTERN HEAD), LIVERPOOL BAY
(ATLANTIC OCEAN), QUEENS COUNTY, NOVA SCOTIA

Client's Statement

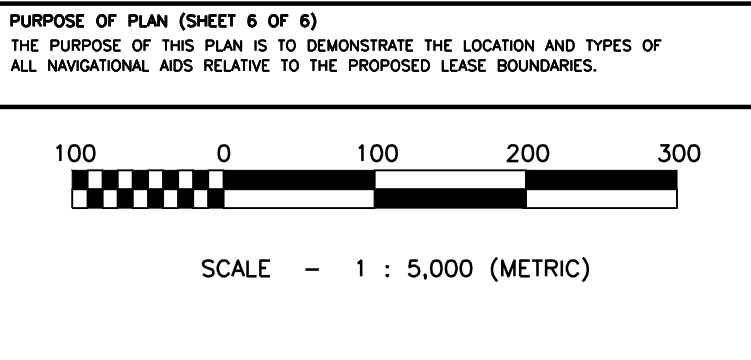
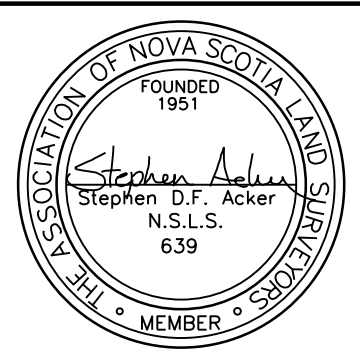
I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 14th day of January, 2019.

Jeff Nickerson

A&D JOB #300-18-BROOKLYN
SHEET 6 OF 6 | **DATE: JAN. 14, 2019**

- NOTES:**
- (1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 - (2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
 - (3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
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Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

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80B Ohio Road, P.O. Box 367
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Phone: (902) 648-2186
www.adsurveying.ca

Phone: (902) 875-2110
info@adsurveying.ca

MEMORANDUM

To: Transport Canada

From: Lynn Winfield, Licensing Coordinator, Aquaculture Division
Nova Scotia Department of Fisheries and Aquaculture

CC: Matthew King, GIS Analyst
Nathaniel Feindel, Manager of Aquaculture Development
Joe Hanrahan, Coastal Resource Coordinator

Date: June 27, 2019

RE: New Aquaculture Application No. 1433 (Mersey Point) – Queens County
Aquaculture Network Review

Attention Transport Canada, Kelly Cove Salmon Ltd. has submitted a new aquaculture application #1433 for the marine finfish cage cultivation of Atlantic salmon. The site is located in Liverpool Bay (Mersey Point), Queens County. Consider this correspondence as a formal request by the Nova Scotia Department of Fisheries and Aquaculture to process this application for Navigation Protection Act approval/authorization.

Please find attached information relating to the following aquaculture Marine Finfish application:

Application No.:	1433
Applicant:	Kelly Cove Salmon Ltd.
Application Type:	New Marine Aquaculture Site
Species:	Atlantic salmon
Cultivation Type:	Marine cage cultivation
Location:	Liverpool Bay, Queens County

To facilitate the screening process, NSDFA offers the following points of information:

1. Following the review of the application by our Network Partners, this application will be provided to the Aquaculture Review Board for final decision;
2. The applicant is making application to Transport Canada for an authorization under the Navigation Protection Act for the placement of marine cages.

We request that you review and submit all components that pertain to this application and provide NSDFA with confirmation should an authorization be issued under the Navigation Protection Act.

Note: We require a written (mail/email) response from each of our review agencies in order to process this application. You may contact me at by phone at 902-875-7440 or email Lynn.Winfield@novascotia.ca if you have any questions.

Sincerely,



Lynn Winfield,
Licensing Coordinator

Aquaculture Licence/Lease Application
Mersey Point



Office Use Only

File Number: AG 1433Date: March 6, 2019Received By: Lynn + Nathaniel

Aquaculture Licence/Lease Application

Applicant Information

Applicant: Kelly Cove Salmon Ltd.Phone: (902) 875-8603 Cell Phone: (902) 275-7493Fax Number: _____ Email Address: jnickerson@cookeaqua.comMailing Address: P.O. Box 33; Bridgewater, NS B4V 2W6Civic Address: 134 North St. Unit B; Bridgewater, NS B4V 2W6*Civic address in Nova Scotia where your daily records will be kept with respect to the Aquaculture operation.*Authorized Contact(s): Jeff NickersonContact Phone: (902) 275-7493 Email: jnickerson@cookeaqua.com

Company Information (if different from above)

Company Name: _____

Mailing Address: _____

Civic Address: _____

Civic address in Nova Scotia where your daily records will be kept with respect to the Aquaculture operation.

Business Phone: _____ Cell Phone: _____

Fax Number: _____ Email Address: _____

Registry of Joint Stocks Number: _____

Revenue Canada Business Number: 89709485

Shareholder's Registration (please attach)



Location Information

Location of Proposed Site

Civic (*land-based*): _____

Municipality/Town: Liverpool

County: Queens County

Waterbody (*if applicable*): Liverpool Bay

Operation Details

Species Cultured:

Finfish: Atlantic salmon (*Salmo salar*)

Shellfish: _____

Marine Plants _____

Other: _____

Term:

Experimental (1 year) Commercial land-based (*Licence - 10 years*)

Commercial marine (*Licence - 10 years; Lease 20 years*)

Landbased:

Fresh Water Salt Water Hatchery

U-Fish Nursery Grow-Out

Marine:

Finfish Operation Marine Plants Shellfish - Suspended

Shellfish - Bottom culture, without gear Shellfish - Bottom culture, with gear

For the purpose of assessing aquaculture applications, it is necessary to provide information to other government departments and interested public. Confidential business information is not released to the public. By signing this application, the applicant agrees to the Department releasing application information about the proposed development.

[Redacted Signature]

Signature of Applicant

Signature of Applicant

[Redacted Signature]

Feb 13/19
Date

4 March 6, 2019
Date

For additional information please visit:

<http://novascotia.ca/fish/programs-and-services/industry-support-services/aquaculture/>

Submit completed application and all required documentation to:

Nova Scotia Department of Fisheries and Aquaculture
Attention: Aquaculture Division
1575 Lake Road
Shelburne, Nova Scotia
B0T1W0

Telephone Number: 902 875-7439
Fax Number: 902 875-7429

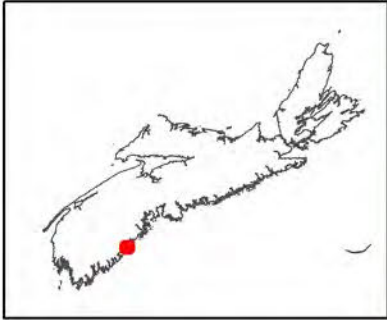
SCHEDULE A
GPS COORDINATE INFORMATION SHEET

Note: The coordinates and dimensions for this site have been taken a legal survey.

Application #:	1433		
Applicant:	Kelly Cove Salmon Ltd.		
Location:	Liverpool Bay	County:	Queens
Hydrographic Chart:	4211	Orthophoto #:	
Dimensions of site:	Approx. 405m x 1005m x 405m 1005m	Size:	Approx. 40.70 ha

Approximate Coordinates of Application:

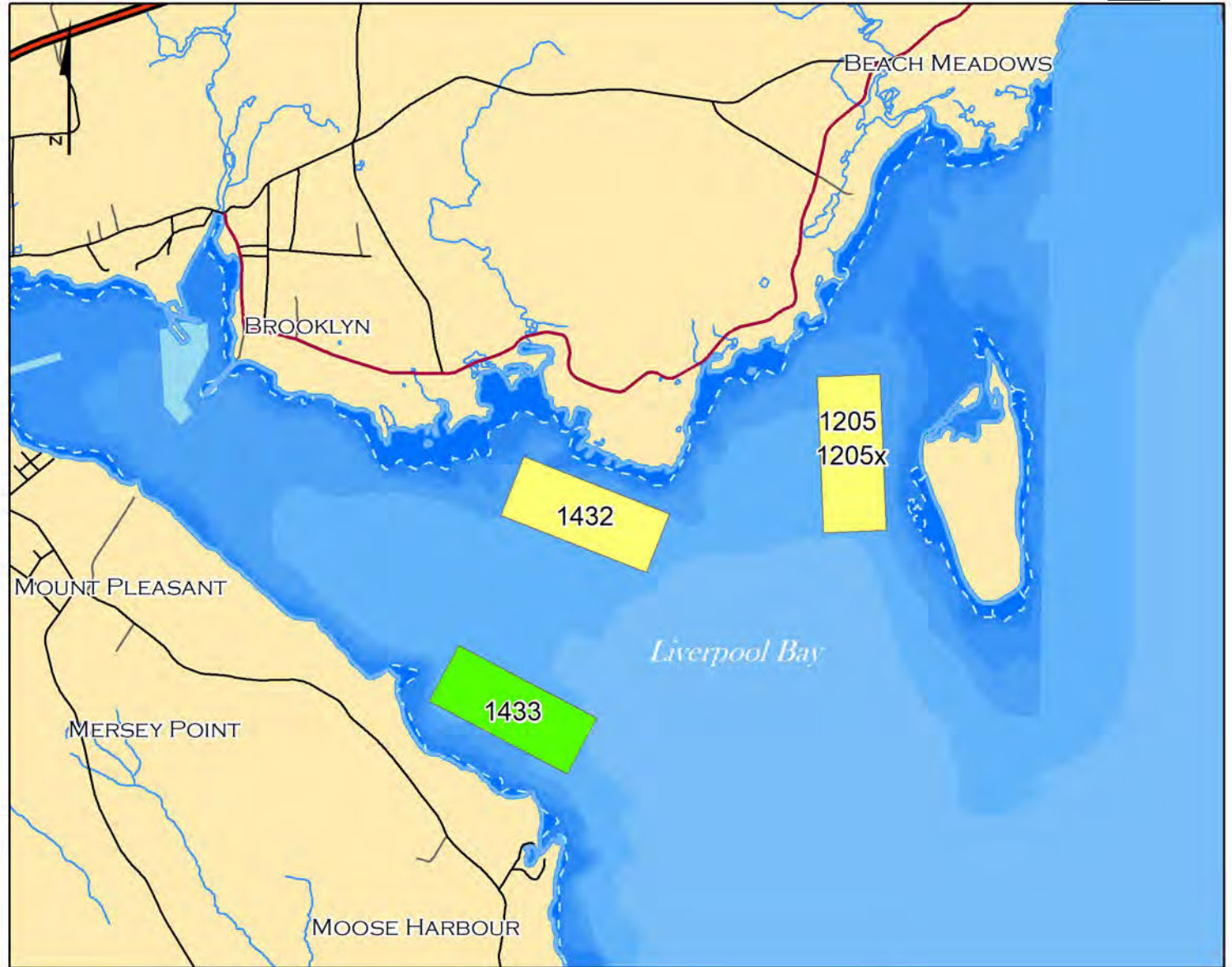
Datum used:	NAD 83				
Centre coordinates (approx.)	Lat.	44° 01' 35.90"			
	Long.	-64° 40' 00.47"			
Corner #1	Lat.	44° 01' 49.22"	Corner #2	Lat.	44° 01' 34.61"
	Long.	-64° 40' 15.68"		Long.	-64° 39' 35.35"
Corner #3	Lat.	44° 01' 22.88"	Corner #4	Lat.	44° 01' 37.49"
	Long.	-64° 39' 43.51"		Long.	-64° 40' 23.85"



**Aquaculture Site
1433**

Centre
 Lat 44° 01' 35.90" Long -64° 40' 00.47"
 Corner 1
 Lat 44° 01' 49.22" Long -64° 40' 15.68"
 Corner 2
 Lat 44° 01' 34.61" Long -64° 39' 35.35"
 Corner 3
 Lat 44° 01' 22.88" Long -64° 39' 43.51"
 Corner 4
 Lat 44° 01' 37.49" Long -64° 40' 23.85"

DATUM NAD 83
 The above coordinates
 are from a legal survey



Application Information

Proponents : Kelly Cove Salmon Ltd.
 Site Location : Liverpool Bay
 Dimensions : Approx. 405m x 1005m x 405m x 1005m
 Area : Approx. 40.70 ha

- Proposed Application
- Other Issued Lease
- Other Proposed Lease
- OMHW Mark
- Low Water Mark

Species: Atlantic Salmon

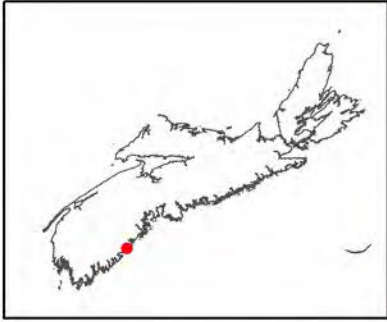
Chart No.
4211



Disclaimer

This map should not be used for navigation or legal purposes. It is intended for general reference use only.

MK-1433-APR-2019



**Aquaculture Site
1433**

Centre

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Corner 1

Lat 44° 01' 49.22" Long -64° 40' 15.68"

Corner 2

Lat 44° 01' 34.61" Long -64° 39' 35.35"

Corner 3

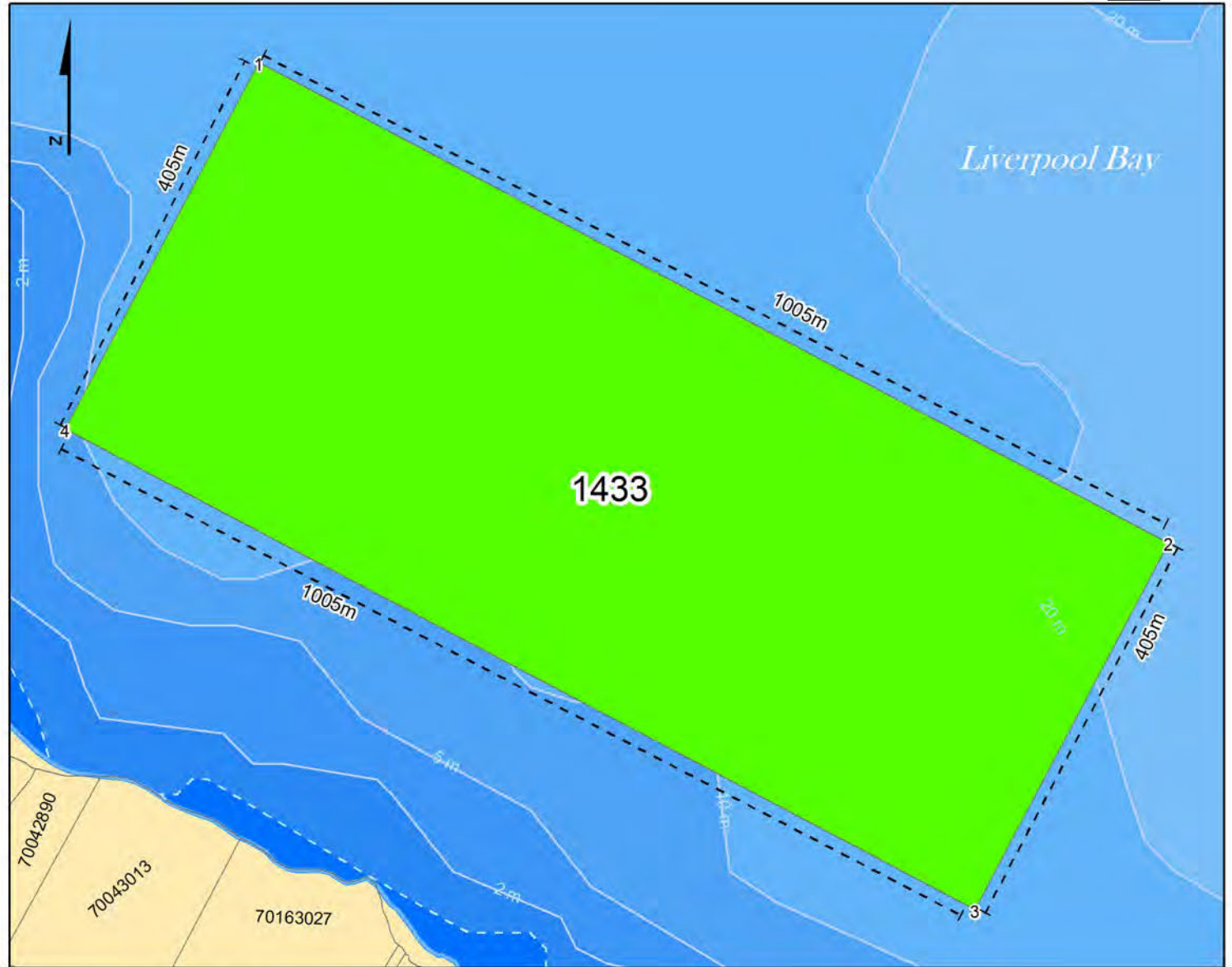
Lat 44° 01' 22.88" Long -64° 39' 43.51"

Corner 4

Lat 44° 01' 37.49" Long -64° 40' 23.85"

DATUM NAD 83

The above coordinates are from a legal survey



Application Information

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- Proposed Application
- Other Issued Lease
- Other Proposed Lease
- OMHW Mark
- NS Bathymetry
- Low Water Mark

Species: Atlantic Salmon

Chart No.

4211



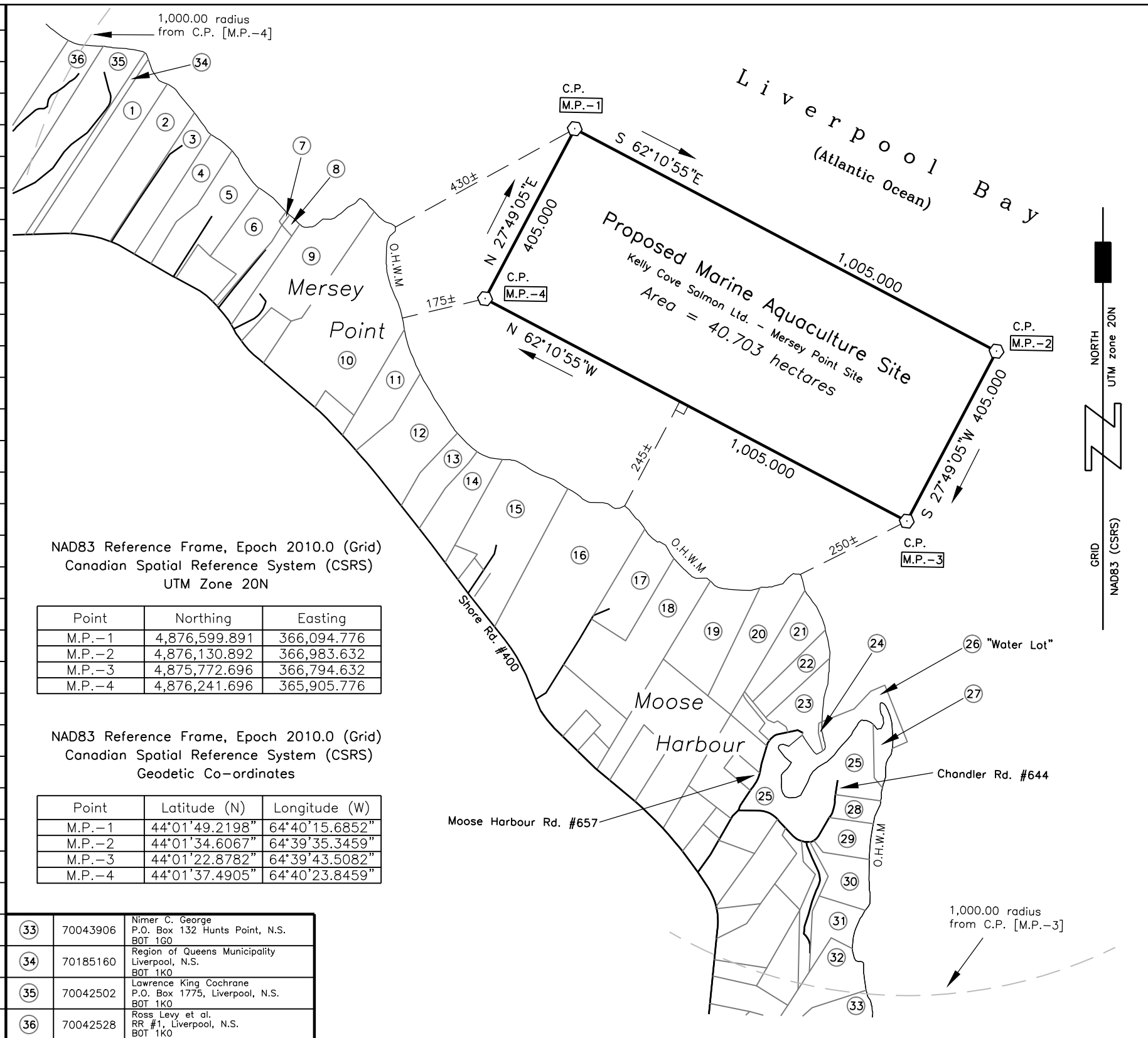
Disclaimer

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MK-1433-APR-2019

Mersey Point

#	P.I.D. #	OWNER / ADDRESS
1	70042551	Cindy Lorene Hartlen 2 Dresden Ct., Lower Sackville, N.S. B4C 3W8
2	70042577	Gordon Levy RR #1, Liverpool, N.S. BOT 1K0
3	70042619	John P. Doucette et al. P.O. Box 1752, Liverpool, N.S. BOT 1K0
4	70216825	Ann Louise Levy P.O. Box 751, Liverpool, N.S. BOT 1K0
5	70228986	Peter Lee Stewart et ux. RR #1, Liverpool, N.S. BOT 1K0
6	70042684	Carey McKiel P.O. Box 353, Yellowknife, N.T. X1A 2N3
7	70042692	Carey McKiel P.O. Box 353, Yellowknife, N.T. X1A 2N3
8	70230677	Kenneth Andrews et ux. P.O. Box 1661, Liverpool, N.S. BOT 1K0
9	70229133	Thomas H. Randall et ux. P.O. Box 910, Liverpool, N.S. BOT 1K0
10	70042783	Michael Kenneth Lohnes et ux. RR #1, Liverpool, N.S. BOT 1K0
11	70245204	Dr. R. Myers Professional Corp. 569 Shore Rd., Liverpool, N.S. BOT 1K0
12	70245212	David R. Myers 130 Whitecap Ridge, Black Point, N.S., BOJ 1B0
13	70245220	Dr. R. Myers Professional Corp. 569 Shore Rd., Liverpool, N.S. BOT 1K0
14	70042890	Roger V. Savage et ux. 611 Shore Rd., Liverpool, N.S. BOT 1K0
15	70043013	Ronald Henry Miller et ux. RR #1, 643 Shore Rd., Liverpool, BOT 1K0
16	70163027	Angus William Smyth et ux. 163 GB 13, Site 5, RR #1 Sand Beach Rd., Liverpool, BOT 1K0
17	70261284	David Thomas Wright et al. 695 Shore Rd., Mersey Point, N.S. BOT 1K0
18	70043054	Angus William Smyth et ux. 163 GB 13, Site 5, RR #1 Sand Beach Rd., Liverpool, BOT 1K0
19	70043286	Phillip Irwin Brooklyn, N.S. BOJ 1H0
20	70043294	Donald Whynot P.O. Box 948, Liverpool, N.S. BOT 1K0
21	70043633	Victor A. Frank et ux. 76 Clouser Rd., Littlestown, PA., U.S.A., 17340-9541
22	70043625	Michael T. Ashcroft et al. 28 Tremaine Ter, Cobourg, ON., K9A 5A8
23	70043617	John O'Brien et ux. 10 RR #4, Hill Country Dr., Stouffville, Ont., L4A 7X5
24	70247960	H.M. in right of Canada (D.F.O.) P.O. Box 698, Halifax, N.S. B3J 2T9
25	70043682	Mersey Seafoods Limited P.O. Box 1290, Liverpool, N.S. BOT 1K0
26	70247952	H.M. in right of Canada (D.F.O.) P.O. Box 698, Halifax, N.S. B3J 2T9
27	70043690	H.M. in right of Canada P.O. Box 1724, Liverpool, N.S. BOT 1K0
28	70043666	Wayne F. Rafuse et ux. P.O. Box 204, Liverpool, N.S. BOT 1K0
29	70043609	Bettina Herdt 37 AM Wiesengrund Offenbach Germany, D-63075
30	70043641	Sheila A. Rear et ux. 3049 Gavin Pl., Duluth, GA., U.S.A. 30096
31	70189972	Matthew P. Kuruc et ux. 340 Crescent, Leonia, N.J., U.S.A. 07605
32	70043914	2220092 Ontario Inc. 2489 Bloor St., Toronto, Ontario M6S 1R6
33	70043906	Nimer C. George P.O. Box 132 Hunts Point, N.S. BOT 1G0
34	70185160	Region of Queens Municipality Liverpool, N.S. BOT 1K0
35	70042502	Lawrence King Cochrane P.O. Box 1775, Liverpool, N.S. BOT 1K0
36	70042528	Ross Levy et al. RR #1, Liverpool, N.S. BOT 1K0

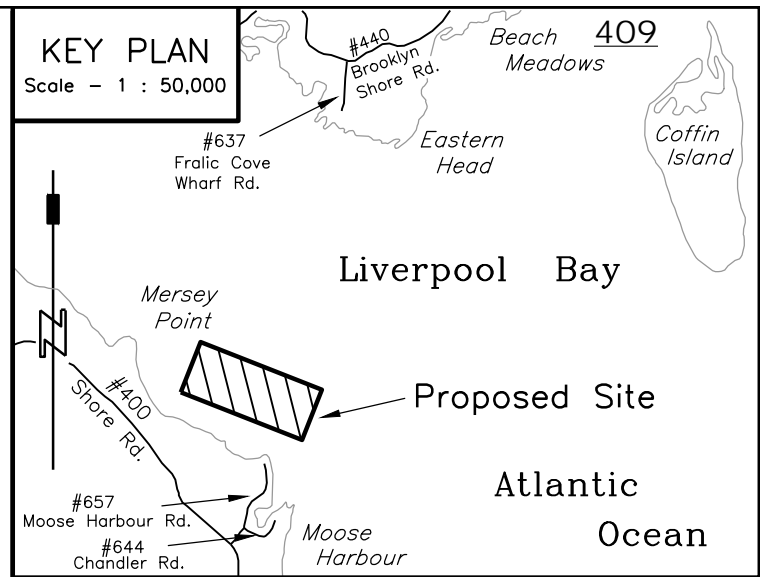


NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
M.P.-1	4,876,599.891	366,094.776
M.P.-2	4,876,130.892	366,983.632
M.P.-3	4,875,772.696	366,794.632
M.P.-4	4,876,241.696	365,905.776

NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
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Legend:

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- CALCULATED (c.)
- N.S. PROPERTY IDENTIFICATION NUMBER P.I.D. #0000000
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- LOCAL REGISTRY NUMBER Book: / Page:
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- DEPTH SOUNDINGS + 00.0
- CONCRETE MOORING □
- SHOVEL ANCHOR ⚓

AQUACULTURE SITE DEVELOPMENT PLANS
SHOWING
AQUACULTURE SITE APPLICATION
KELLY COVE SALMON LTD. / MERSEY POINT
LOCATED AT:
MERSEY POINT, LIVERPOOL BAY (ATLANTIC OCEAN),
QUEENS COUNTY, NOVA SCOTIA

Client's Statement

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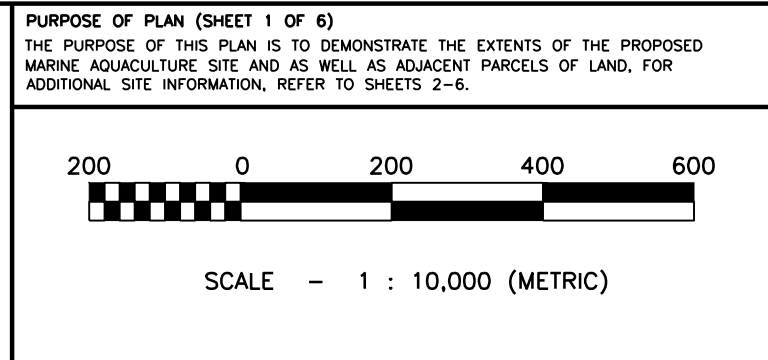
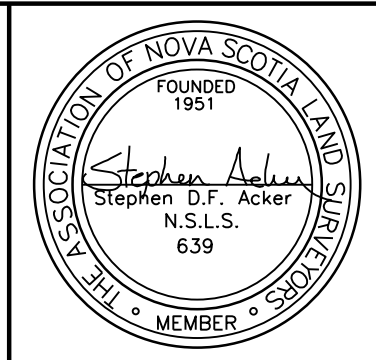
Dated this 18th day of January, 2019.

Jeff Nickerson

A&D JOB #300-18-MERSEY POINT
SHEET 1 OF 6 DATE: January 18, 2019

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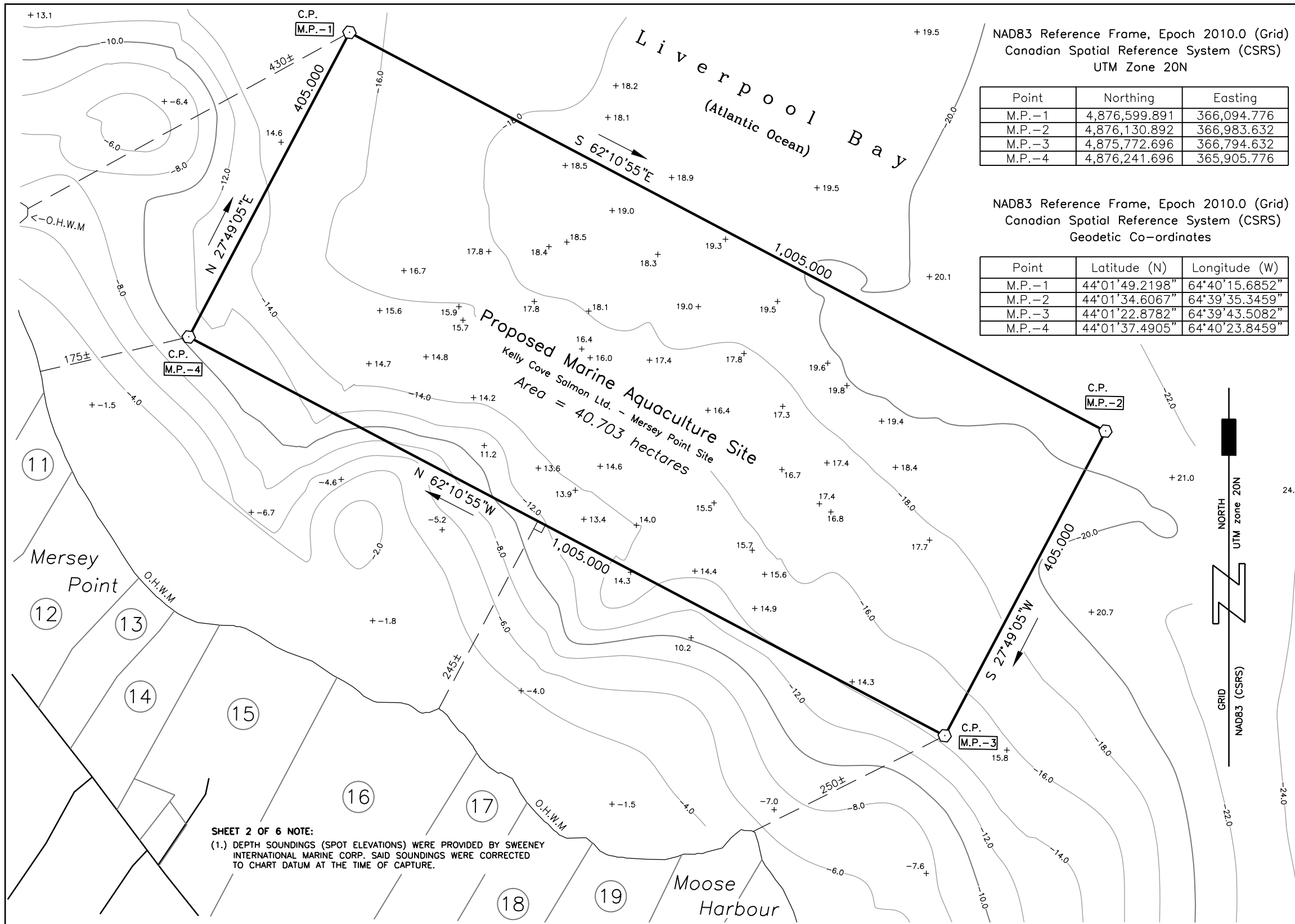
Acker & Doucette Surveying Inc.
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KEY PLAN
Scale - 1 : 50,000

Legend:

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- MAJOR CONTOURS
- MINOR CONTOURS
- DEPTH SOUNDINGS + 00.0
- CONCRETE MOORING □
- SHOVEL ANCHOR

AQUACULTURE SITE DEVELOPMENT PLANS
SHOWING
BASIC SEAFLOOR TOPOGRAPHY
KELLY COVE SALMON LTD. / MERSEY POINT
LOCATED AT:
MERSEY POINT, LIVERPOOL BAY (ATLANTIC OCEAN),
QUEENS COUNTY, NOVA SCOTIA

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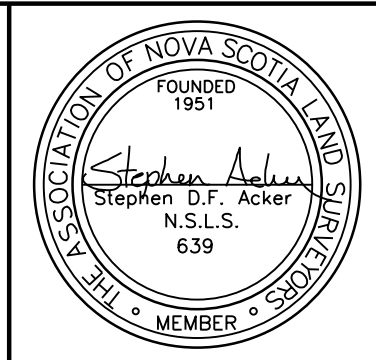
Dated this 18th day of January, 2019.

Jeff Nickerson

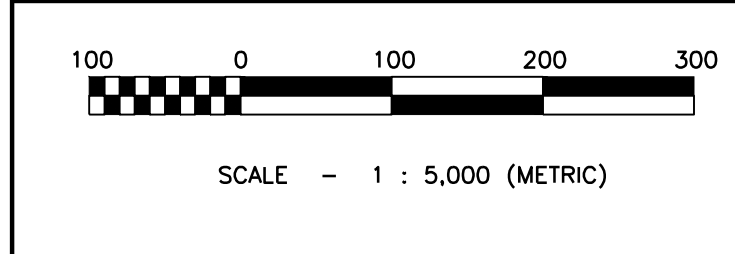
A&D JOB #300-18-MERSEY POINT
SHEET 2 OF 6 | **DATE: January 18, 2019**

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PURPOSE OF PLAN (SHEET 2 OF 6)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND BASIC SEAFLOOR TOPOGRAPHY, FOR ADDITIONAL ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1, 3-6.



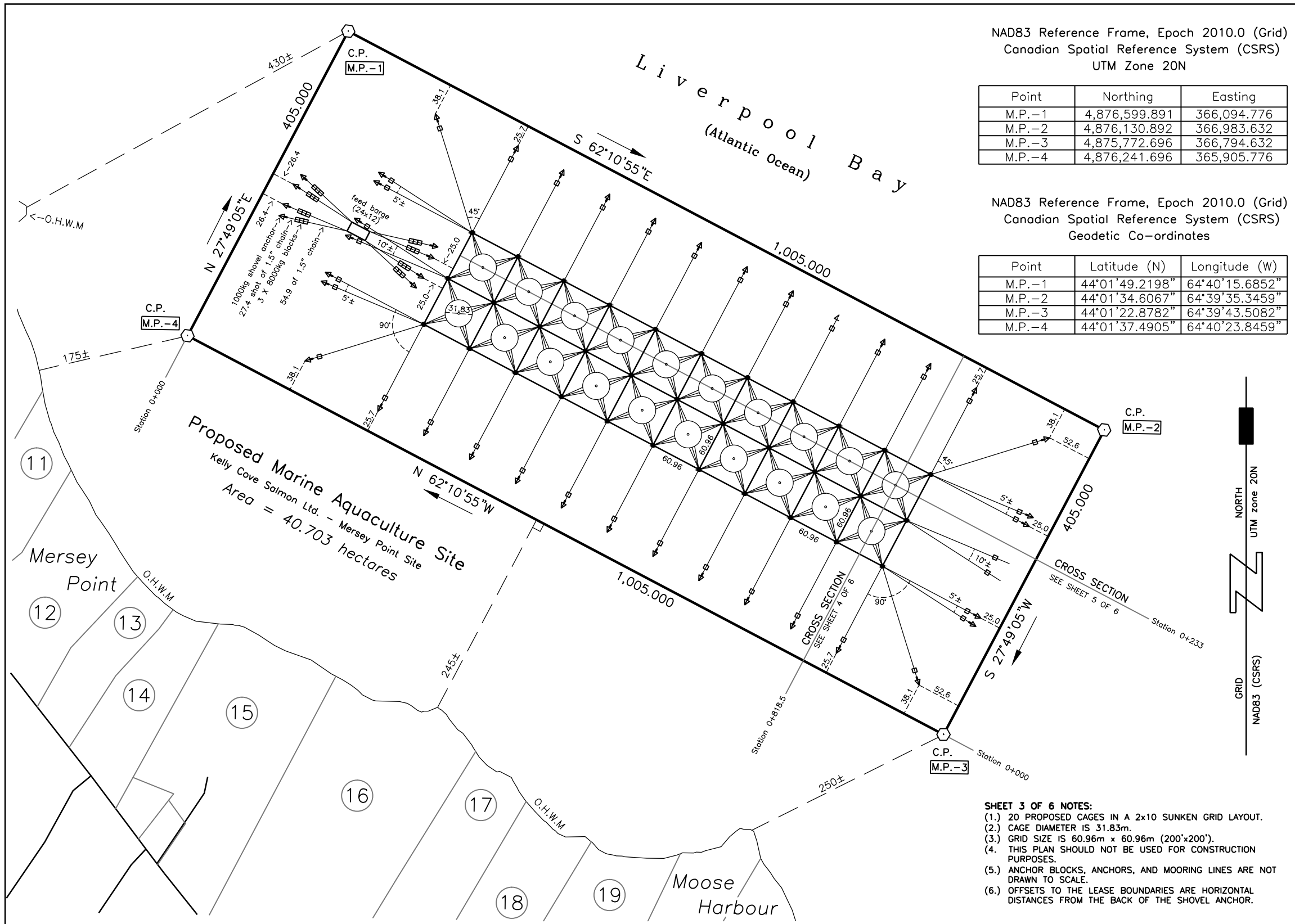
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B0W 3M0

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Phone: (902) 875-2110
info@adsurveying.ca

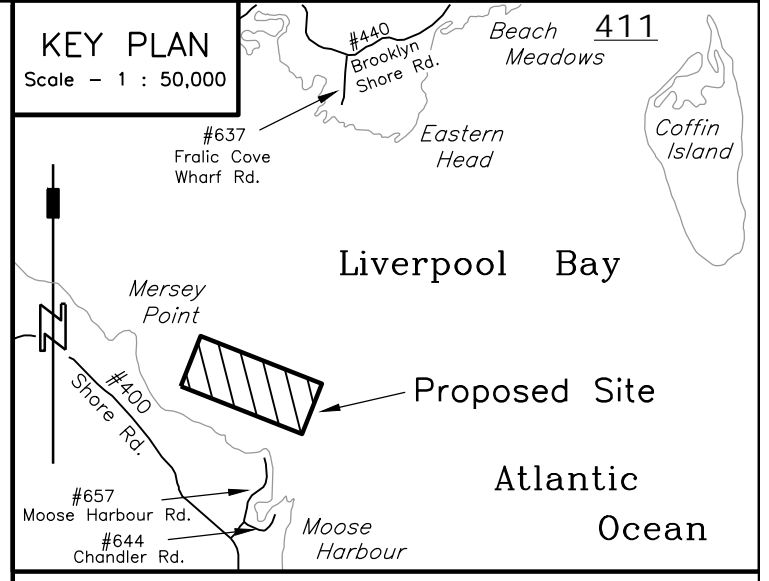


NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
M.P.-1	4,876,599.891	366,094.776
M.P.-2	4,876,130.892	366,983.632
M.P.-3	4,875,772.696	366,794.632
M.P.-4	4,876,241.696	365,905.776

NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
M.P.-1	44°01'49.2198"	64°40'15.6852"
M.P.-2	44°01'34.6067"	64°39'35.3459"
M.P.-3	44°01'22.8782"	64°39'43.5082"
M.P.-4	44°01'37.4905"	64°40'23.8459"



Legend:

CALCULATED POINT	..... C.P. (c)
CALCULATED	..... (c.)
N.S. PROPERTY IDENTIFICATION NUMBER	..... P.I.D. #00000000
NORTHING / EASTING	..... N. / E.
LOCAL REGISTRY NUMBER	..... Book: / Page:
ORDINARY HIGH WATER MARK	..... O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	..... + 00.0
CONCRETE MOORING	.....
SHOVEL ANCHOR	.....

AQUACULTURE SITE DEVELOPMENT PLANS
SHOWING
AQUACULTURE CAGE CONFIGURATION
KELLY COVE SALMON LTD. / MERSEY POINT
LOCATED AT:
MERSEY POINT, LIVERPOOL BAY (ATLANTIC OCEAN),
QUEENS COUNTY, NOVA SCOTIA

Client's Statement

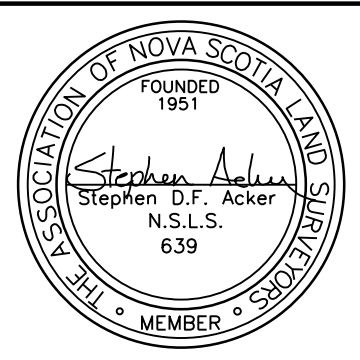
I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 18th day of January, 2019.

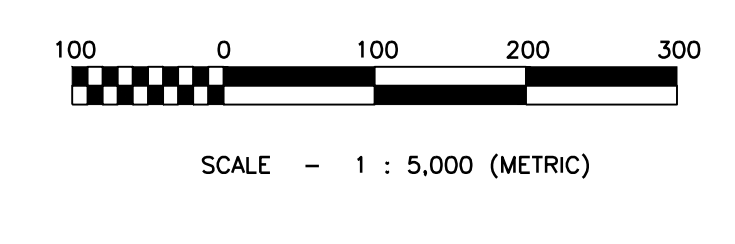
Jeff Nickerson

A&D JOB #300-18-MERSEY POINT
SHEET 3 OF 6 | **DATE: January 18, 2019**

- NOTES:**
- (1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 - (2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
 - (3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
 - (4.) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
 - (5.) SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
 - (6.) NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
 - (7.) ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
 - (8.) ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).



PURPOSE OF PLAN (SHEET 3 OF 6)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATIONS OF ALL ANCHORS, CAGES, AND THE GRID/MOORING CONFIGURATION RELATIVE TO THE LEASE BOUNDARIES.



Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

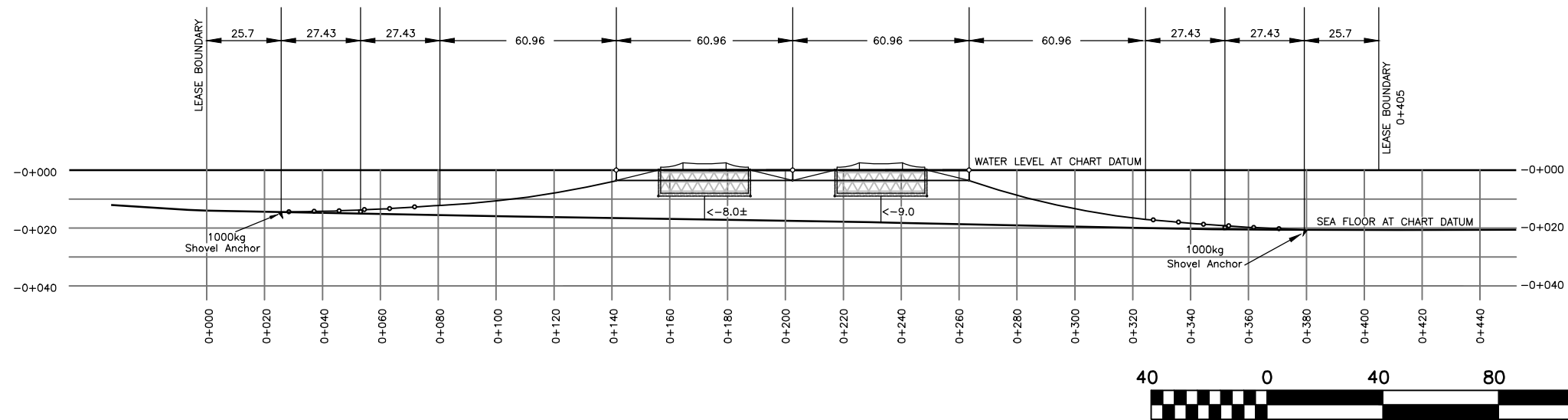
4083 Highway #308, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
B0W 3M0

80B Ohio Road, P.O. Box 367
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Phone: (902) 648-2186
www.adsurveying.ca

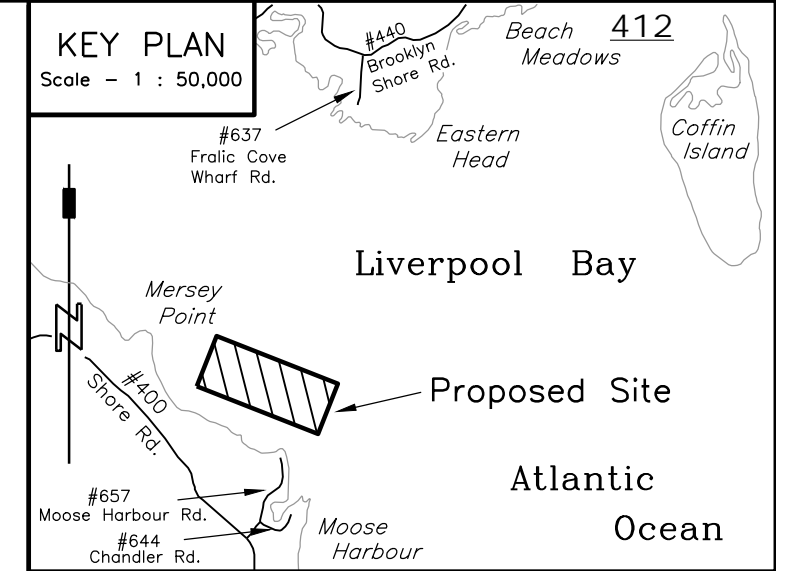
Phone: (902) 875-2110
info@adsurveying.ca

CROSS SECTION - STATION 0+818.5
 HORIZONTAL SCALE - 1 : 2,000 (METRIC)
 VERTICAL SCALE - 1 : 2,000 (METRIC)



SCALE - 1 : 2,000 (METRIC)

KEY PLAN
 Scale - 1 : 50,000

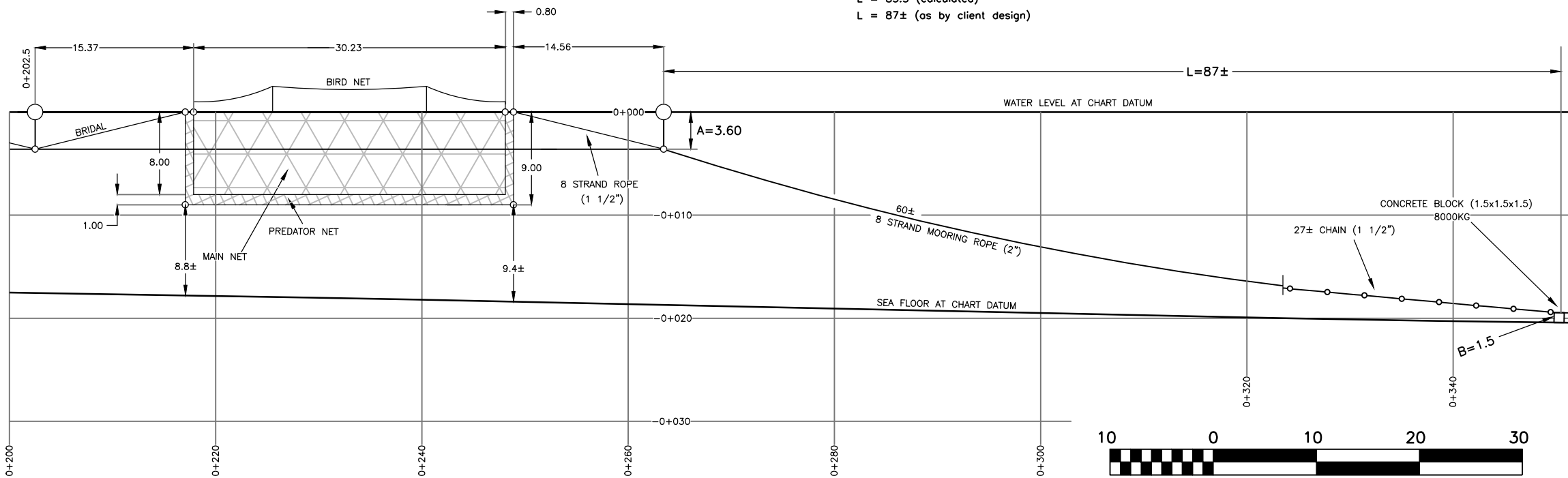


Legend:

CALCULATED POINT . . . . .	.c.p. ⊙
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	_____
OTHER BOUNDARY	_____
TIE LINES	-----
NOT TO SCALE	~~~~~
MAJOR CONTOURS	_____
MINOR CONTOURS	_____
DEPTH SOUNDINGS	+ 00.0
CONCRETE MOORING	□
SHOVEL ANCHOR	⊕

DETAILED CROSS SECTION - STATION 0+818.5
 HORIZONTAL SCALE - 1 : 500 (METRIC)
 VERTICAL SCALE - 1 : 500 (METRIC)

5:1 Mooring Scope Calculation
 $L = [(max\ depth + max\ tide\ range) - A - B] \times 5$
 $L = [(20\pm + 2.2) - 3.6 - 1.5] \times 5$
 $L = 85.5\ (calculated)$
 $L = 87\pm\ (as\ by\ client\ design)$



SCALE - 1 : 500 (METRIC)

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
 LATERAL CROSS-SECTION
 KELLY COVE SALMON LTD. / MERSEY POINT
 LOCATED AT:
 MERSEY POINT, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 18th day of January, 2019.

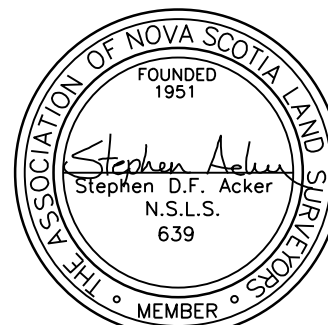
Jeff Nic

A&D JOB #300-18-MERSEY POINT

SHEET 4 OF 6 | DATE: January 18, 2019

NOTES:

- ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
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- NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
- ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
- ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).



PURPOSE OF PLAN (SHEET 4 OF 6)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LATERAL CROSS SECTION AS SHOWN ON SHEET 3 OF 6, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

- THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
- FOR HORIZONTAL LOCATION OF EACH CROSS SECTION SEE SHEET 3 OF 5.
- DISTANCES FROM SEA FLOOR MAY VARY DEPENDING ON TIDE AND CURRENT.
- DISTANCES FROM SEA FLOOR ARE APPROXIMATE ONLY.
- DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).



Acker & Doucette Surveying Inc.

Nova Scotia Land Surveyors &
 Professional Engineers

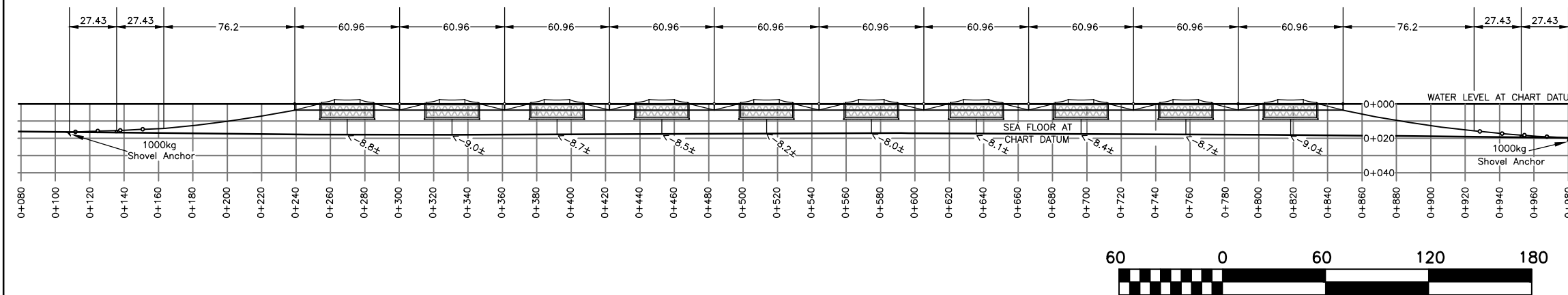
4083 Highway #308, P.O. Box 64
 Tusket, Yarmouth County
 Nova Scotia, Canada
 B0W 3M0

Phone: (902) 648-2186
 www.adsurveying.ca

80B Ohio Road, P.O. Box 367
 Shelburne, Shelburne County
 Nova Scotia, Canada
 B0T 1W0

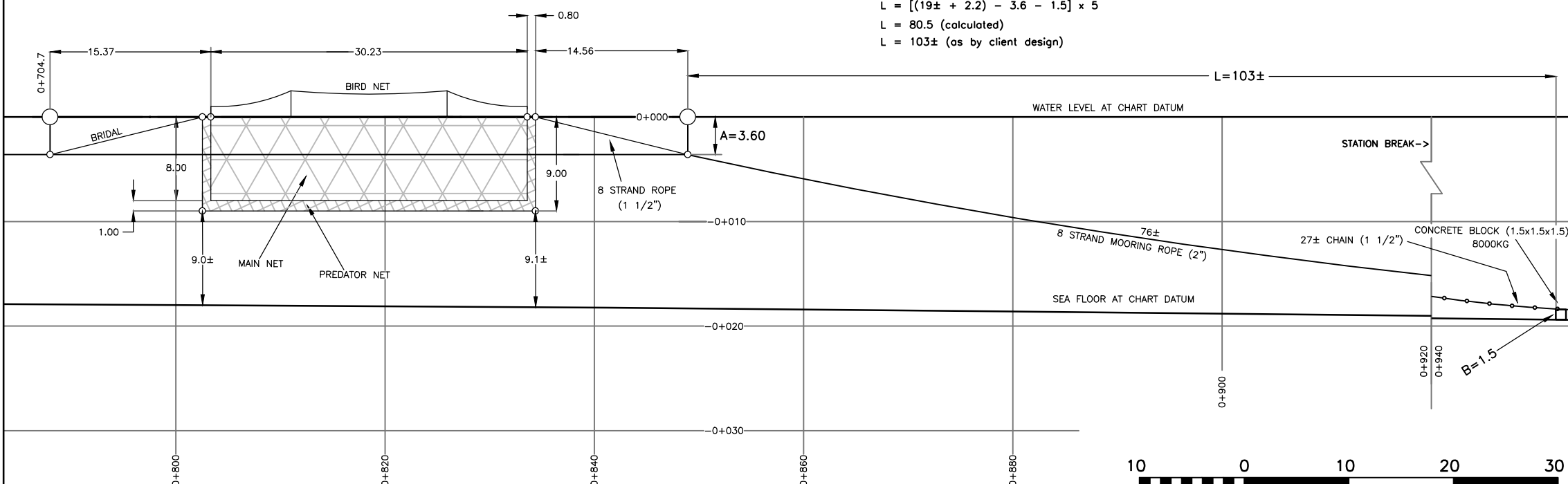
Phone: (902) 875-2110
 info@adsurveying.ca

CROSS SECTION - STATION 0+233
 HORIZONTAL SCALE - 1 : 3,000 (METRIC)
 VERTICAL SCALE - 1 : 3,000 (METRIC)



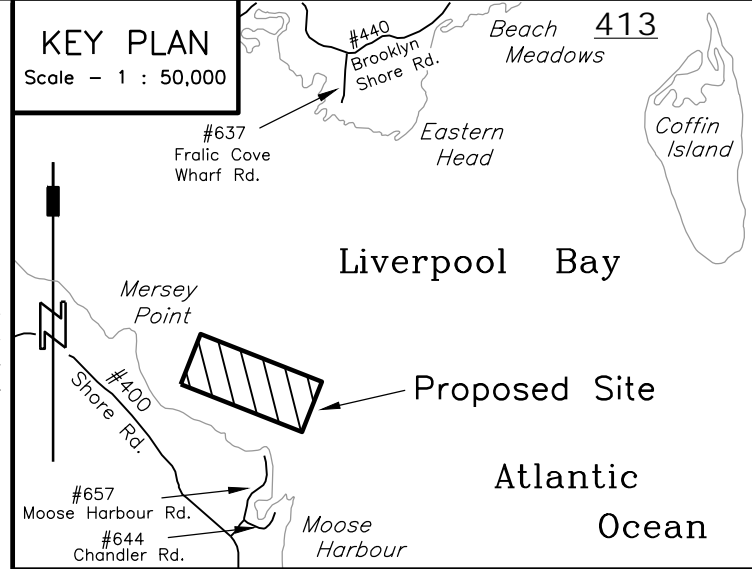
SCALE - 1 : 3,000 (METRIC)

DETAILED CROSS SECTION - STATION 0+233
 HORIZONTAL SCALE - 1 : 500 (METRIC)
 VERTICAL SCALE - 1 : 500 (METRIC)



SCALE - 1 : 500 (METRIC)

5:1 Mooring Scope Calculation
 $L = [(max\ depth + max\ tide\ range) - A - B] \times 5$
 $L = [(19\pm + 2.2) - 3.6 - 1.5] \times 5$
 $L = 80.5\ (calculated)$
 $L = 103\pm\ (as\ by\ client\ design)$



Legend:

CALCULATED POINT	.....	C.P. (c.)
CALCULATED	.....	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	.....	P.I.D. #00000000
NORTHING / EASTING	.....	N. / E.
LOCAL REGISTRY NUMBER	.....	Book / Page
ORDINARY HIGH WATER MARK	.....	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	.....	+ 00.0
CONCRETE MOORING	.....
SHOVEL ANCHOR	.....

AQUACULTURE SITE DEVELOPMENT PLANS
 SHOWING
 LONGITUDINAL CROSS-SECTION
KELLY COVE SALMON LTD. / MERSEY POINT
 LOCATED AT:
 MERSEY POINT, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA

Client's Statement

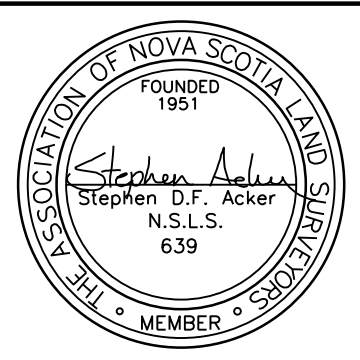
I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this _____ 2019

Jeff Nickerson

A&D JOB #300-18-MERSEY POINT
 SHEET 5 OF 6 | DATE: January 18, 2019

- NOTES:**
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PURPOSE OF PLAN (SHEET 5 OF 6)
 THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LONGITUDINAL CROSS SECTION AS SHOWN ON SHEET 3 OF 6, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

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- (4) DISTANCES FROM SEA FLOOR ARE APPROXIMATE ONLY.
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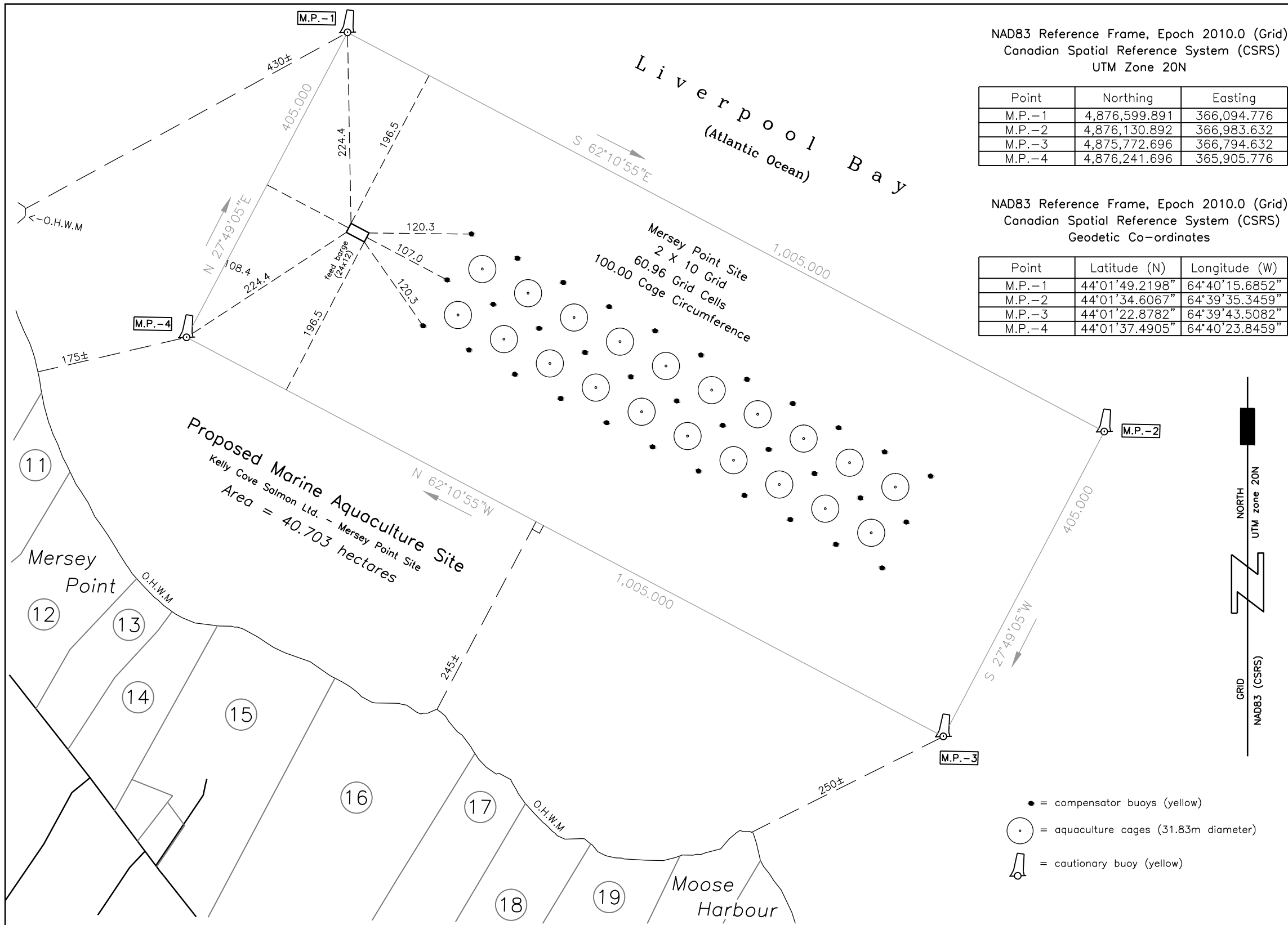
Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
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 B0T 3M0

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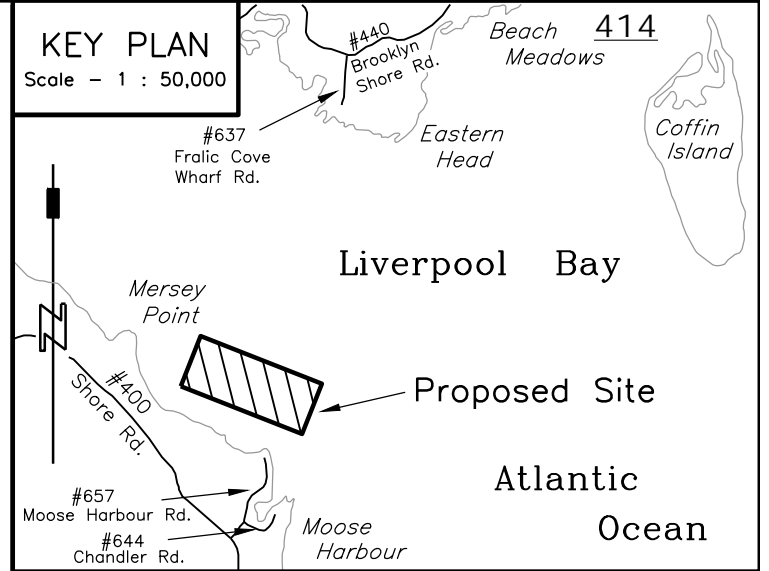


NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
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M.P.-4	44°01'37.4905"	64°40'23.8459"



Legend:

CALCULATED POINTC.P. ○
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	.....	.N. / E.
LOCAL REGISTRY NUMBER	.....	.Book: / Page:
ORDINARY HIGH WATER MARK	.....	.O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	.....	+ 00.0
CONCRETE MOORING	.....	□
SHOVEL ANCHOR	.....	⚓

AQUACULTURE SITE DEVELOPMENT PLANS
SHOWING
PROPOSED NAVIGATIONAL AIDS MARKING PLAN
KELLY COVE SALMON LTD. / MERSEY POINT
LOCATED AT:
MERSEY POINT, LIVERPOOL BAY (ATLANTIC OCEAN),
QUEENS COUNTY, NOVA SCOTIA

Client's Statement

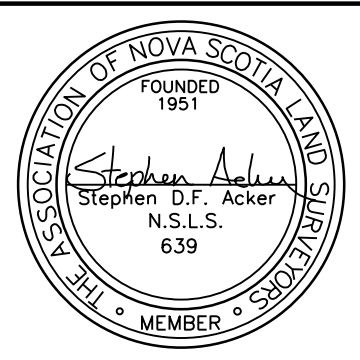
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Dated this 18th day of January, 2019.

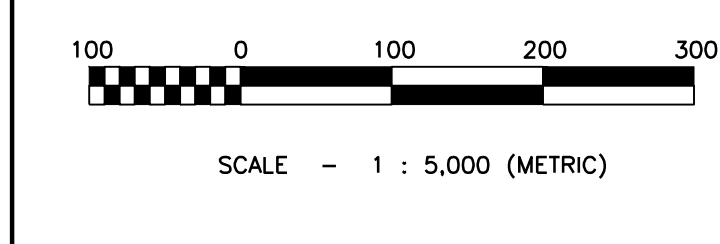
Jeff Nickerson

A&D JOB #300-18-MERSEY POINT
SHEET 6 OF 6 | DATE: January 18, 2019

- NOTES:**
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PURPOSE OF PLAN (SHEET 6 OF 6)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATION AND TYPES OF ALL NAVIGATIONAL AIDS RELATIVE TO THE PROPOSED LEASE BOUNDARIES.



Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
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NAVIGATION PROTECTION ACT (NPA) NOTICE OF WORKS FORM

WARNING: Any false or misleading statement with respect to this form and supporting documentation, including the misrepresentation of a material fact, may result in the refusal to authorize or issue Approval, or result in the suspension or cancellation of an Approval obtained through fraudulent means.

PRIOR TO COMPLETING THIS FORM:

1. Determine if your project is on a navigable water listed on the Schedule to the NPA. A *Notice to the Minister* is required for works on scheduled navigable waters. Works on non-scheduled navigable waters may be eligible to opt in; if requesting Opt-in, the Opt-in annex must be included with your *Notice to the Minister*.
2. Self assess your project against the *Minor Works Order* to determine if a *Notice to the Minister* is required. Links to the NPA Schedule, Order and Regulations can be accessed through the Navigation Protection Program (NPP) website at <http://www.tc.gc.ca/eng/programs-621.html>.

PURPOSE	
<p>This <i>Notice of Works Form</i> and its supporting documentation (as well as other relevant information) which may be required for a review by Transport Canada (TC), once completed and submitted, comprise the <i>Notice to the Minister</i> as required under the NPA. For assistance in completing your submission, refer to the guidance provided on the NPP website under "Apply to the NPP" including the <i>Guide to the Navigation Protection Program's Notification, Application and Review Requirements</i>.</p>	
SUPPORTING DOCUMENTATION REQUIREMENTS	
<p>Mandatory Information Checklist (incomplete information will be returned with no action)</p> <p><input checked="" type="checkbox"/> Completed and signed "Notice of Works Form" with all mandatory fields completed</p> <p><input checked="" type="checkbox"/> Map showing location of project¹</p> <p><input checked="" type="checkbox"/> Top/Plan drawing with dimensions¹</p> <p><input checked="" type="checkbox"/> Side/Profile drawing with dimensions¹</p> <p>¹ 6 copies if hard copy submission</p>	<p>Recommended Information (may expedite your review)</p> <p><input checked="" type="checkbox"/> Body of water details</p> <p><input checked="" type="checkbox"/> Land use/Ownership information</p> <p><input checked="" type="checkbox"/> Body of water use information</p> <p><input checked="" type="checkbox"/> Impacts, obstructions and mitigation plans</p> <p><input checked="" type="checkbox"/> Any environmental review information</p> <p><input checked="" type="checkbox"/> Operation, maintenance and marking plans</p> <p><input type="checkbox"/> Photographs of work site and body of water</p> <p><input type="checkbox"/> Aboriginal consultation results</p> <p><input checked="" type="checkbox"/> Other government agencies involved</p> <p><input type="checkbox"/> Water lot lease information</p> <p><input type="checkbox"/> Opt-in request annex (non-scheduled navigable waters only)</p>
<p>When submitting a Notice to the Minister, owners should note:</p> <ul style="list-style-type: none"> All plans and drawings must be legible when printed on 11" x 17" paper For e-mail submissions, provide a scan of all relevant supporting documentation Your completed Notice to the Minister should be sent to the appropriate regional office as outlined below 	
TRANSPORT CANADA NAVIGATION PROTECTION PROGRAM REGIONAL OFFICE LOCATIONS	
<p>Pacific Region 820-800 Burrard Street Vancouver BC V6Z 2J8 Telephone: 604-775-8867 Email: NPPPAC-PPNPAC@tc.gc.ca</p>	<p>Prairie and Northern Region Canada Place 1100-9700 Jasper Ave Edmonton AB T5J 4E6 Telephone: 780-495-8215 Email: NPPPNR-PPNRPN@tc.gc.ca</p>
<p>Headquarters (For info on the NPP and NPA ONLY) Notices not processed at this office Tower C, 330 Sparks Street, 18th Floor Ottawa ON K1A 0N5 Telephone: 613-991-3476 Email: NPPHQ-PPNAC@tc.gc.ca</p>	<p>Quebec Region 401-1550 d'Estimauville Avenue, 5th Floor Quebec QC G1J 0C8 Telephone: 877-646-6420 Email: PPNQUE-NPPQUE@tc.gc.ca</p>
<p>Ontario Region 100 South Front Street, 1st Floor Sarnia ON N7T 2M4 Telephone: 519-383-1863 Email: NPPONT-PPNONT@tc.gc.ca</p>	<p>Atlantic Region 95 Foundry Street, 6th Floor P.O. Box 42 Moncton NB E1C 8K6 Telephone: 506-851-3113 Email: NPPATL-PPNATL@tc.gc.ca</p>

NAVIGATION PROTECTION ACT NOTICE OF WORKS FORM

TC file number (if known):

 Are you the riparian property owner? Yes No

GENERAL INFORMATION			
Official and/or local name(s) of the body of water (Required) Liverpool Bay		Is the body of water listed on the schedule to the NPA? <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unknown	
Are you also requesting an Approval, if required? <input checked="" type="radio"/> Yes <input type="radio"/> No		Is this an Opt-in request? <input type="radio"/> Yes <input checked="" type="radio"/> No	
Are you representing an Aboriginal group? <input type="radio"/> Yes <input checked="" type="radio"/> No		Is the work near/on First Nations reserve or land claim? <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	
Does this project involve throwing or depositing materials in water? <input type="radio"/> Yes <input checked="" type="radio"/> No		Does this project involve dewatering a body of water? <input type="radio"/> Yes <input checked="" type="radio"/> No	
OWNER CONTACT INFORMATION ²			
Individual or company name (Required) Kelly Cove Salmon Ltd.		Contact name (Required) Jeff Nickerson	
Mailing address (Required) P.O.Box 33			
City/Town (Required) Bridgewater		Province/Territory (Required) Nova Scotia	Postal code (Required) B4V 2W6
Primary telephone number (Required) 902-275-7493	Other telephone number	E-mail jnickerson@cookeaque.com	
Owner's agent/mandatary (contractor/consultant/representative/co-proponent, if any)			
Company name Sweeney International Marine Corp.		Contact name Leah Lewis-McCrea	
Mailing address 46 Milltown Blvd.			
City/Town St. Stephen		Province/Territory NB	Postal code E3L 1G3
Primary telephone number 902-492-0359	Other telephone number	E-mail llewis@simcorp.ca	
WORK SITE INFORMATION			
Nearest municipality/county/district (Required) Liverpool, Queens County		Province/Territory (Required) Nova Scotia	
Site location such as lot, concession, section, township, range, meridian, 911 address, property identification, etc. (Required) Mersey Point aquaculture site is located in Liverpool Bay, approximately 3.8 kilometers south southeast of the town of Liverpool. The site is east of Mersey Point, between Black Point and Moose Harbour.			
Site position Latitude North (Required) Degrees <u>44</u> Minutes <u>01</u> Seconds <u>36.1</u>		Site position Longitude West (Required) Degrees <u>64</u> Minutes <u>39</u> Seconds <u>59.6</u>	
Hydro chart number: <u>4211</u>		Topo map number: _____	

Body of water details, such as characteristics, bank/bottom features, biological components, flow/tides, etc.

The Mersey Point site is located east of Mersey Point between Black Point and Moose Harbour in Liverpool Bay, occupies a 40.703 ha parcel, and is located over waters ranging from 7 - 20 m in depth. The sediment composition of the seafloor is composed primarily of cobble, rubble, and hard packed sand, with infrequent boulders.

Potential obstructions, such as natural/man-made, other works, navigation aids, etc.

This site consists of plastic circular cages and compensator buoys. The outside corners of the lease are marked with a 0.6 m buoy equipped with a light and radar reflectors. Liverpool Bay also has a marked navigation channel.

Land use/Ownership, such as past/current, private/government, rural/suburban, coastal, environmental, etc.

Kelly Cove Salmon Ltd. has submitted an application for the Mersey Point site, as described in this document.

BODY OF WATER USE INFORMATION

Navigation types (check all that apply) <input checked="" type="checkbox"/> Commercial <input checked="" type="checkbox"/> Recreational		Maximum vessel size Length _____ Width _____ Draft _____	
Traffic direction <input type="radio"/> One-way <input checked="" type="radio"/> Two-way		Manoeuvrability (check all that apply) <input type="checkbox"/> Poor <input type="checkbox"/> Good <input checked="" type="checkbox"/> Excellent	
Day/Night <input type="radio"/> Day <input type="radio"/> Night <input checked="" type="radio"/> Both	Volume <input type="radio"/> Low <input checked="" type="radio"/> Med <input type="radio"/> High	Navigation season(s) (check all that apply) <input checked="" type="checkbox"/> Winter <input checked="" type="checkbox"/> Spring <input checked="" type="checkbox"/> Summer <input checked="" type="checkbox"/> Fall	

Other uses such as cottagers, special events, fishing, etc

The area surrounding the proposed Mersey Point site is used primarily by fishing vessels traveling in and out of the port of Liverpool. Recreational vessels also frequent this area. The primary vessel traffic around the proposed site will be from vessels servicing the site.

PROJECT INFORMATION

Name of work such as bridge, dam, marina, etc. (Required) Aquaculture site	Type of work (check all that apply) (Required) <input checked="" type="checkbox"/> Construct <input type="checkbox"/> Place <input checked="" type="checkbox"/> Alter <input type="checkbox"/> Repair <input type="checkbox"/> Decommission <input type="checkbox"/> Rebuild <input checked="" type="checkbox"/> Permanent <input type="checkbox"/> Temporary <input type="checkbox"/> Remove
---	--

Brief project description (or attach) such as status, structures, operation, etc. (Required)

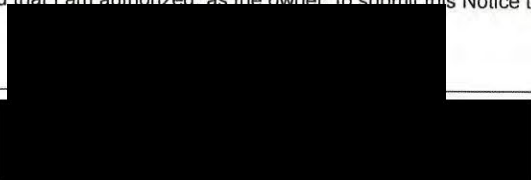
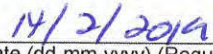
The aquaculture site consists of two strings of 10 circular 100 m circumference cages. Cages will be present on site all year round.

Method of construction such as temporary works, activities, etc. (Required)

Aquaculture site consists of anchored cage systems (see attached plans). Crews will visit the site daily to feed and maintain cage system.

Anticipated impacts such as source, severity, mitigation, marking, waste/debris management, use, cumulative, etc.

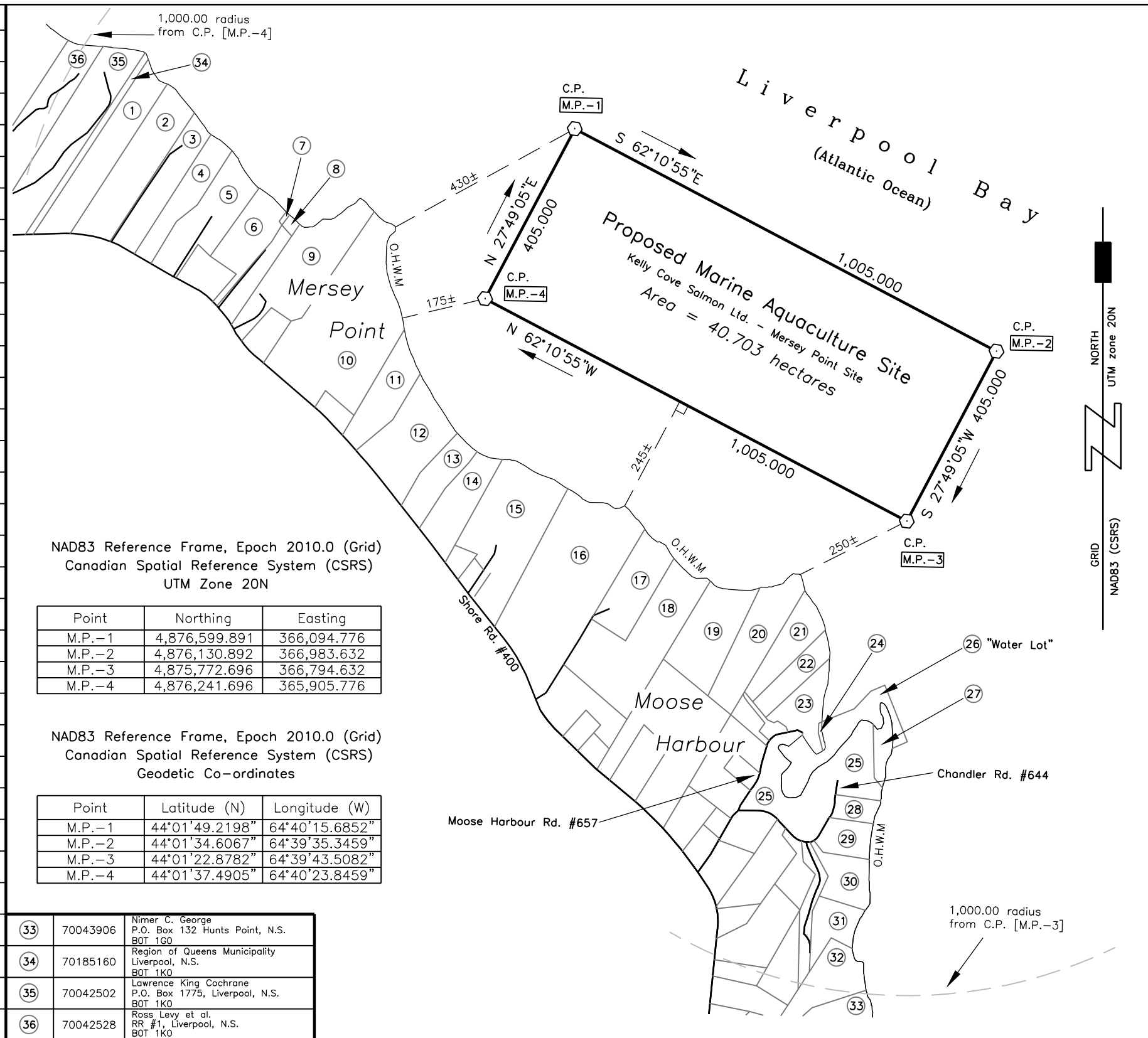
Expected start date (dd-mm-yyyy) (Required) <p style="text-align: center;">Spring 2021</p>	Expected completion date (dd-mm-yyyy) (Required) <p style="text-align: center;">Ongoing</p>
---	--

ENVIRONMENTAL REVIEW INFORMATION	
Is the work located on Federal lands? <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	Is the project a designated project under the <i>Regulations Designating Physical Activities</i> under the <i>Canadian Environmental Assessment Act, 2012</i> ? <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
Is the project subject to Northern Environmental Assessment (EA) Regime(s)? <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	If yes, identify the northern EA regime(s) that apply <input type="checkbox"/> Inuvialuit Final Agreement (IFA) <input type="checkbox"/> <i>Mackenzie Valley Resource Management Act</i> (MVRMA) <input type="checkbox"/> Nunavut Land Claims Agreement (NLCA) <input type="checkbox"/> <i>Yukon Environmental and Socio-economic Assessment Act</i> (YESAA)
Other Federal Organizations involved	
<input checked="" type="checkbox"/> Canadian Environmental Assessment Agency (CEAA) <input checked="" type="checkbox"/> Fisheries and Oceans Canada (DFO) <input type="checkbox"/> Major Projects Management Office (MPMO) <input type="checkbox"/> Aboriginal Affairs and Northern Development Canada (AANDC)	<input type="checkbox"/> Environment Canada (EC) <input type="checkbox"/> Natural Resources Canada (NRCan) <input type="checkbox"/> Northern Projects Management Office (NPMO) <input type="checkbox"/> Other: _____
OWNER AUTHORIZATION ²	
I hereby certify that the information contained herein and in any of the supporting documents is complete, true and accurate to the best of my knowledge and belief, and that I am authorized, as the owner, to submit this Notice to the Minister.	
 _____ Print Name (Required)	 _____ Date (dd-mm-yyyy) (Required)
FOR OFFICE USE ONLY	
	Date stamped (dd-mm-yyyy)

² "Owner", in relation to a work, means the actual or reputed owner of the work or that owner's agent or mandatary. It includes a person who is in possession or claiming ownership of the work and a person who is authorizing or otherwise responsible for the construction, placement, alteration, repair, rebuilding, removal, decommissioning, maintenance, operation, safety or use of the work. It also includes a person who proposes to construct or place a work.

The personal information provided on this Notice to the Minister is collected under the authority of the *Navigation Protection Act*, sections 4, 5, 6, 9, 21, 22, 23 and 24. This information is required for the purpose of processing applications made under the above-noted sections for proposed, commenced or existing works that are or will be constructed, placed, altered, repaired, rebuilt, removed or decommissioned in, on, over, under, through or across any navigable water in Canada. The personal information collected is described in a personal information bank entitled *Navigation Protection Program* (bank number TC PPU 086). Under the provisions of the *Privacy Act*, individuals have the right of access to, correction of and protection of their personal information. Instructions for obtaining personal information are provided in Info Source, a copy of which is available in major public and academic libraries or online at <http://www.infosource.gc.ca>

#	P.I.D. #	OWNER / ADDRESS
1	70042551	Cindy Lorene Hartlen 2 Dresden Ct., Lower Sackville, N.S. B4C 3W8
2	70042577	Gordon Levy RR #1, Liverpool, N.S. BOT 1K0
3	70042619	John P. Doucette et al. P.O. Box 1752, Liverpool, N.S. BOT 1K0
4	70216825	Ann Louise Levy P.O. Box 751, Liverpool, N.S. BOT 1K0
5	70228986	Peter Lee Stewart et ux. RR #1, Liverpool, N.S. BOT 1K0
6	70042684	Carey McKiel P.O. Box 353, Yellowknife, N.T. X1A 2N3
7	70042692	Carey McKiel P.O. Box 353, Yellowknife, N.T. X1A 2N3
8	70230677	Kenneth Andrews et ux. P.O. Box 1661, Liverpool, N.S. BOT 1K0
9	70229133	Thomas H. Randall et ux. P.O. Box 910, Liverpool, N.S. BOT 1K0
10	70042783	Michael Kenneth Lohnes et ux. RR #1, Liverpool, N.S. BOT 1K0
11	70245204	Dr. R. Myers Professional Corp. 569 Shore Rd., Liverpool, N.S. BOT 1K0
12	70245212	David R. Myers 130 Whitecap Ridge, Black Point, N.S., BOJ 1B0
13	70245220	Dr. R. Myers Professional Corp. 569 Shore Rd., Liverpool, N.S. BOT 1K0
14	70042890	Roger V. Savage et ux. 611 Shore Rd., Liverpool, N.S. BOT 1K0
15	70043013	Ronald Henry Miller et ux. RR #1, 643 Shore Rd., Liverpool, BOT 1K0
16	70163027	Angus William Smyth et ux. 163 GB 13, Site 5, RR #1 Sand Beach Rd., Liverpool, BOT 1K0
17	70261284	David Thomas Wright et al. 695 Shore Rd., Mersey Point, N.S. BOT 1K0
18	70043054	Angus William Smyth et ux. 163 GB 13, Site 5, RR #1 Sand Beach Rd., Liverpool, BOT 1K0
19	70043286	Phillip Irwin Brooklyn, N.S. BOJ 1H0
20	70043294	Donald Whynot P.O. Box 948, Liverpool, N.S. BOT 1K0
21	70043633	Victor A. Frank et ux. 76 Clouser Rd., Littlestown, PA., U.S.A., 17340-9541
22	70043625	Michael T. Ashcroft et al. 28 Tremaine Ter, Cobourg, ON., K9A 5A8
23	70043617	John O'Brien et ux. 10 RR #4, Hill Country Dr., Stouffville, Ont., L4A 7X5
24	70247960	H.M. in right of Canada (D.F.O.) P.O. Box 698, Halifax, N.S. B3J 2T9
25	70043682	Mersey Seafoods Limited P.O. Box 1290, Liverpool, N.S. BOT 1K0
26	70247952	H.M. in right of Canada (D.F.O.) P.O. Box 698, Halifax, N.S. B3J 2T9
27	70043690	H.M. in right of Canada P.O. Box 1724, Liverpool, N.S. BOT 1K0
28	70043666	Wayne F. Rafuse et ux. P.O. Box 204, Liverpool, N.S. BOT 1K0
29	70043609	Bettina Herdt 37 AM Wiesengrund Offenbach Germany, D-63075
30	70043641	Sheila A. Rear et ux. 3049 Gavin Pl., Duluth, GA., U.S.A. 30096
31	70189972	Matthew P. Kuruc et ux. 340 Crescent, Leonia, N.J., U.S.A. 07605
32	70043914	2220092 Ontario Inc. 2489 Bloor St., Toronto, Ontario M6S 1R6
33	70043906	Nimer C. George P.O. Box 132 Hunts Point, N.S. BOT 1G0
34	70185160	Region of Queens Municipality Liverpool, N.S. BOT 1K0
35	70042502	Lawrence King Cochrane P.O. Box 1775, Liverpool, N.S. BOT 1K0
36	70042528	Ross Levy et al. RR #1, Liverpool, N.S. BOT 1K0

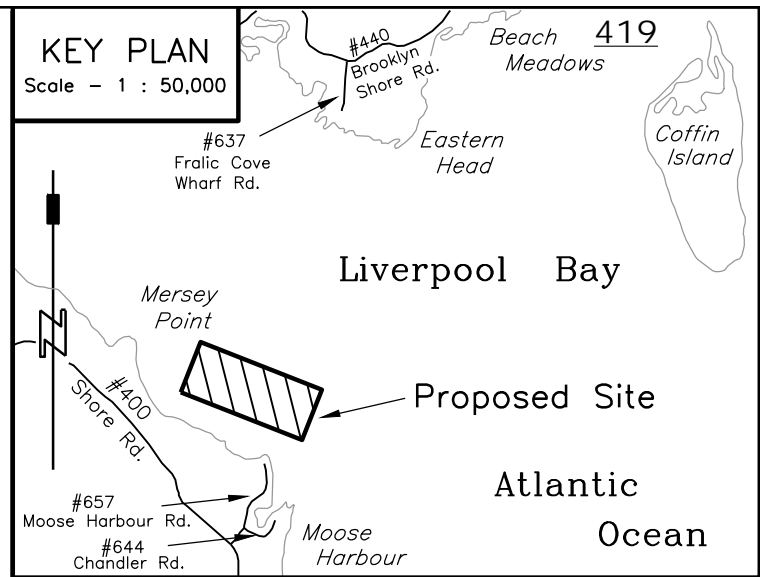


NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
M.P.-1	4,876,599.891	366,094.776
M.P.-2	4,876,130.892	366,983.632
M.P.-3	4,875,772.696	366,794.632
M.P.-4	4,876,241.696	365,905.776

NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
M.P.-1	44°01'49.2198"	64°40'15.6852"
M.P.-2	44°01'34.6067"	64°39'35.3459"
M.P.-3	44°01'22.8782"	64°39'43.5082"
M.P.-4	44°01'37.4905"	64°40'23.8459"



Legend:

- CALCULATED POINT C.P. ⊙
- CALCULATED (c.)
- N.S. PROPERTY IDENTIFICATION NUMBER P.I.D. #0000000
- NORTHING / EASTING N. / E.
- LOCAL REGISTRY NUMBER Book: / Page:
- ORDINARY HIGH WATER MARK O.H.W.M.
- BOUNDARY DEALT WITH BY THIS PLAN
- OTHER BOUNDARY
- TIE LINES
- NOT TO SCALE
- MAJOR CONTOURS
- MINOR CONTOURS
- DEPTH SOUNDINGS + 00.0
- CONCRETE MOORING
- SHOVEL ANCHOR

AQUACULTURE SITE DEVELOPMENT PLANS
SHOWING
AQUACULTURE SITE APPLICATION
KELLY COVE SALMON LTD. / MERSEY POINT
LOCATED AT:
MERSEY POINT, LIVERPOOL BAY (ATLANTIC OCEAN),
QUEENS COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

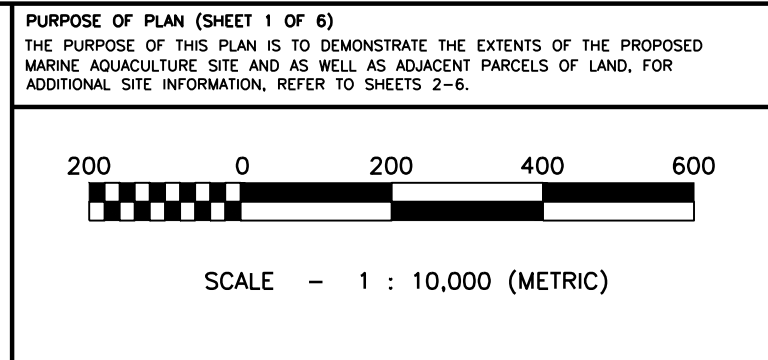
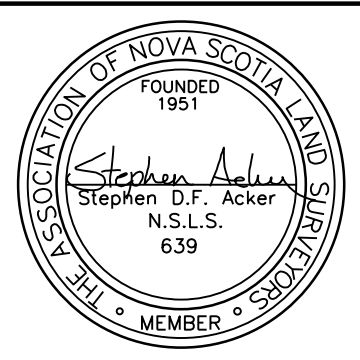
Dated this 18th day of January, 2019.

Jeff Nickerson

A&D JOB #300-18-MERSEY POINT
SHEET 1 OF 6 DATE: January 18, 2019

NOTES:

- ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
- THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
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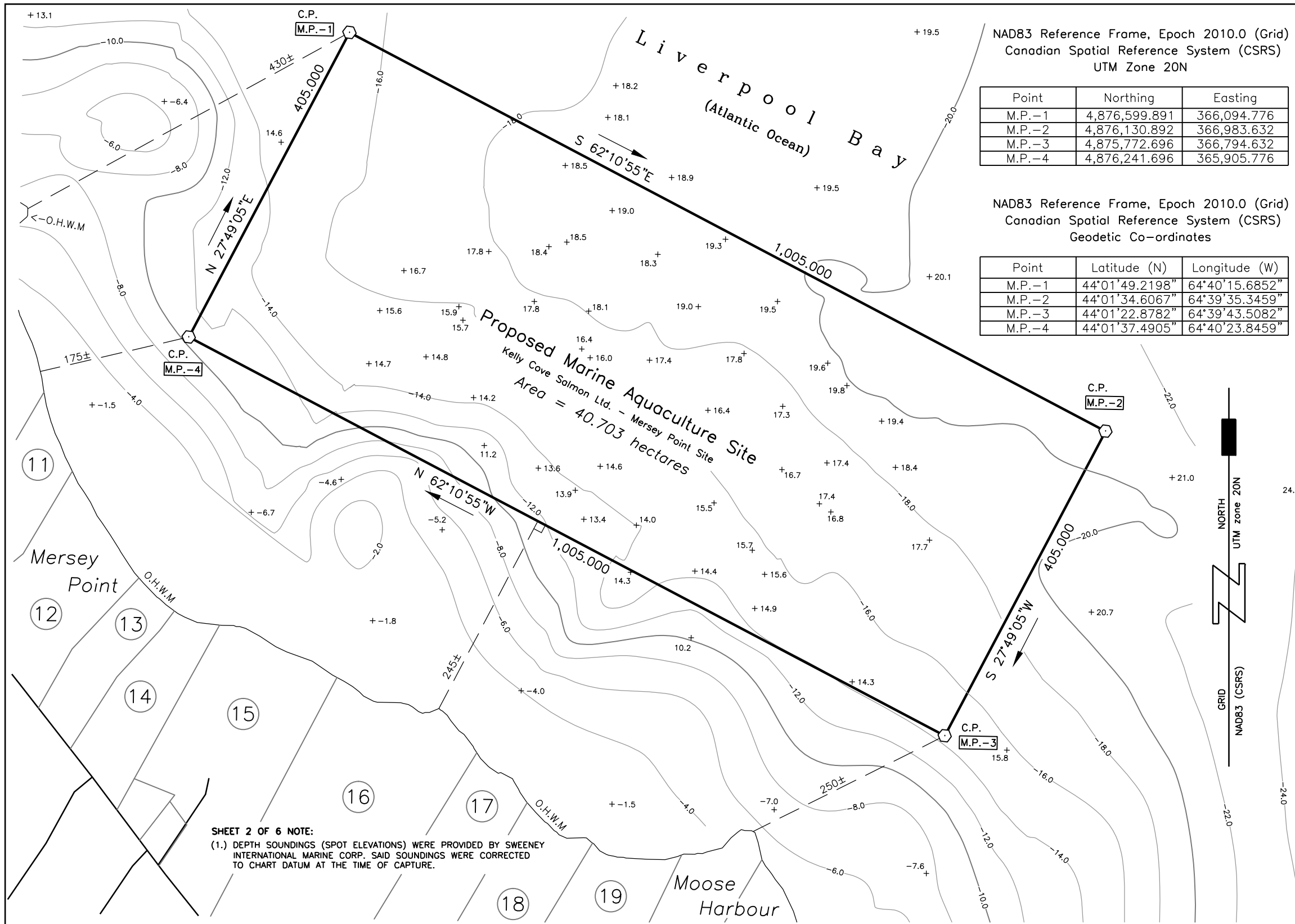
Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
B0W 3M0

80B Ohio Road, P.O. Box 367
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Phone: (902) 648-2186
www.adsurveying.ca

Phone: (902) 875-2110
info@adsurveying.ca



NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

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KEY PLAN
Scale - 1 : 50,000

Legend:

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AQUACULTURE SITE DEVELOPMENT PLANS
SHOWING
BASIC SEAFLOOR TOPOGRAPHY
KELLY COVE SALMON LTD. / MERSEY POINT
LOCATED AT:
MERSEY POINT, LIVERPOOL BAY (ATLANTIC OCEAN),
QUEENS COUNTY, NOVA SCOTIA

Client's Statement

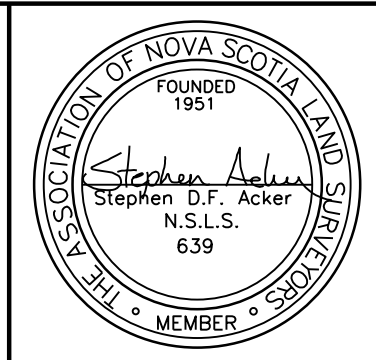
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Dated this 18th day of January, 2019.

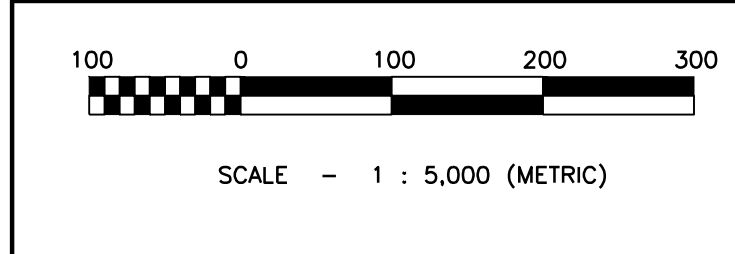
Jeff Nickerson

A&D JOB #300-18-MERSEY POINT
SHEET 2 OF 6 | DATE: January 18, 2019

- NOTES:**
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PURPOSE OF PLAN (SHEET 2 OF 6)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE EXTENTS OF THE PROPOSED MARINE AQUACULTURE SITE AND BASIC SEAFLOOR TOPOGRAPHY. FOR ADDITIONAL ADDITIONAL SITE INFORMATION, REFER TO SHEETS 1, 3-6.



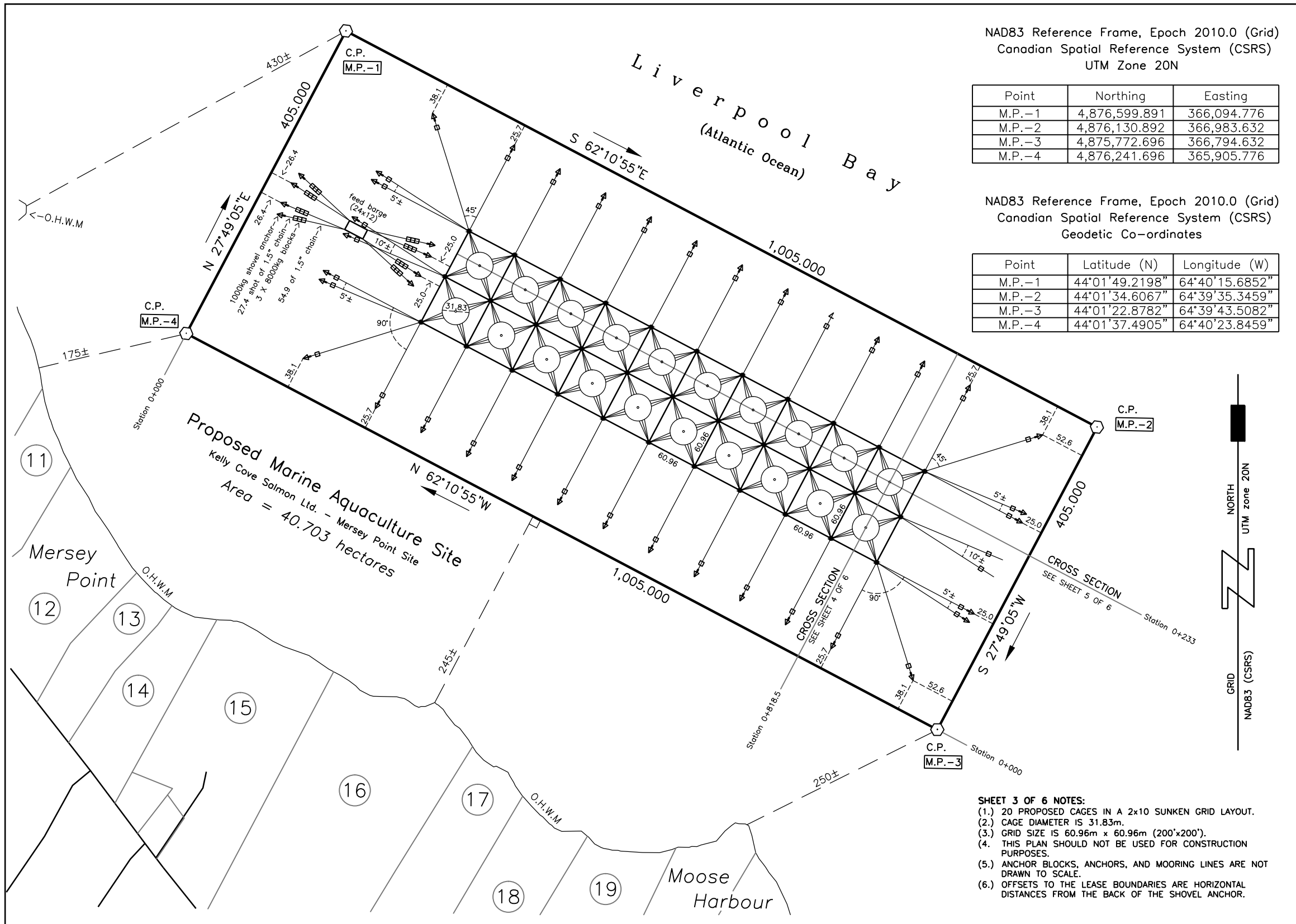
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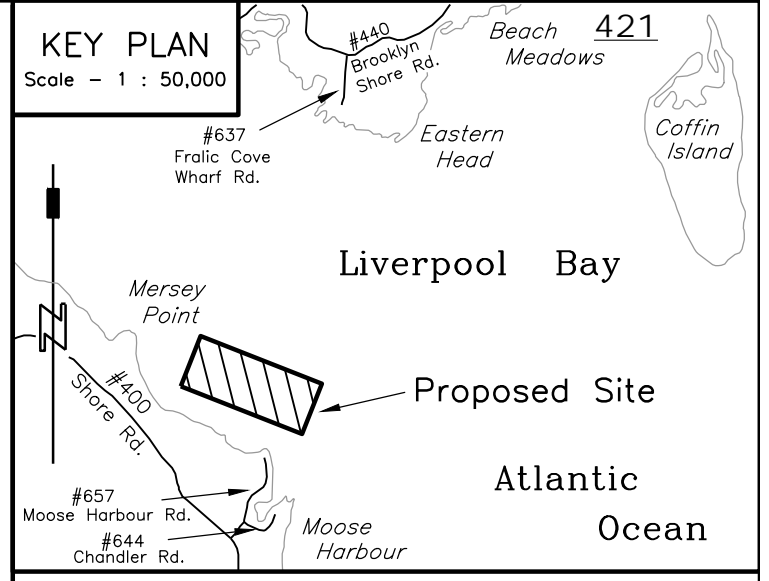


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Legend:

CALCULATED POINT C.P. (c)
CALCULATED (c.)
N.S. PROPERTY IDENTIFICATION NUMBER P.I.D. #00000000
NORTHING / EASTING	..... N. / E.
LOCAL REGISTRY NUMBER	..... Book: / Page:
ORDINARY HIGH WATER MARK	..... O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN
OTHER BOUNDARY
TIE LINES
NOT TO SCALE
MAJOR CONTOURS
MINOR CONTOURS
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CONCRETE MOORING
SHOVEL ANCHOR

AQUACULTURE SITE DEVELOPMENT PLANS
SHOWING
AQUACULTURE CAGE CONFIGURATION
KELLY COVE SALMON LTD. / MERSEY POINT
LOCATED AT:
MERSEY POINT, LIVERPOOL BAY (ATLANTIC OCEAN),
QUEENS COUNTY, NOVA SCOTIA

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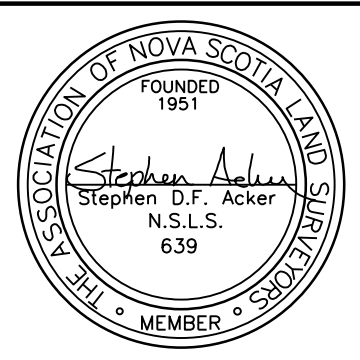
Dated this 18th day of January, 2019.

Jeff Nickerson

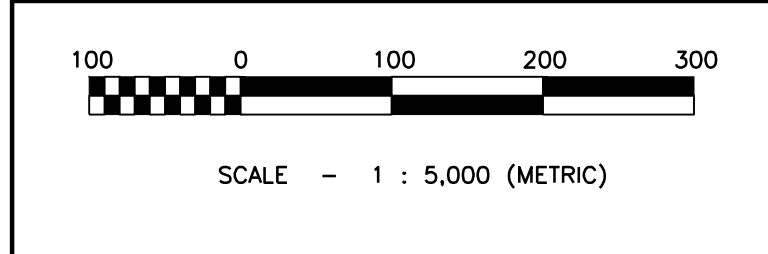
A&D JOB #300-18-MERSEY POINT
SHEET 3 OF 6 | DATE: January 18, 2019

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PURPOSE OF PLAN (SHEET 3 OF 6)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATIONS OF ALL ANCHORS, CAGES, AND THE GRID/MOORING CONFIGURATION RELATIVE TO THE LEASE BOUNDARIES.



Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

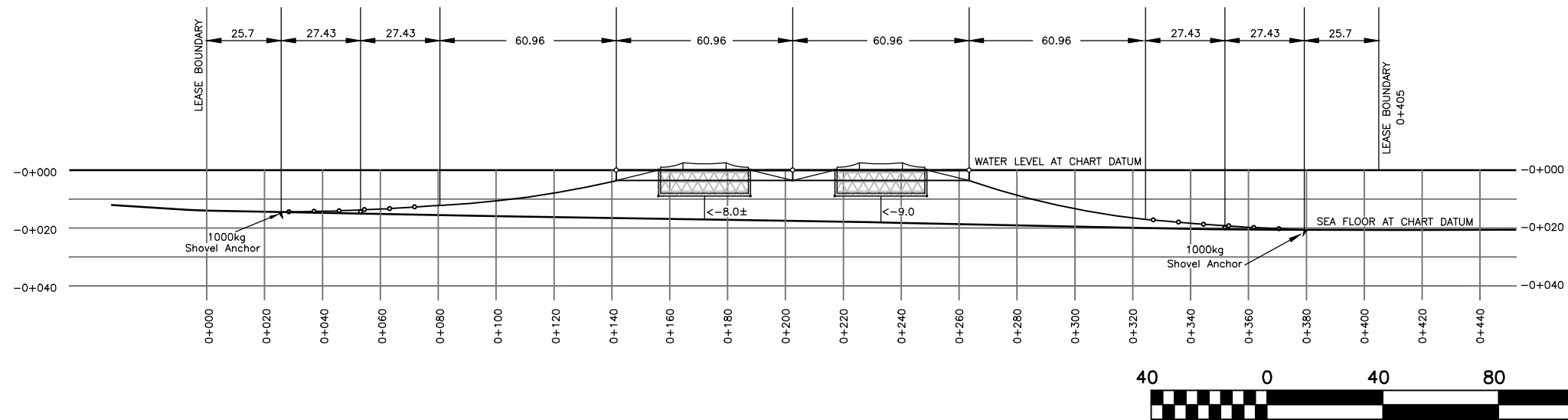
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Nova Scotia, Canada
B0T 1W0

Phone: (902) 648-2186
www.adsurveying.ca

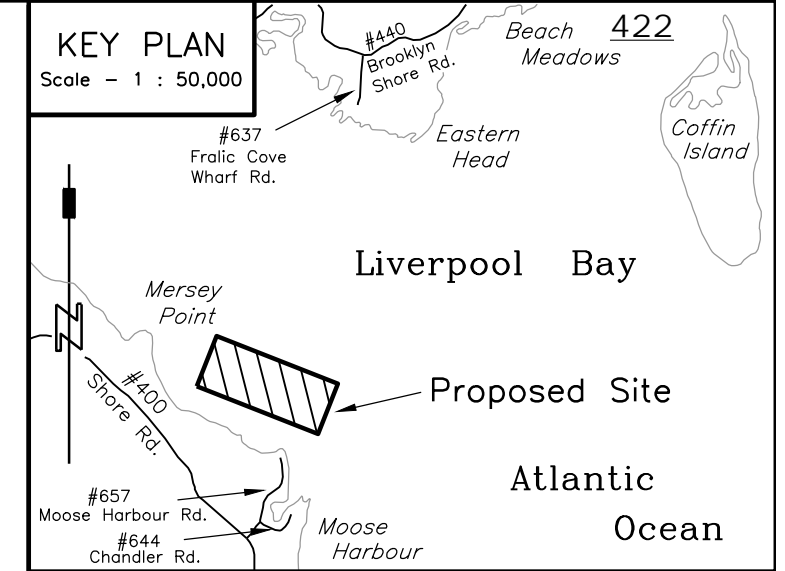
Phone: (902) 875-2110
info@adsurveying.ca

CROSS SECTION - STATION 0+818.5
 HORIZONTAL SCALE - 1 : 2,000 (METRIC)
 VERTICAL SCALE - 1 : 2,000 (METRIC)



SCALE - 1 : 2,000 (METRIC)

KEY PLAN
 Scale - 1 : 50,000

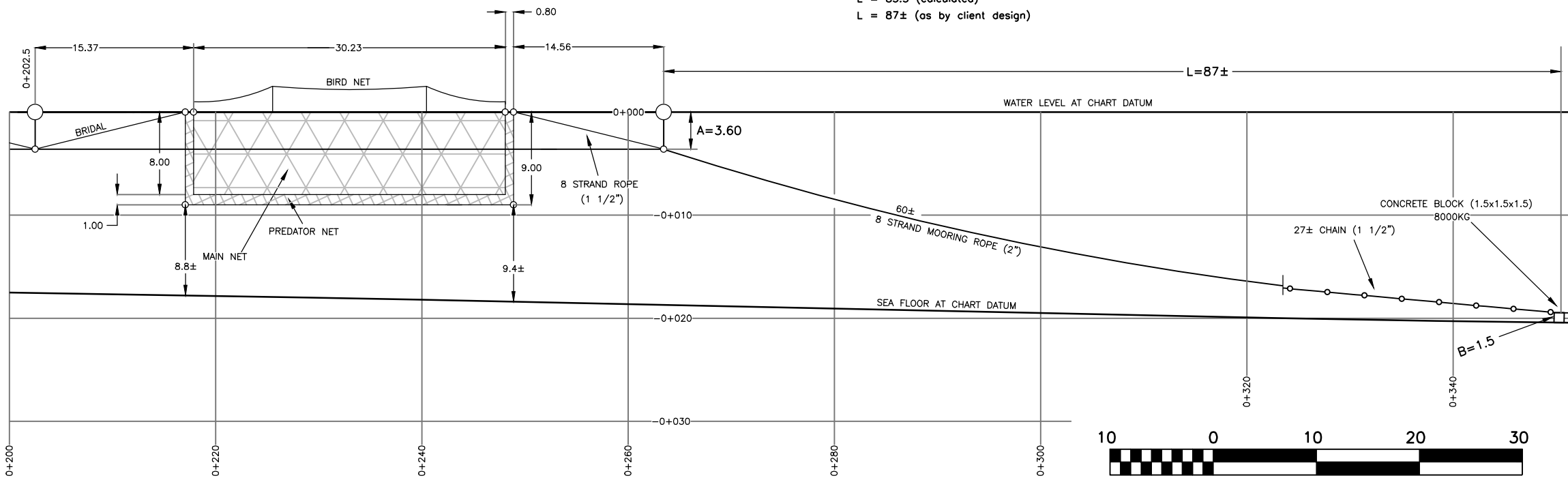


Legend:

CALCULATED POINT	.....	.C.P. (C)
CALCULATED	.....	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	.....	P.I.D. #00000000
NORTHING / EASTING	.....	N. / E.
LOCAL REGISTRY NUMBER	.....	Book: / Page:
ORDINARY HIGH WATER MARK	.....	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	.....	+ 00.0
CONCRETE MOORING	.....
SHOVEL ANCHOR	.....

DETAILED CROSS SECTION - STATION 0+818.5
 HORIZONTAL SCALE - 1 : 500 (METRIC)
 VERTICAL SCALE - 1 : 500 (METRIC)

5:1 Mooring Scope Calculation
 $L = [(max\ depth + max\ tide\ range) - A - B] \times 5$
 $L = [(20 \pm + 2.2) - 3.6 - 1.5] \times 5$
 $L = 85.5$ (calculated)
 $L = 87 \pm$ (as by client design)



SCALE - 1 : 500 (METRIC)

AQUACULTURE SITE DEVELOPMENT PLANS

SHOWING
 LATERAL CROSS-SECTION
 KELLY COVE SALMON LTD. / MERSEY POINT
 LOCATED AT:
 MERSEY POINT, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 18th day of January, 2019.

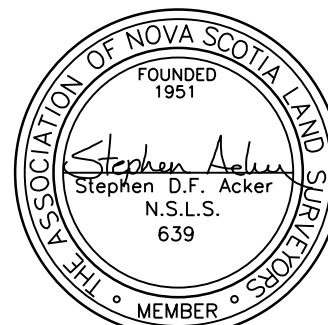
Jeff Nickerson

A&D JOB #300-18-MERSEY POINT

SHEET 4 OF 6 | DATE: January 18, 2019

NOTES:

- ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
- THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
- ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
- DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
- SPOT SOUNDINGS ARE BASED ON SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. SAID SOUNDINGS WERE CORRECTED TO CHART DATUM FROM G.N.S.S. OBSERVATIONS.
- NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
- ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
- ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).



PURPOSE OF PLAN (SHEET 4 OF 6)

THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LATERAL CROSS SECTION AS SHOWN ON SHEET 3 OF 6, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

CROSS SECTION NOTES:

- THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
- FOR HORIZONTAL LOCATION OF EACH CROSS SECTION SEE SHEET 3 OF 5.
- DISTANCES FROM SEA FLOOR MAY VARY DEPENDING ON TIDE AND CURRENT.
- DISTANCES FROM SEA FLOOR ARE APPROXIMATE ONLY.
- DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).



Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors &
 Professional Engineers

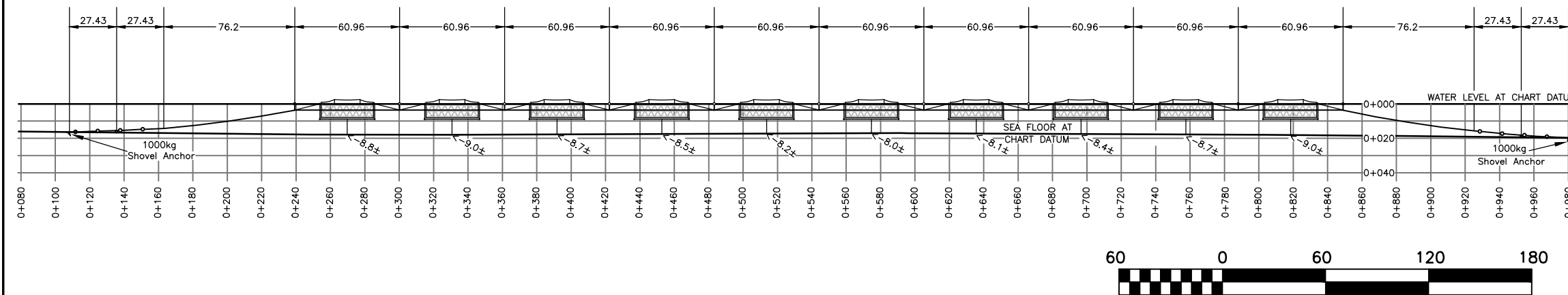
4083 Highway #308, P.O. Box 64
 Tusket, Yarmouth County
 Nova Scotia, Canada
 B0T 3M0

Phone: (902) 648-2186
 www.adsurveying.ca

80B Ohio Road, P.O. Box 367
 Shelburne, Shelburne County
 Nova Scotia, Canada
 B0T 1W0

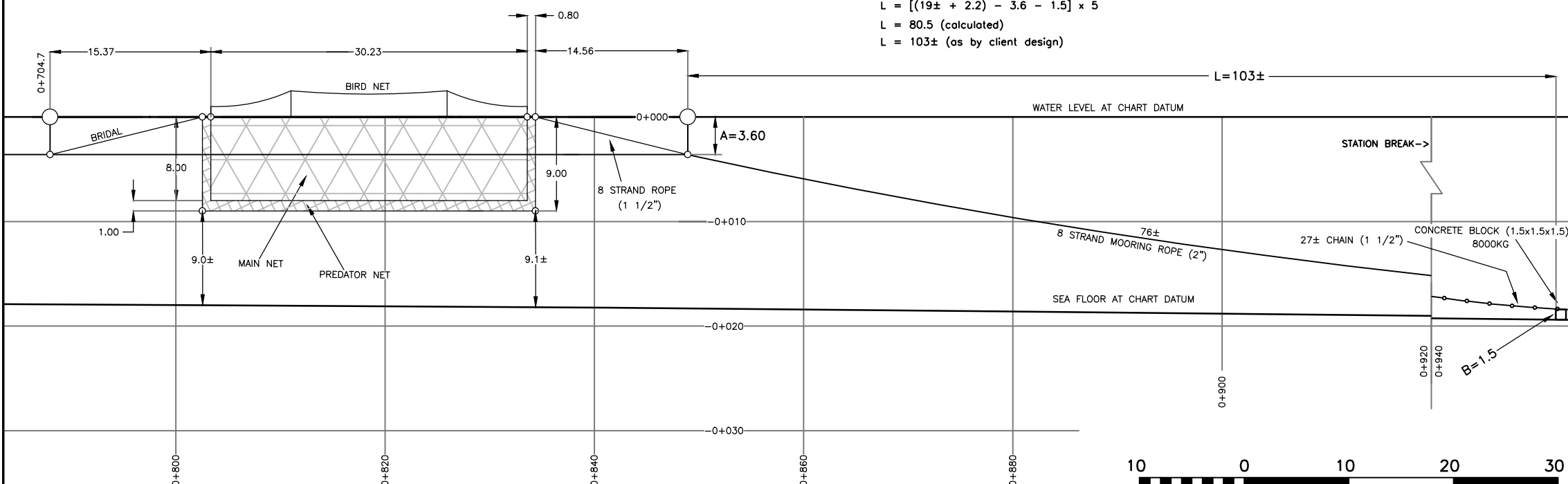
Phone: (902) 875-2110
 info@adsurveying.ca

CROSS SECTION - STATION 0+233
 HORIZONTAL SCALE - 1 : 3,000 (METRIC)
 VERTICAL SCALE - 1 : 3,000 (METRIC)



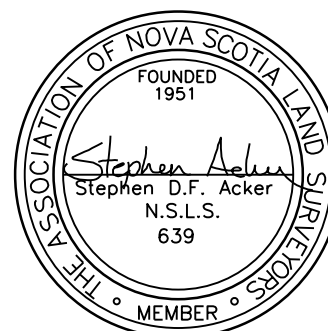
SCALE - 1 : 3,000 (METRIC)

DETAILED CROSS SECTION - STATION 0+233
 HORIZONTAL SCALE - 1 : 500 (METRIC)
 VERTICAL SCALE - 1 : 500 (METRIC)



SCALE - 1 : 500 (METRIC)

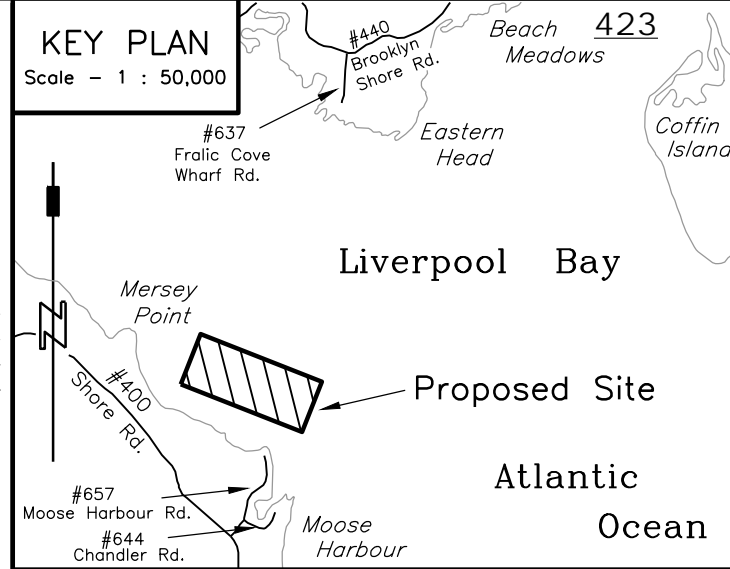
- NOTES:**
- (1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 - (2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
 - (3.) ALL DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).
 - (4.) DEPTH CONTOUR DATA IS BASED ON GARMIN MARINE MAPSOURCE DATA AND BATHYMETRIC SOUNDING DATA PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP.
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 - (6.) NATURAL FEATURES WERE DETERMINED BY NOVA SCOTIA PROPERTY ONLINE MAPPING AND GEONOVA DATA LOCATOR GEOGRAPHIC INFORMATION.
 - (7.) ONSHORE PROPERTY DATA IS BASED ON NOVA SCOTIA PROPERTY ONLINE MAPPING.
 - (8.) ALL BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83 CSRS) USING THE UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 20 NORTH (UTM Z20N).



PURPOSE OF PLAN (SHEET 5 OF 6)
 THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE A LONGITUDINAL CROSS SECTION AS SHOWN ON SHEET 3 OF 6, TO DEMONSTRATE DETAILS ASSOCIATED WITH THE CAGE INFRASTRUCTURE, ANCHOR AND MOORING LINES, AND SEAFLOOR PROFILE.

- CROSS SECTION NOTES:**
- (1.) THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
 - (2.) FOR HORIZONTAL LOCATION OF EACH CROSS SECTION SEE SHEET 3 OF 5.
 - (3.) DISTANCES FROM SEA FLOOR MAY VARY DEPENDING ON TIDE AND CURRENT.
 - (4.) DISTANCES FROM SEA FLOOR ARE APPROXIMATE ONLY.
 - (5.) DEPTHS ARE REFERENCED TO CHART DATUM (LOWER LOW WATER, LARGE TIDE).

KEY PLAN
 Scale - 1 : 50,000



Legend:

CALCULATED POINT . . . . .	.C.P. ⊙
CALCULATED	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	P.I.D. #00000000
NORTHING / EASTING	N. / E.
LOCAL REGISTRY NUMBER	Book: / Page:
ORDINARY HIGH WATER MARK	O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	_____
OTHER BOUNDARY	_____
TIE LINES	-----
NOT TO SCALE	~~~~~
MAJOR CONTOURS	_____
MINOR CONTOURS	_____
DEPTH SOUNDINGS	+ 00.0
CONCRETE MOORING	□
SHOVEL ANCHOR	⊠

AQUACULTURE SITE DEVELOPMENT PLANS
 SHOWING
 LONGITUDINAL CROSS-SECTION
KELLY COVE SALMON LTD. / MERSEY POINT
 LOCATED AT:
 MERSEY POINT, LIVERPOOL BAY (ATLANTIC OCEAN),
 QUEENS COUNTY, NOVA SCOTIA

Client's Statement

I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 18th day of January, 2019.

 Jeff Nickerson

A&D JOB #300-18-MERSEY POINT
 SHEET 5 OF 6 | DATE: January 18, 2019

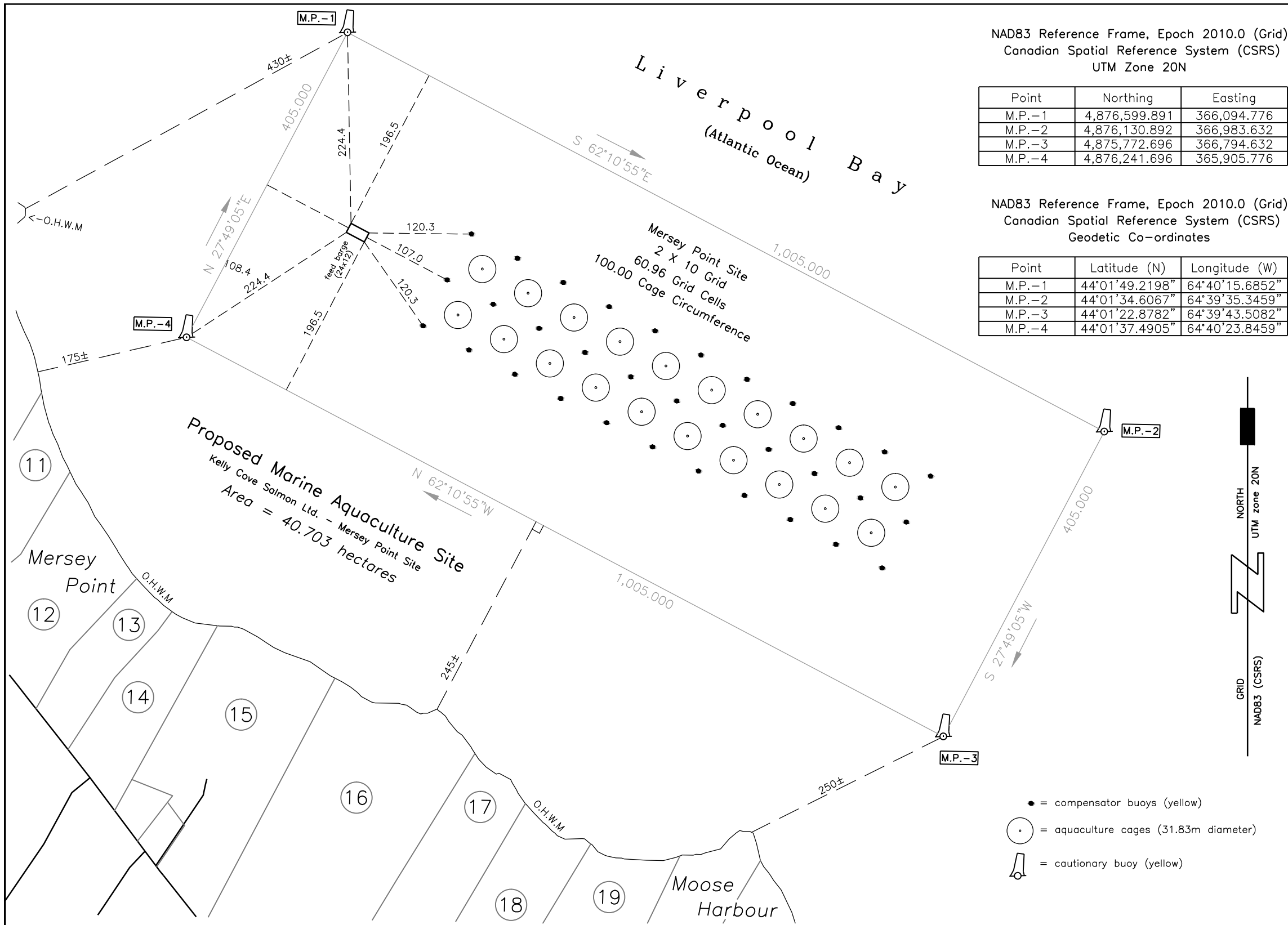
Acker & Doucette Surveying Inc.
 Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
 Tusket, Yarmouth County
 Nova Scotia, Canada
 B0T 3M0

80B Ohio Road, P.O. Box 367
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 Nova Scotia, Canada
 B0T 1W0

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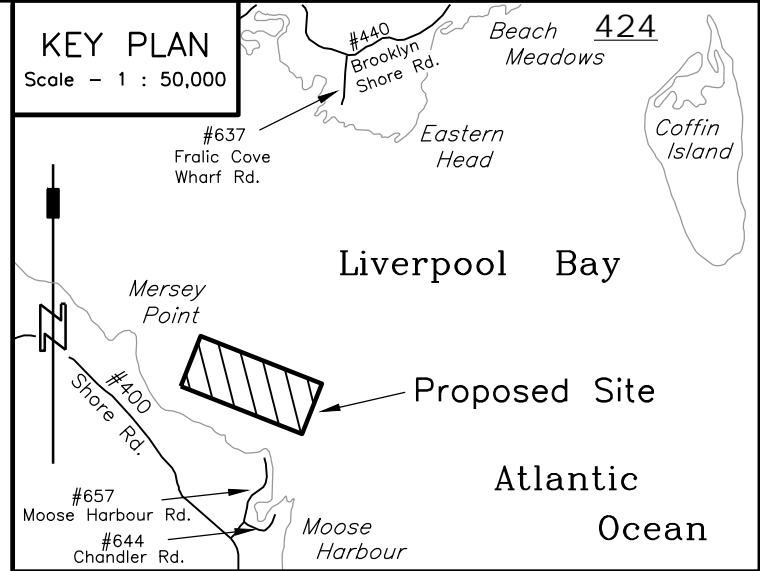


NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
UTM Zone 20N

Point	Northing	Easting
M.P.-1	4,876,599.891	366,094.776
M.P.-2	4,876,130.892	366,983.632
M.P.-3	4,875,772.696	366,794.632
M.P.-4	4,876,241.696	365,905.776

NAD83 Reference Frame, Epoch 2010.0 (Grid)
Canadian Spatial Reference System (CSRS)
Geodetic Co-ordinates

Point	Latitude (N)	Longitude (W)
M.P.-1	44°01'49.2198"	64°40'15.6852"
M.P.-2	44°01'34.6067"	64°39'35.3459"
M.P.-3	44°01'22.8782"	64°39'43.5082"
M.P.-4	44°01'37.4905"	64°40'23.8459"



Legend:

CALCULATED POINT	.....	.C.P. ○
CALCULATED	.....	(c.)
N.S. PROPERTY IDENTIFICATION NUMBER	.....	P.I.D. #00000000
NORTHING / EASTING	.....	.N. / E.
LOCAL REGISTRY NUMBER	.....	.Book: / Page:
ORDINARY HIGH WATER MARK	.....	.O.H.W.M.
BOUNDARY DEALT WITH BY THIS PLAN	.....
OTHER BOUNDARY	.....
TIE LINES	.....
NOT TO SCALE	.....
MAJOR CONTOURS	.....
MINOR CONTOURS	.....
DEPTH SOUNDINGS	.....	+ 00.0
CONCRETE MOORING	.....	□
SHOVEL ANCHOR	.....	⚓

AQUACULTURE SITE DEVELOPMENT PLANS
SHOWING
PROPOSED NAVIGATIONAL AIDS MARKING PLAN
KELLY COVE SALMON LTD. / MERSEY POINT
LOCATED AT:
MERSEY POINT, LIVERPOOL BAY (ATLANTIC OCEAN),
QUEENS COUNTY, NOVA SCOTIA

Client's Statement

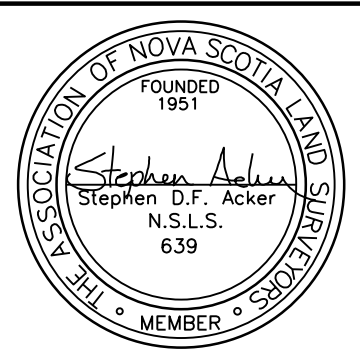
I, Jeff Nickerson of Kelly Cove Salmon Ltd. acknowledge and confirm that Acker & Doucette Surveying Inc., make no representations or warranties with respect to the adequacy or the integrity of the proposed cage and mooring design of system depicted.

Dated this 18th day of January, 2019.

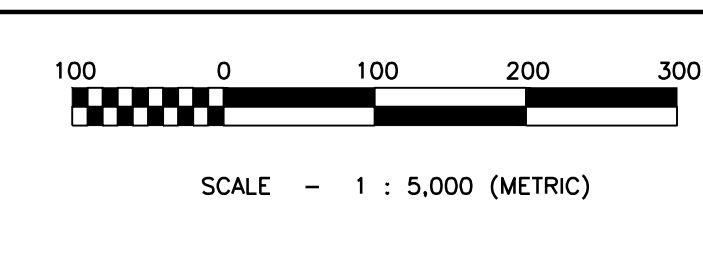
Jeff Nickerson

A&D JOB #300-18-MERSEY POINT
SHEET 6 OF 6 | DATE: January 18, 2019

- NOTES:**
- (1.) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 - (2.) THIS PLAN IS A COMPILATION OF THIRD PARTY DATA. DATA WAS PROVIDED BY SWEENEY INTERNATIONAL MARINE CORP. ACKER & DOUCETTE SURVEYING INC. HAS COMPLETED THIS PLAN IN ACCORDANCE WITH THE "GUIDE TO MARINE FINFISH AQUACULTURE SITE REQUIREMENTS", DATED NOVEMBER 2007.
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PURPOSE OF PLAN (SHEET 6 OF 6)
THE PURPOSE OF THIS PLAN IS TO DEMONSTRATE THE LOCATION AND TYPES OF ALL NAVIGATIONAL AIDS RELATIVE TO THE PROPOSED LEASE BOUNDARIES.



Acker & Doucette Surveying Inc.
Nova Scotia Land Surveyors & Professional Engineers

4083 Highway #308, P.O. Box 64
Tusket, Yarmouth County
Nova Scotia, Canada
B0W 3M0

80B Ohio Road, P.O. Box 387
Shelburne, Shelburne County
Nova Scotia, Canada
B0T 1W0

Phone: (902) 848-2188
www.adsurveying.ca

Phone: (902) 875-2110
info@adsurveying.ca

From: Winfield, Lynn
Sent: June 27, 2019 10:52 AM
To: NPPATL-PPNATL@tc.gc.ca
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>; Hanrahan, Joe <Joe.Hanrahan@novascotia.ca>
Subject: Kelly Cove Salmon - Development Plan for AQ#1205, AQ#1432 and AQ#1433

Good Morning,

Please see the attached Development Plan for the Kelly Cove Salmon Ltd.'s applications as follows:

1. Boundary Amendment AQ#1205 (sent previously);
2. New application for AQ#1432 Liverpool Bay (Brooklyn), Queens County; and
3. New application for AQ#1433 Liverpool Bay (Mersey Point), Queens County (to follow shortly).

If you have any questions please do not hesitate to contact me.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
 Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
 Shelburne, NS B0T 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429
 Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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From: LeBlanc, Mélanie <melanie.leblanc@tc.gc.ca>
Sent: July 4, 2019 4:35 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: AQ1205

Good afternoon Lynn,

I have reviewed the documents for lease 1205 and the information appears to be complete to be processed on the Navigation Protection Program side.

At this time, I don't have objections from the NPP side.

Mélanie LeBlanc

Navigation Protection Program Officer
Transport Canada / Atlantic Region / Heritage Court, P.O. Box 42, Moncton, N.B. E1C 8K6 |
melanie.leblanc@tc.gc.ca / Tel: 506-962-1412

Agente, Programme de la protection de la navigation
Transports Canada / Région de l'Atlantique / Place Héritage, C.P. 42, Moncton, N.-B. E1C 8K6
melanie.leblanc@tc.gc.ca / Tél. : 506-962-1412



From: Winfield, Lynn
Sent: June 15, 2020 12:37 PM
To: LeBlanc, Mélanie <melanie.leblanc@tc.gc.ca>
Subject: AQ1205, AQ1432 and AQ1433 - Kelly Cove Salmon - Liverpool Bay

Hi Melanie,

I have been asked to check with you on the 3 Kelly Cove Salmon, Liverpool Bay sites (AQ1205 Amendment, AQ1432 and AQ1433 New sites).

Can you confirm that you have received the NPP applications for these 3 sites? Do you see any problems with them?

Thanks,

Lynn

E. Lynn Winfield
Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture



1575 Lake Road
 Shelburne, NS B0T 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429
 Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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From: Babineau-LeBlanc, Linda <linda.babineau-leblanc@tc.gc.ca>

Sent: September 18, 2020 5:18 PM

To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>

Subject: AQ Sites 1205, 1432, 1433 (Kelly Cove Salmon Ltd), Queens County, NS

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Good afternoon Lynn,

I'm following up on some files and am inquiring on the status of the above aquaculture files for Kelly Cove Salmon. The last communication I have on record is a letter from KMKNO on March 5, 2020. It stated that they would like to meet as they don't feel their concerns have been adequately addressed. I know that the pandemic has put a hold on face to face meetings at the moment. I'm just wondering if a response is being prepared, or if you're planning a call with them to further discuss. Any updates would be greatly appreciated. Happy to discuss.

Regards,

Linda Babineau-LeBlanc

Aboriginal Consultation Officer, Environmental Programs and Indigenous Relations
 Transport Canada / Government of Canada
linda.babineau-leblanc@tc.gc.ca / Tel. : 506-850-3319/ Fax: 506-851-7542 / TTY: 1-888-675-6863

Agente de consultations autochtones, Programmes environnementaux et Relations Autochtones,
 Transports Canada / Gouvernement du Canada
linda.babineau-leblanc@tc.gc.ca / Tél. : 506-850-3319/ Téléc. : 506-851-7542 / ATS : 1-888-675-6863

From: Winfield, Lynn
Sent: September 21, 2020 8:37 AM
To: Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Subject: FW: AQ Sites 1205, 1432, 1433 (Kelly Cove Salmon Ltd), Queens County, NS

Hi

Please see below, can you please respond?

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture**

NOTE: REFERING TO THE EMAIL SENT BY LINDA BABINEAU-LEBLANC ON SEPTEMBER 18, 2020.

From: Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Sent: September 21, 2020 8:53 AM
To: Babineau-LeBlanc, Linda <linda.babineau-leblanc@tc.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: AQ Sites 1205, 1432, 1433 (Kelly Cove Salmon Ltd), Queens County, NS

Hi Linda, yes we are still working on a way to proceed with consultation with the KMKNO for AQ#1205, 1432 and 1433. Our Executive Director, Bruce Hancock, is currently in discussion with Twila Gaudet from KMKNO to agree on what would be an acceptable format for discussion, and who would be included.

Regarding these files and the KMKNO response, our Department believes that many of their concerns raised were of a general nature regarding aquaculture, and we have agreed with the KMKNO to hold a "technical meeting" with them to go over their generic concerns, prior to holding a consultation meeting which would likely involve Transport Canada and the DFO.

I would expect that after our department holds the "technical meeting" with the KMKNO, Lynn or I will contact you to let you know what the plan will be in order to continue consultation on these files.

Regards,
Robert Ceschiutti
Manager, Licensing and Leasing
NS Department of Fisheries and Aquaculture
1575 Lake Road
Shelburne, Nova Scotia
B0T 1W0
Phone: 902-875-7430
Cell: 902-874-0996
Robert.Ceschiutti@novascotia.ca

From: Ceschiutti, Robert [<mailto:Robert.Ceschiutti@novascotia.ca>]
Sent: Tuesday, September 22, 2020 8:32 AM
To: LeBlanc, Mélanie <melanie.leblanc@tc.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: Kelly Cove Salmon Adjudicative Applications AQ#1205, AQ#1432, AQ#1433

Hi Melanie, I'd like to confirm the approach for three of the Kelly Cove Adjudicative Applications (AQ#1205, AQ#1432, AQ#1433) which are currently posted on our website at the following link:
<https://novascotia.ca/fish/aquaculture/Routine-disclosure-of-Kelly-Cove-Salmon-site-application-documents.pdf>

Melanie, did these applications for Transport Canada notice of works go through the "old" process or do these three applications require a public posting for comments related to the Transport Canada notice of works applications (Similar to what was recently posted for Town Point)? If so, could you please let me know what your file numbers are for the sites?

It sounds like we have additional information that should be added to the package that is currently online, so if we need to add a section for Transport Canada we can time it to be done at the same time (likely sometime in October)

Regards,
 Robert Ceschiutti
 Manager, Licensing and Leasing
 NS Department of Fisheries and Aquaculture
 1575 Lake Road
 Shelburne, Nova Scotia
 B0T 1W0
 Phone: 902-875-7430
 Cell: 902-874-0996
Robert.Ceschiutti@novascotia.ca

From: LeBlanc, Mélanie <melanie.leblanc@tc.gc.ca>
Sent: September 22, 2020 1:05 PM
To: Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: RE: Kelly Cove Salmon Adjudicative Applications AQ#1205, AQ#1432, AQ#1433

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

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Hi Robert,
 We did receive the application under the old act (NPA) and although at the time we had sent Kelly Cove a letter stating that they would not have to publish.

Where so much time has passed and that we would have the opportunity to post the TC part on the NSDAF site, I would like to say that we would want to post it for better transparency.

The file numbers are as follows

1205 = 1996-200265

1432 = 2019-200109

1433 = 2019-200110
Cheers
Melanie

From: Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Sent: September 23, 2020 9:07 AM
To: LeBlanc, Mélanie <melanie.leblanc@tc.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: RE: Kelly Cove Salmon Adjudicative Applications AQ#1205, AQ#1432, AQ#1433

Okay, sounds good. I will try my best to let you know when this gets posted PRIOR to going on the website this time!

Regards,
Robert Ceschiutti
Manager, Licensing and Leasing
NS Department of Fisheries and Aquaculture
1575 Lake Road
Shelburne, Nova Scotia
B0T 1W0
Phone: 902-875-7430
Cell: 902-874-0996
Robert.Ceschiutti@novascotia.ca

From: Ceschiutti, Robert [<mailto:Robert.Ceschiutti@novascotia.ca>]
Sent: Tuesday, May 18, 2021 3:12 PM
To: LeBlanc, Mélanie <melanie.leblanc@tc.gc.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: Posting of 3 Kelly Cove applications to website including comment period for TC
Importance: High

Hi Melanie, I've received a rush request inside our government to update a posting to our Aquaculture website in regards to a public request. At the same time, I had previously flagged these three applications as requiring an update to include a notice that Transport Canada will have a public comment period.

I was wondering if I could do both updates at once to save time and effort, but I wanted to check with you first to see how much time you'd need to prepare your public comment period. I've put it in tentatively for tomorrow (May 19th), but let me know if more time is needed.

This is for Kelly Cove Salmon Ltd. Boundary Amendment for AQ#1205, and new marine licence and lease for AQ#1432 and AQ#1433. I've attached the first two pages of the document (the total document is 1200+ pages!!)

Thanks for your help

Regards,
Robert Ceschiutti

Manager, Licensing and Leasing
NS Department of Fisheries and Aquaculture
1575 Lake Road
Shelburne, Nova Scotia
B0T 1W0
Phone: 902-875-7430
Robert.Ceschiutti@novascotia.ca



Application Posted
Notice - AQ1205_14

NOTICE OF APPLICATIONS POSTED

These documents have been submitted with respect to three applications from Kelly Cove Salmon Ltd. One application for a boundary amendment to an existing marine aquaculture site, and two applications for new marine aquaculture sites. The applications follow a Scoping period, during which the applicant collected information to support their application. The information in these documents is provided as part of the routine disclosure of information by the Department of Fisheries and Aquaculture. Some information may be redacted as business confidential information or personal information.

These documents were provided to the Department by the applicant. The Department is not responsible for the content of these documents, including, but not limited to, the accuracy, reliability, or currency of the information contained within.

Adjudicative Application for Boundary Amendment	
Applicant: Kelly Cove Salmon Ltd.	Species: Atlantic salmon, Rainbow trout
Location: Liverpool Bay, Queens County	Method of Cultivation: Marine cage cultivation
Aquaculture Site: AQ#1205	Initial Application Received: October 30, 2016
	Updated Application Received: March 6, 2019

Adjudicative Application for a New Aquaculture Licence and Lease	
Applicant: Kelly Cove Salmon Ltd.	Species: Atlantic salmon
Location: Liverpool Bay, Queens County	Method of Cultivation: Marine cage cultivation
Aquaculture Site: AQ#1432	Application Received: March 6, 2019

Adjudicative Application for a New Aquaculture Licence and Lease	
Applicant: Kelly Cove Salmon Ltd.	Species: Atlantic salmon
Location: Liverpool Bay, Queens County	Method of Cultivation: Marine cage cultivation
Aquaculture Site: AQ#1433	Application Received: March 6, 2019

To learn more about the the marine aquaculture lease and license application process, please visit <https://novascotia.ca/fish/aquaculture/licensing-leasing/Aqua-Licensing-and-Leasing-Overview.pdf>

For information on the Nova Scotia Aquaculture Review Board, please visit <https://arb.novascotia.ca/>

Posting Date of this notice: May 19, 2021

Please note that this application is being reviewed pursuant to the *Canadian Navigable Waters Act* by Transport Canada. Written comments regarding the effect of this work on marine navigation may be submitted to Transport Canada as follows, for a period of 30 days following the posting date of this notice.

1. On line at : <http://cps.canada.ca/> under the
 AQ#1205: Registry/NPP#1996-200265
 AQ#1432: Registry/NPP#2019-200109
 AQ#1433: Registry/NPP#2019-200110
2. By Mail at: Manager
 Transport Canada - Navigation Protection Program
 P.O. Box 42, Moncton, NB E1C 8K6

Table of Contents (Page 1 starts after this table)

Document	Page(s)
Initial development plan for adjudicative amendment – AQ#1205 (October 30, 2016)	1-188
Updated application for adjudicative amendment – AQ#1205 (March 6, 2019)	189-198
Application for new marine licence and lease – AQ#1432	199-204
Application for new marine licence and lease – AQ#1433	205-210
Executive Summary – AQ#1205, AQ#1432, AQ#1433	211-214
Development Plan – AQ#1205, AQ#1432, AQ#1433	215-986
Community Engagement Report – AQ#1205, AQ#1432, AQ#1433	987-1174
Site Development Plans – AQ#1205, AQ#1432, AQ#1433	1175-1206

From: LeBlanc, Mélanie <melanie.leblanc@tc.gc.ca>
Sent: May 18, 2021 4:18 PM
To: Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Posting of 3 Kelly Cove applications to website including comment period for TC

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

Exercice caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Hi Robert,

I can work with that... I will get them up and ready for tomorrow. If I am missing anything I will contact Lynn ☺

I have checked the notice and it looks good for the NPP portion.

Thanks

Melanie

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: Monday, August 29, 2022 2:55 PM
To: LeBlanc, Mélanie <melanie.leblanc@tc.gc.ca>
Subject: RE: Kelly Cove Salmon Adjudicative Applications AQ#1205, AQ#1432, AQ#1433

Hi Melanie,

The below files are still moving through the process, I just wanted to check with you to see if you have any issues/concerns on any of these applications?

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture**

From: LeBlanc, Mélanie <melanie.leblanc@tc.gc.ca>
Sent: August 29, 2022 5:20 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Carbonell, Marina <Marina.Carbonell@tc.gc.ca>
Subject: RE: Kelly Cove Salmon Adjudicative Applications AQ#1205, AQ#1432, AQ#1433

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UNCLASSIFIED / NON CLASSIFIÉ

Hi Lynn,

We are good on our side.
I will need to put the Site Marking plan together for the 3 sites.

Melanie

From: LeBlanc, Mélanie <melanie.leblanc@tc.gc.ca>
Sent: September 1, 2022 3:57 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Kelly Cove Salmon Adjudicative Applications AQ#1205, AQ#1432, AQ#1433

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UNCLASSIFIED / NON CLASSIFIÉ

Hi Lynn,

Nothing on our side. I will be reaching out to CCG AtoN to ensure the SMP is ok with them with Yellows buoys (or if they would rather green and reds).. but that is about it.

Melanie

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: Monday, October 17, 2022 2:21 PM
To: LeBlanc, Mélanie (TC/TC) <melanie.leblanc@tc.gc.ca>
Subject: RE: Kelly Cove Salmon Adjudicative Applications AQ#1205, AQ#1432, AQ#1433

Hi Melanie

Sorry to bother you, but can you explain the Acronyms
CCG AtoN
SMP (I'm guessing Site Marking Plan for this one?)

Thanks,
Lynn

E. Lynn Winfield

**Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture**

From: LeBlanc, Mélanie (TC/TC) <melanie.leblanc@tc.gc.ca>

Sent: October 17, 2022 3:09 PM

To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>

Subject: RE: Kelly Cove Salmon Adjudicative Applications AQ#1205, AQ#1432, AQ#1433

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I am sooo sorry... that was the worst Government talk email. 😊

CCG – AtoN is Canadian Coast Guard – Aids to Navigation (they are the group within Coast Guard that designs the buoys for channel marking and such)

And you are correct for the SMP – Site Marking Plan

Melanie

APPENDIX E – ENVIRONMENT AND CLIMATE CHANGE CANADA
(CANADIAN SHELLFISH SANITATION PROGRAM)

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: June 27, 2019 10:05 AM
To: Hood, Shane (CFIA/ACIA) <shane.hood@canada.ca>; MacArthur, David (EC) <david.macarthur@canada.ca>; Gautreau, Rachel (EC) <rachel.gautreau@canada.ca>; Birch, Angela <Angela.Birch@novascotia.ca>; Miller, L (Dawn) <Dawn.Miller2@novascotia.ca>; Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>; Murrant, Darryl D <Darryl.Murrant@novascotia.ca>; Blackburn, Lori M <Lori.Blackburn@novascotia.ca>; Smith, Angela (CFIA/ACIA) <angela.smith@canada.ca>
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Attn: Network Review Agencies:

Attached please find the Boundary Amendment application and information for Kelly Cove Salmon AQ#1205 in Liverpool Bay, Queens County.

Please respond with your feedback by August 27, 2019.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
 Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
 Shelburne, NS BOT 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429
 Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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***Please refer to Application Package, Section 2.0 - Applicant's Aquaculture Development Plan, for documents sent to and reviewed by Environment Climate Change Canada.**

NOTE: THIS EMAIL WAS DUPLICATED FOR AQ#1432 AND AQ#1433 AND SENT TO THE SAME RECIPIENTS.

From: MacArthur, David (EC) <david.macarthur@canada.ca>
Sent: August 21, 2019 3:57 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Attached

David MacArthur

Senior Area Coordinator, Shellfish Water Classification Program - Atlantic
Environment & Climate Change Canada / Government of Canada
david.macarthur@canada.ca / Tel: 902-426-6296 / Fax: 902-426-8041

Coordonnateur Principal Zone, Programme de Classification des Eaux Coquillieres - Atlantique
Environnement & Changement Climatique Canada / Gouvernement du Canada
david.macarthur@canada.ca / Tél: 902-426-6296 / Téléc: 902-426-8041

Network Agency Review of an Aquaculture Application

Agency	ECCC - CSSP
Division (if applicable)	
Date	Aug 21, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1205 (Coffin Island), Queens County
Type of application	Boundary Amendment
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Public Notice and Disclosure

As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

Privacy Statement

The network review information collected as part of an aquaculture application will only be used or disclosed by Fisheries and Aquaculture for the purpose of deciding on the application.

All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: MacArthur, David (EC) <david.macarthur@canada.ca>

Sent: August 21, 2019 3:54 PM

To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>

Subject: RE: AQ#1432 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Brooklyn),
Queens County

Attached

David MacArthur

Senior Area Coordinator, Shellfish Water Classification Program - Atlantic
Environment & Climate Change Canada / Government of Canada
david.macarthur@canada.ca / Tel: 902-426-6296 / Fax: 902-426-8041

Coordonnateur Principal Zone, Programme de Classification des Eaux Coquillieres - Atlantique
Environnement & Changement Climatique Canada / Gouvernement du Canada
david.macarthur@canada.ca / Tél: 902-426-6296 / Téléc: 902-426-8041

Network Agency Review of an Aquaculture Application

Agency	ECCC - CSSP
Division (if applicable)	
Date	Aug 21, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1432 (Brooklyn), Queens County
Type of application	Marine Finfish Cage Cultivation (Atlantic Salmon)
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

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From: MacArthur, David (EC) <david.macarthur@canada.ca>
Sent: August 21, 2019 3:51 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: AQ#1433 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Mersey Point), Queens County

Attached.

David MacArthur

Senior Area Coordinator, Shellfish Water Classification Program - Atlantic
Environment & Climate Change Canada / Government of Canada
david.macarthur@canada.ca / Tel: 902-426-6296 / Fax: 902-426-8041

Coordonnateur Principal Zone, Programme de Classification des Eaux Coquillieres - Atlantique
Environnement & Changement Climatique Canada / Gouvernement du Canada
david.macarthur@canada.ca / Tél: 902-426-6296 / Téléc: 902-426-8041

Network Agency Review of an Aquaculture Application

Agency	ECCC - CSSP
Division (if applicable)	
Date	Aug 21, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1433 (Mersey Point), Queens County
Type of application	Marine Finfish Cage Cultivation (Atlantic Salmon)
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

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In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

Privacy Statement

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APPENDIX F – ENVIRONMENT AND CLIMATE CHANGE CANADA
CANADIAN WILDLIFE SERVICES DIVISION

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: June 27, 2019 10:05 AM
To: Hood, Shane (CFIA/ACIA) <shane.hood@canada.ca>; MacArthur, David (EC) <david.macarthur@canada.ca>; Gautreau, Rachel (EC) <rachel.gautreau@canada.ca>; Birch, Angela <Angela.Birch@novascotia.ca>; Miller, L (Dawn) <Dawn.Miller2@novascotia.ca>; Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>; Murrant, Darryl D <Darryl.Murrant@novascotia.ca>; Blackburn, Lori M <Lori.Blackburn@novascotia.ca>; Smith, Angela (CFIA/ACIA) <angela.smith@canada.ca>
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Attn: Network Review Agencies:

Attached please find the Boundary Amendment application and information for Kelly Cove Salmon AQ#1205 in Liverpool Bay, Queens County.

Please respond with your feedback by August 27, 2019.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
 Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
 Shelburne, NS BOT 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429
 Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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***Please refer to Application Package, Section 2.0 - Applicant's Aquaculture Development Plan, for documents sent to and reviewed by Environment Climate Change Canada.**

NOTE: THIS EMAIL WAS DUPLICATED FOR AQ#1432 AND AQ#1433 AND SENT TO THE SAME RECIPIENTS.

From: Gautreau, Rachel (EC) <rachel.gautreau@canada.ca>
Sent: August 27, 2019 2:47 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Wilhelm, Sabina (EC) <sabina.wilhelm@canada.ca>; Hanson, Al (EC) <al.hanson@canada.ca>
Subject: Boundary Amendment Application No. 1205 (Coffin Island) - Liverpool Bay, Queens County, Nova Scotia

Hi Lynn,

Environment and Climate Change Canada's Canadian Wildlife Service (CWS) has reviewed the proposed boundary amendment application for AQ#1205 in Liverpool Bay, Queens County, Nova Scotia, and it is not clear whether the reconfigured boundaries of the lease would be located within 300 m of Coffin Island. **If the proposed boundary amendment is in part <300m Coffin Island, then we recommend reconfiguring/partly relocating the lease such that it would be entirely located >300 m from the island.**

Coffin Island is used for nesting by colonial birds, including the Endangered (Schedule 1 of the *Species at Risk Act*) Roseate Tern. Colonial birds are particularly vulnerable to the effects of human disturbance. The period spent at the colony prior to egg-laying is very important for seabirds as this is when they engage in pair formation and other important breeding behaviours, such as nest site defense, nest building, and copulation. Disturbance prior to egg-laying may cause birds to abandon historical colony locations. Meanwhile, disturbance during the breeding season can cause these birds to abandon their nests or young, or to use valuable energy reserves for defence, instead of incubating eggs and feeding their young. The presence of humans in close proximity to nests may prevent parent birds from returning to protect and feed their young, and expose eggs or chicks to predation, and to the lethal effects of heat, cold and rain. When parent birds are flushed, many of the young chicks wander from their nest site and be taken by predators, or be pecked to death by neighbouring birds.

Also, as indicated in page 117 of the application, the area is important for shorebirds in migration, and as wintering habitat for Harlequin Duck (Special Concern, Schedule 1 of the *Species at Risk Act*). It is important to not disturb migrating shorebirds or wintering waterfowl during energetically expensive times of the year.

Although not officially designated under the Important Bird Areas program, the beaches and flats at East Berlin, West Berlin, Eagle Head, Beach Meadows and Western Head all host small populations of migrant shorebird in late summer and early fall. Furthermore, Purple Sandpipers are known to forage and roost on the ledges at Western Head. Also, the Endangered (Schedule 1 of the *Species at Risk Act*) Piping Plover is known to nest at Beach Meadows Beach and White Point. And the Hudsonian Godwit which was recently assessed as Threatened by COSEWIC (May 2019) has been observed in Liverpool Bay. And as indicated on page 117 of the application, the shorelines from Eastern Head to Beach Meadows, and Black Point to Western Head, are wintering habitat for Harlequin Ducks. There is therefore concern for lost gear washing up along the coast and a risk of entanglement for birds.

Therefore, we recommend the following:

In general, maintain a minimum distance of at least 300 m from all areas of the island or colony occupied by seabirds and waterbirds.

For high-disturbance activities (e.g. drilling, blasting), maintain a buffer of at least 1 km from colonies.

In addition to the above buffers, it is extremely important that mitigation measures, such as the following, be implemented to avoid/minimize adverse effects on migratory birds:

In the vicinity of Coffin Island, marine travel should take place at steady speeds, moving parallel to the shore, rather than approaching the island directly.

Vessels and equipment should be well muffled, and the proponent/contractors should avoid any sharp or loud noises, should not blow horns or whistles, and should maintain constant engine noise levels. Due to the proximity to sensitive receptors, we recommend replacing whistle blasts and horns with radio communications.

Marine vessels should not pursue seabirds/waterbirds swimming on the water surface, and avoid concentrations of birds on the water.

Oil or waste should never be dumped overboard, as even small amounts of oil can kill birds and other marine life, and habitats may take years to recover.

There should be no access to Coffin Island, including the intertidal zone, by project staff and/or equipment. Should equipment wash up at these sites during the courtship, nesting, and/or chick rearing seasons of colonial nesters (spring and summer), the proponent would be expected to contact the Canadian Wildlife Service prior to accessing offshore islands to ensure that colonial nesters are not disturbed during retrieval of equipment, and should be prepared with a plan that would comply with the *Migratory Birds Convention Act (MBCA)*.

Annual or bi-annual shoreline clean-ups should be conducted in outer Liverpool Bay (Western Head to West Berlin), but avoiding the mid-March to September 30th period.

Food scraps and other garbage left on beaches and other coastal habitat can artificially enhance the populations of avian and mammalian predators of eggs and chicks of terns. A similar effect could occur if gulls are attracted and have access to excess feed. No litter (including food scraps) should be left in coastal areas. Also, the feed program should be managed to minimize waste, and should include the use of tarps to prevent bird access to fish feed.

Since even small spills of oil can have very serious effects on birds, every effort should be taken to ensure that no oil spills occur. The proponent should ensure that all precautions are taken by staff to prevent fuel leaks from equipment, and contingency plans in case of oil spills should be prepared.

Project staff and vessels should not approach concentrations of seabirds, waterfowl or shorebirds. Beaches and wetlands are sensitive habitats and the proponent should not utilize these habitats for construction, operational or decommissioning activities, with the exception of beach clean-up activities, which should be timed to not coincide with sensitive periods for breeding birds.

The proponent should ensure that staff/contractors are familiar with all mitigation measures and are prepared to implement these. In the event of a discrepancy between environmental legislation and these measures, the requirements of the legislation will take precedence.

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Also, it should be clarified whether grow lights are proposed for this site. Bright lights can cause problems for night migrating birds and night-flying seabirds (e.g. storm-petrels), especially during periods of fog, drizzle, and haze. A powerful pencil of light shining upwards into the fog can appear as a corridor through

darkness into which the birds fly. Birds then get killed or injured by flying into the lit object, by flying into the light itself, or by colliding with other birds. For those that don't get killed or injured but flutter in the light pencil for a long period, they may deplete their energy reserves and either die of exhaustion or drop to the ground where they are at risk from predators. In order to avoid impacts on migratory birds, it is recommended that lights be shielded and aimed downwards.

On page 15 of the Wildlife Interaction Plan, it is stated that “Migratory birds that are more commonly seen around the sites or have the greatest potential to be seen include:”, and photos of 4 migratory bird SAR (e.g. Barrow’s Goldeneye, Harlequin Duck, Ivory Gull, Roseate Tern) photos are presented. However, the species in the photos do not reflect the broad range of sensitive species of migratory birds most likely to be seen around aquaculture sites in the area. This section should be updated accordingly. Similarly, the “Nova Scotia Protected Wildlife” sheets in the “REFERENCED MATERIALS” section should be updated.

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“5.1 (1) No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area.

(2) No person or vessel shall deposit a substance or permit a substance to be deposited in any place if the substance, in combination with one or more substances, results in a substance — in waters or an area frequented by migratory birds or in a place from which it may enter such waters or such an area — that is harmful to migratory birds.”

It is the responsibility of the proponent to ensure that activities comply with the MBCA and regulations. In fulfilling its responsibility for MBCA compliance, the proponent should take the following points into consideration:

Information regarding regional nesting periods can be found at <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods.html>.. Some species protected under the MBCA may nest outside these timeframes

Most migratory bird species construct nests in trees (sometimes in tree cavities) and shrubs, but several species nest at ground level (e.g., Common Nighthawk, Killdeer, sandpipers), in hay fields, pastures or in burrows. Some bird species may nest on cliffs or in stockpiles of overburden material from mines or the banks of quarries. Some migratory birds (including certain waterfowl species) may nest in head ponds created by beaver dams. Some migratory birds (e.g., Barn Swallow, Cliff Swallow, Eastern Phoebe) may build their nests on structures such as bridges, ledges or gutters.

One method frequently used to minimize the risk of destroying bird nests consists of avoiding certain

activities, such as clearing, during the regional nesting period for migratory birds.-

The risk of impacting active nests or birds caring for pre-fledged chicks, discovered during project activities outside the regional nesting period, can be minimized by measures such as the establishment of vegetated buffer zones around nests, and minimization of activities in the immediate area until nesting is complete and chicks have naturally migrated from the area. It is incumbent on the proponent to identify the best approach, based on the circumstances, to complying with the MBCA.

Further information can be found at <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds.html>

The proponent should also be reminded that the prohibitions under the *Species at Risk Act* (SARA) are now in force. The complete text of SARA, including prohibitions, is available at www.sararegistry.gc.ca .

Please do not hesitate to contact me should you have any questions regarding our comments.

Sincerely,

Rachel

From: Gautreau, Rachel (EC) <rachel.gautreau@canada.ca>
Sent: August 27, 2019 2:18 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Wilhelm, Sabina (EC) <sabina.wilhelm@canada.ca>; Hanson, Al (EC) <al.hanson@canada.ca>
Subject: New aquaculture application No. 1432 (Brooklyn) - Liverpool Bay, Queens County, Nova Scotia

Hi Lynn,

Environment and Climate Change Canada's Canadian Wildlife Service (CWS) has reviewed the proposed new aquaculture application for AQ#1432 in Liverpool Bay, Queens County, Nova Scotia, and the project appears to overlap with a portion of coastline identified as significant habitat by provincial wildlife biologists. And as indicated on page 117 of the application, the shorelines from Eastern Head to Beach Meadows, and Black Point to Western Head, are wintering habitat for Harlequin Ducks. It should be clarified whether the "significant habitat" identified by provincial wildlife biologists and illustrated on Figure 54 is Harlequin Duck wintering habitat. If not, it should be clarified what is this "significant habitat", and the distance of the proposed aquaculture lease to Harlequin Duck wintering habitat should be clarified. **Aquaculture leases should not be situated within areas where there are concentrations of wintering Harlequin Ducks, and an adequate buffer should be implemented between Harlequin Duck wintering areas and aquaculture sites.** It should be noted that we may have additional comments once clarification is provided.

The following should also be considered:

Coffin Island is used for nesting by colonial birds, including the Endangered (Schedule 1 of the *Species at Risk Act*) Roseate Tern. Colonial birds are particularly vulnerable to the effects of human disturbance. The period spent at the colony prior to egg-laying is very important for seabirds as this is when they engage in pair formation and other important breeding behaviours, such as nest site defense, nest building, and copulation. Disturbance prior to egg-laying may cause birds to abandon historical colony locations. Meanwhile, disturbance during the breeding season can cause these birds to abandon their nests or young, or to use valuable energy reserves for defence, instead of incubating eggs and feeding their young. The presence of humans in close proximity to nests may prevent parent birds from returning to protect and feed their young, and expose eggs or chicks to predation, and to the lethal effects of heat, cold and rain. When parent birds are flushed, many of the young chicks wander from their nest site and be taken by predators, or be pecked to death by neighbouring birds.

Also, although not officially designated under the Important Bird Areas program, the beaches and flats at East Berlin, West Berlin, Eagle Head, Beach Meadows and Western Head all host small populations of migrant shorebird in late summer and early fall. Furthermore, Purple Sandpipers are known to forage and roost on the ledges at Western Head. Also, the Endangered (Schedule 1 of the *Species at Risk Act*) Piping Plover is known to nest at Beach Meadows Beach and White Point. And the Hudsonian Godwit which was recently assessed as Threatened by COSEWIC (May 2019) has been observed in Liverpool Bay. There is therefore concern for lost gear washing up along the coast and a risk of entanglement for birds.

It is therefore extremely important that mitigation measures, such as the following, be implemented to avoid/minimize adverse effects on migratory birds:

- In the vicinity of Coffin Island, marine travel should take place at steady speeds, moving parallel to the shore, rather than approaching the island directly.

- Vessels and equipment should be well muffled, and the proponent/contractors should avoid any sharp or loud noises, should not blow horns or whistles, and should maintain constant engine noise levels. Due to the proximity to sensitive receptors, we recommend replacing whistle blasts and horns with radio communications.
- Marine vessels should not pursue seabirds/waterbirds swimming on the water surface, and avoid concentrations of birds on the water.
- Oil or waste should never be dumped overboard, as even small amounts of oil can kill birds and other marine life, and habitats may take years to recover.
- There should be no access to Coffin Island, including the intertidal zone, by project staff and/or equipment. Should equipment wash up at these sites during the courtship, nesting, and/or chick rearing seasons of colonial nesters (spring and summer), the proponent would be expected to contact the Canadian Wildlife Service prior to accessing offshore islands to ensure that colonial nesters are not disturbed during retrieval of equipment, and should be prepared with a plan that would comply with the *Migratory Birds Convention Act* (MBCA).
- Annual or bi-annual shoreline clean-ups should be conducted in outer Liverpool Bay (Western Head to West Berlin), but avoiding the mid-March to September 30th period.
- Food scraps and other garbage left on beaches and other coastal habitat can artificially enhance the populations of avian and mammalian predators of eggs and chicks of terns. A similar effect could occur if gulls are attracted and have access to excess feed. No litter (including food scraps) should be left in coastal areas. Also, the feed program should be managed to minimize waste, and should include the use of tarps to prevent bird access to fish feed.
- Since even small spills of oil can have very serious effects on birds, every effort should be taken to ensure that not oil spills occur. The proponent should ensure that all precautions are taken by staff to prevent fuel leaks from equipment, and contingency plans in case of oil spills should be prepared.
- Project staff and vessels should not approach concentrations of seabirds, waterfowl or shorebirds.
- Beaches and wetlands are sensitive habitats and the proponent should not utilize these habitats for construction, operational or decommissioning activities, with the exception of beach clean-up activities, which should be timed to not coincide with sensitive periods for breeding birds.
- The proponent should ensure that staff/contractors are familiar with all mitigation measures and are prepared to implement these. In the event of a discrepancy between environmental legislation and these measures, the requirements of the legislation will take precedence.

We have the following additional comments and questions:

- Also, it should be clarified whether grow lights are proposed for this site. Bright lights can cause problems for night migrating birds and night-flying seabirds (e.g. storm-petrels), especially during periods of fog, drizzle, and haze. A powerful pencil of light shining upwards into the fog can appear as a corridor through darkness into which the birds fly. Birds then get killed or injured by flying into the lit object, by flying into the light itself, or by colliding with other birds. For those that don't get killed or injured but flutter in the light pencil for a long period, they may deplete their energy reserves and either die of exhaustion or drop to the ground where they are at risk from predators. In order to avoid impacts on migratory birds, it is recommended that lights be shielded and aimed downwards.
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It is the responsibility of the proponent to ensure that activities comply with the MBCA and regulations. In fulfilling its responsibility for MBCA compliance, the proponent should take the following points into consideration:

- Information regarding regional nesting periods can be found at <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods.html>. Some species protected under the MBCA may nest outside these timeframes
- Most migratory bird species construct nests in trees (sometimes in tree cavities) and shrubs, but several species nest at ground level (e.g., Common Nighthawk, Killdeer, sandpipers), in hay fields, pastures or in burrows. Some bird species may nest on cliffs or in stockpiles of overburden material from mines or the banks of quarries. Some migratory birds (including certain waterfowl species) may nest in head ponds created by beaver dams. Some migratory birds (e.g., Barn Swallow, Cliff Swallow, Eastern Phoebe) may build their nests on structures such as bridges, ledges or gutters.
- One method frequently used to minimize the risk of destroying bird nests consists of avoiding certain activities, such as clearing, during the regional nesting period for migratory birds.-
- The risk of impacting active nests or birds caring for pre-fledged chicks, discovered during project activities outside the regional nesting period, can be minimized by measures such as the establishment of vegetated buffer zones around nests, and minimization of activities in the immediate area until nesting is complete and chicks have naturally migrated from the area. It is incumbent on the proponent to identify the best approach, based on the circumstances, to complying with the MBCA.

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Sincerely,

Rachel

From: Gautreau, Rachel (EC) <rachel.gautreau@canada.ca>
Sent: August 27, 2019 2:44 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Wilhelm, Sabina (EC) <sabina.wilhelm@canada.ca>; Hanson, Al (EC) <al.hanson@canada.ca>
Subject: New aquaculture application No. 1433 (Mersey Point) - Liverpool Bay, Queens County, Nova Scotia

Hi Lynn,

Environment and Climate Change Canada's Canadian Wildlife Service (CWS) has reviewed the proposed new aquaculture application for AQ#1433 in Liverpool Bay, Queens County, Nova Scotia, and the project appears to overlap with a portion of coastline identified as significant habitat by provincial wildlife biologists. And as indicated on page 117 of the application, the shorelines from Eastern Head to Beach Meadows, and Black Point to Western Head, are wintering habitat for Harlequin Ducks. It should be clarified whether the "significant habitat" identified by provincial wildlife biologists and illustrated on Figure 54 is Harlequin Duck wintering habitat. If not, it should be clarified what is this "significant habitat", and the distance of the proposed aquaculture lease to Harlequin Duck wintering habitat should be clarified. **Aquaculture leases should not be situated within areas where there are concentrations of wintering Harlequin Ducks, and an adequate buffer should be implemented between Harlequin Duck wintering areas and aquaculture sites.** It should be noted that we may have additional comments once clarification is provided.

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Also, although not officially designated under the Important Bird Areas program, the beaches and flats at East Berlin, West Berlin, Eagle Head, Beach Meadows and Western Head all host small populations of migrant shorebird in late summer and early fall. Furthermore, Purple Sandpipers are known to forage and roost on the ledges at Western Head. Also, the Endangered (Schedule 1 of the *Species at Risk Act*) Piping Plover is known to nest at Beach Meadows Beach and White Point. And the Hudsonian Godwit which was recently assessed as Threatened by COSEWIC (May 2019) has been observed in Liverpool Bay. There is therefore concern for lost gear washing up along the coast and a risk of entanglement for birds.

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Please do not hesitate to contact me should you have any questions regarding our comments.

Sincerely,

Rachel

From: Watts, Melinda
Sent: September 16, 2020 3:35 PM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>; 'jnickerson@cookeaqua.com' <jnickerson@cookeaqua.com>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: Network Comments for Liverpool Bay Applications (Brooklyn, Mersey Point, Liverpool Boundary Amendment)

Good afternoon Jennifer and Jeff,

Please see the attached table, which summarizes the network comments provided for each of the three applications submitted for Liverpool Bay. Comments from ECCC/CWS are also attached separately as their response was too lengthy to include in the table.

Further conversations will be required between some of the network partners, including Lands and Forestry and Environment and Climate Change Canada, based on the comments and recommendations included.

Please do not hesitate to reach out if you have any questions and wish to discuss further.

Cheers,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca



Network Comments



Boundary



New aquaculture

Re. KCS Liverpool BaAmendment 1205 (Capplications 1432 ar

NOTE: REFER TO COMMENTS FROM ECCC-CWS ABOVE.

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: May 20, 2021 10:16 AM
To: Gautreau, Rachel (EC) <rachel.gautreau@canada.ca>
Cc: sabina.wilhelm@canada.ca; al.hanson@canada.ca; Breau, Monique (EC) <monique.breau@canada.ca>;
 Mailhiot, Joshua (EC) <joshua.mailhiot@canada.ca>; Ronconi, Robert (EC) <robert.ronconi@canada.ca>;
 Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: Additional information from Kelly Cove Salmon - Liverpool Bay Aquaculture Applications
 (AQ#1205 AQ#1432 AQ31433)

Good morning Rachel,

We have received a response from Kelly Cove Salmon for your questions on the two new sites (Brooklyn and Mersey Point) and the boundary amendment for Coffin Island site in Liverpool Bay (see the original emails attached). All recommendations were also shared with applicant when they were first received by our Department and have been taken into consideration by the applicant.

Please see their response in the attached PDF.

If you have any further questions, please let us know.

Cheers,
 Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
 1800 Argyle St. 6th Floor (Suite 603) - WTCC
 Halifax, NS B3J 3N8
 T: (902) 483-7668
 E: Melinda.Watts@novascotia.ca



Rachel Gautreau,
 Enviro Canada 1432 application No. 143:



New aquaculture



Boundary



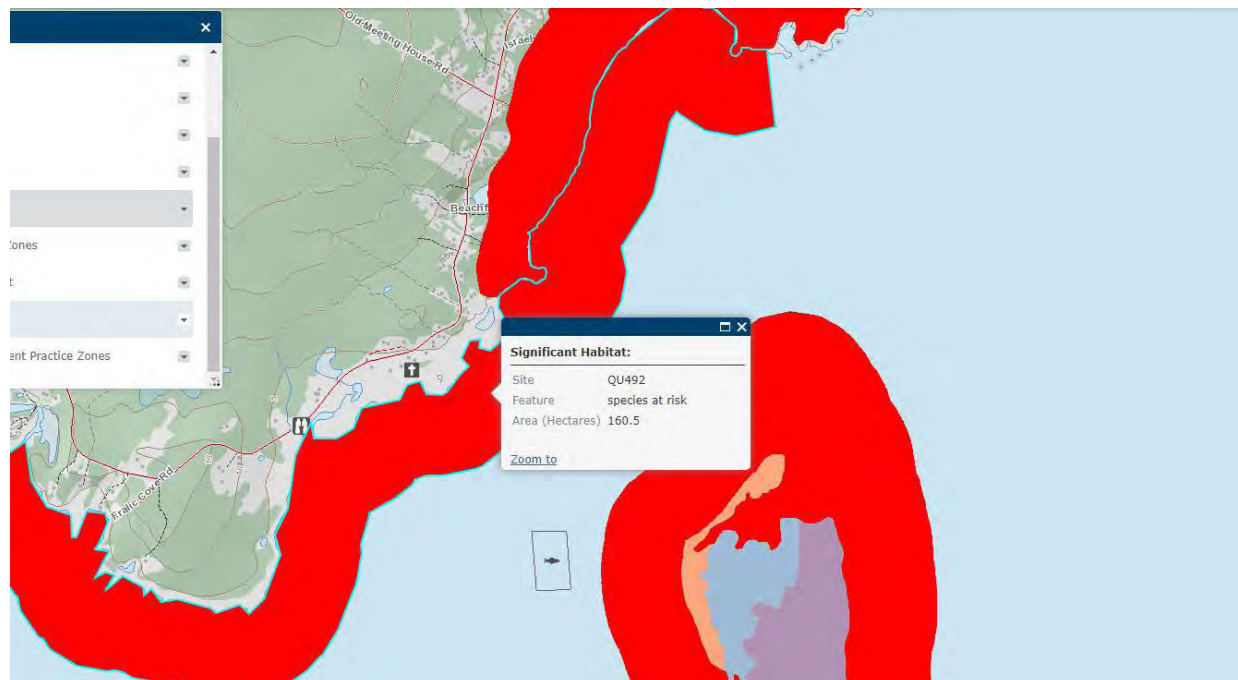
Aquaculture

Applications for Live

KCS Response to ECCC - Liverpool Application

As indicated on page 117 of the application, the shorelines from Eastern Head to Beach Meadows, and Black Point to Western Head, are wintering habitat for Harlequin Ducks. It should be clarified whether the “significant habitat” identified by provincial wildlife biologists and illustrated on Figure 54 is Harlequin Duck wintering habitat. If not, it should be clarified what is this “significant habitat”, and the distance of the proposed aquaculture lease to Harlequin Duck wintering habitat should be clarified.

Red is deemed as significant habitat for species at risk QU492 – that is all that is available on the website.



LU47	Great Blue Heron
LU75	Great Blue Heron
LU83	Great Blue Heron
LU24	Great Blue Heron
QU397	Great Blue Heron
QU46	Great Blue Heron
HX654	Great Blue Heron
CU13	Great Blue Heron
LU224	Great Cormorant
LU225	Great Cormorant
HX656	Great Cormorant
AP4	Greater Scaup
AP99	Greater Scaup
LU202	Greater Yellowlegs
AP122	Green-winged Teal
LU10	Gull (unclassified)
LU64	Gull (unclassified)
QU14	Gull (unclassified)
HN5293	Gypsum sink hole pond, no species recorded
HX645	Harlequin Duck
HX646	Harlequin Duck
KI202	Harlequin Duck
LU1	Harlequin Duck
LU257	Harlequin Duck
LU258	Harlequin Duck
QU492	Harlequin Duck
AP179	Harlequin Duck
CU11	Herring Gull
KI3	Herring Gull
LU1	Herring Gull
LU5	Herring Gull
LU6	Herring Gull
LU7	Herring Gull
LU9	Herring Gull

QU492 = Harlequin Duck (source: <https://novascotia.ca/nse/ea/kaizer.meadow.wind.project/Section-4.6.2-to-end-of-Appendices.pdf>)

<http://www.speciesatrisk.ca/SARGuide/download/Harlequin%20Duck.pdf> this source indicates that they winter along NS coastline. So if QU492 = Harlequin duck and species at risk indicates they can be found

here in winter.... Then the red indicates overwintering grounds.

It should be clarified whether grow lights are proposed for this site.

Artificial lighting will be used on the site between November 15-April 15th. LED lights from the blue spectrum are used, all lights will be pointed downward towards the bottom of the cage there will be no glow as was observed when using halogen lights. The lights will be powered from the on-site feed barge. There will be 4 lights per cage positioned ~ 5 meters deep in the cage.

On page 15 of the Wildlife Interaction Plan, it is stated that “Migratory birds that are more commonly seen around the sites or have the greatest potential to be seen include:”, and photos of 4 migratory bird SAR (e.g. Barrow’s Goldeneye, Harlequin Duck, Ivory Gull, Roseate Tern) photos are presented. However, the species in the photos do not reflect the broad range of sensitive species of migratory birds most likely to be seen around aquaculture sites in the area. This section should be updated accordingly. Similarly, the “Nova Scotia Protected Wildlife” sheets in the “REFERENCED MATERIALS” section should be updated.

The short list of birds is those that have the greatest potential to be seen as the farms – considering the farms marine locations. The same is true for the Wildlife – given potential interactions and likelihood of seeing the species based on locations of farms. Example the Ivory Gull is listed on the NB list, but not the NS or NL list. A larger list of species is included within the WIP for Atlantic Canada.

Should we ever have sightings or interactions with others, we would update based on experience.

However, based on our experience, these are the most likely. We cannot list every bird on the SARA list as this is a tool to be used by the Managers, and its purpose is to be a quick reference.

From: Watts, Melinda
Sent: July 18, 2023 8:50 PM
To: Breau, Monique (EC) <monique.breau@canada.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: Liverpool Bay Aquaculture Applications (AQ#1205 AQ#1432 AQ#1433) - CWS Comments
Importance: High

Good morning Monique,

Our department is preparing to refer an application package to the Nova Scotia Aquaculture Review Board (NSARB) for marine finfish licence and lease AQ#1205x (boundary amendment) and AQ#1432/AQ#1433 (new marine sites) in Liverpool Bay by Kelly Cove Salmon Ltd.

As a follow up to the request CWS made on August 27, 2019, for additional information (see attached emails) a response from the applicant was provided to CWS on May 20, 2021, from our department (see attached pdfs). During the preparation of the application package for the NSARB, we have noted that our department did not receive comment from CWS after the additional information was provided. Can you please confirm that the information that was provided satisfied your request for additional information?

This is a time sensitive issue so please confirm by **Monday, July 24th** to allow the applications to be submitted in a timely manner.

Please do not hesitate to reach out if you have any questions.

Thank you,
 Melinda

Melinda Watts
Aquaculture Development Advisor

Nova Scotia Department of Fisheries and Aquaculture
 1800 Argyle St. 6th Floor (Suite 603) - WTCC
 Halifax, NS B3J 3N8
 T: (902) 483-7668
 E: Melinda.Watts@novascotia.ca



Boundary
 Amendment



New aquaculture
 application No. 143



New aquaculture
 application No. 143



Additional



Aquaculture

Applications for Live

From: Roberts,Sydney (elle, la | she, her) (ECCC) <sydney.roberts@ec.gc.ca>
Sent: July 25, 2023 1:50 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Cc: EE SCF Atl / EA CWS Atl (ECCC) <eaatlantic@EC.GC.CA>
Subject: Liverpool Bay Aquaculture Applications (AQ #1205, #1432, #1433) - CWS Comments

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

Exercice caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Hi Melinda,

Thank you for reaching out to us to follow-up on your question from May 2021, we appreciate the opportunity to provide input at this late stage.

Environment and Climate Change Canada's Canadian Wildlife Service has reviewed the additional information that Kelly Cove Salmon Ltd.'s provided in response to ECCC-CWS' comments on the Liverpool Bay, NS aquaculture applications (AQ #1205, AQ#1432, AQ #1433) and offers the following comments.

Comment 1:

The applicant has confirmed that the Liverpool Bay, NS area is overwintering habitat for Harlequin Duck. Harlequin Duck (*Histrionicus histrionicus*) are listed on Schedule 1 of the *Species at Risk Act* (SARA) as Special Concern, and are provincially listed on the Nova Scotia *Endangered Species Act* (ESA) as Endangered.

It should be noted that the link provided (<http://www.speciesatrisk.ca/SARGuide/download/Harlequin%20Duck.pdf>) is no longer active, so ECCC-CWS was unable to view this source.

ECCC-CWS reiterates that per our August 2019 comments "*Aquaculture leases should not be situated within areas where there are concentrations of wintering Harlequin Ducks, and an adequate buffer should be implemented between Harlequin Duck wintering areas and aquaculture sites*". ECCC-CWS recommends that the aquaculture sites be reconfigured/relocated so that it does not overlap with annual/consistently used Harlequin Duck overwintering habitat to avoid potential disturbance to these and other seaducks. ECCC-CWS recommends that the applicant consider the information provided on page 205-208 of the "*Atlas of Sea Duck Key Habitat Sites in North America*" (Sea Duck Joint Venture, 2022) (see [Sea Duck Key Habitat Sites Atlas \(seaduckjv.org\)](https://seaduckjv.org/)), which notes that Liverpool Bay area is overwintering habitat for Harlequin Duck. ECCC-CWS will provide additional information, including updated maps of Harlequin Duck overwintering habitat in the Liverpool Bay area, particularly those that overlap with the three lease sites, to support best site location to ensure that potential disturbance to overwintering Harlequin Duck and other seaducks is avoided/minimized.

Additionally, ECCC-CWS notes that over-wintering seaducks may be attracted to these sites to forage. In addition to fish-eating birds (e.g. gulls, terns, herons) that may be attracted to the site, diving migratory birds such as seaducks may also be attracted to finfish aquaculture site and fish feed, and could become entangled in underwater predator nets. ECCC recommends that the proponent identify measures to monitor underwater predator nets for potential diving bird entanglement.

ECCC-CWS should be contacted for further advice if there is an increase in bird activity or any changes in seaduck distribution or numbers observed in vicinity of the lease (including species and numbers, if possible), particularly if attraction and depredation is suspected (e.g. attraction the feed). If depredation issues do arise, ECCC-CWS can provide additional advice on mitigation measures (also see below advice – Bird Entanglement Contingency Planning Advice).

Comment 2:

ECCC-CWS acknowledges that the applicant has indicated that any lights used will be pointed downwards to avoid glare. ECCC-CWS is satisfied with this information.

Comment 3:

ECCC-CWS acknowledges that the applicant has provided a short list of birds with the greatest potential to be sighted at the lease sites, including Barrow's Goldeneye (SARA Schedule 1, Endangered; NS ESA, Special Concern), Harlequin Duck (see above), Ivory Gull (SARA Schedule 1, Endangered; not listed on NS ESA), and Roseate Tern (SARA Schedule 1, Endangered; NS ESA, Endangered), and that they have committed to updating the Wildlife Interaction Plan (WIP) if they have interactions with other species. The applicant states that the WIP is meant to be a quick reference for Managers.

ECCC-CWS disagrees with this approach to the Wildlife Interaction Plan. Applicants should be aware of all species (migratory birds, species at risk and species of conservation concern) that have the potential to be impacted by their activities to ensure that they have adequately considered all measures to avoid/minimize the potential impacts.

Please let us know if you have any questions.

Thanks

Sydney

Sydney Roberts

Coordinator, Environmental Assessment, Canadian Wildlife Service
Environment and Climate Change Canada / Government of Canada
NEW! Sydney.Roberts@ec.gc.ca / Tel: +1-709-325-1740

Coordonnatrice, Évaluations environnementales, Service canadien de la faune
Environnement et Changement climatique Canada / Gouvernement du Canada
NOUVEAU! Sydney.Roberts@ec.gc.ca / Tél : +1-709-325-1740

From: Watts, Melinda
Sent: July 26, 2023 10:17 AM
To: Roberts,Sydney (elle, la | she, her) (ECCC) <sydney.roberts@ec.gc.ca>
Cc: EE SCF Atl / EA CWS Atl (ECCC) <eaatlantic@EC.GC.CA>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Liverpool Bay Aquaculture Applications (AQ #1205, #1432, #1433) - CWS Comments

Thank you, Sydney, for this quick turnaround response.

Just two quick comments/questions.

It states you “will provide additional information, including updated maps of Harlequin Duck overwintering habitat in the Liverpool Bay area, particularly those that overlap with the three lease sites, to support best site location to ensure that potential disturbance to overwintering Harlequin Duck and other seaducks is avoided/minimized.” Can you please send this so it can be shared with the applicant?

Finally, with regards to the last comment, Kelly Cove Salmon did update their Wildlife Interaction Plan in 2022, which was done after the original response was provided to CWS. I have attached it here for your reference and apologies I did not send with our request for review last week. As you will see, this is more inclusive of a variety of species, not just those with designations. Through the department’s Farm Management Plan Program, mitigation measures to avoid interactions with wildlife, including birds are identified by all licence/lease holders. ECCC-CWS’ recommendations and mitigation measures have been shared with the applicant.

Cheers,
Melinda

Melinda Watts
Aquaculture Development Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca



WIP Wildlife
Interaction Plan 22.C

NOTE: REFER TO APPENDIX K FOR THE UPDATED WILDLIFE INTERACTION PLAN

From: Roberts,Sydney (elle, la | she, her) (ECCC)
Sent: July 27, 2023 1:40 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Cc: EE SCF Atl / EA CWS Atl (ECCC) <eaatlantic@EC.GC.CA>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>; Keeping,Brent (ECCC) <Brent.Keeping@ec.gc.ca>
Subject: RE: Liverpool Bay Aquaculture Applications (AQ #1205, #1432, #1433) - CWS Comments

Hi Melinda,

Please see ECCC-CWS' responses to your follow-up questions below. Let us know if you have any additional questions.

Thanks!

Sydney



EA_Liverpool_NS_HARD
ARD_20230727_Tem



Liverpool_NS_HARD
_Obs.csv

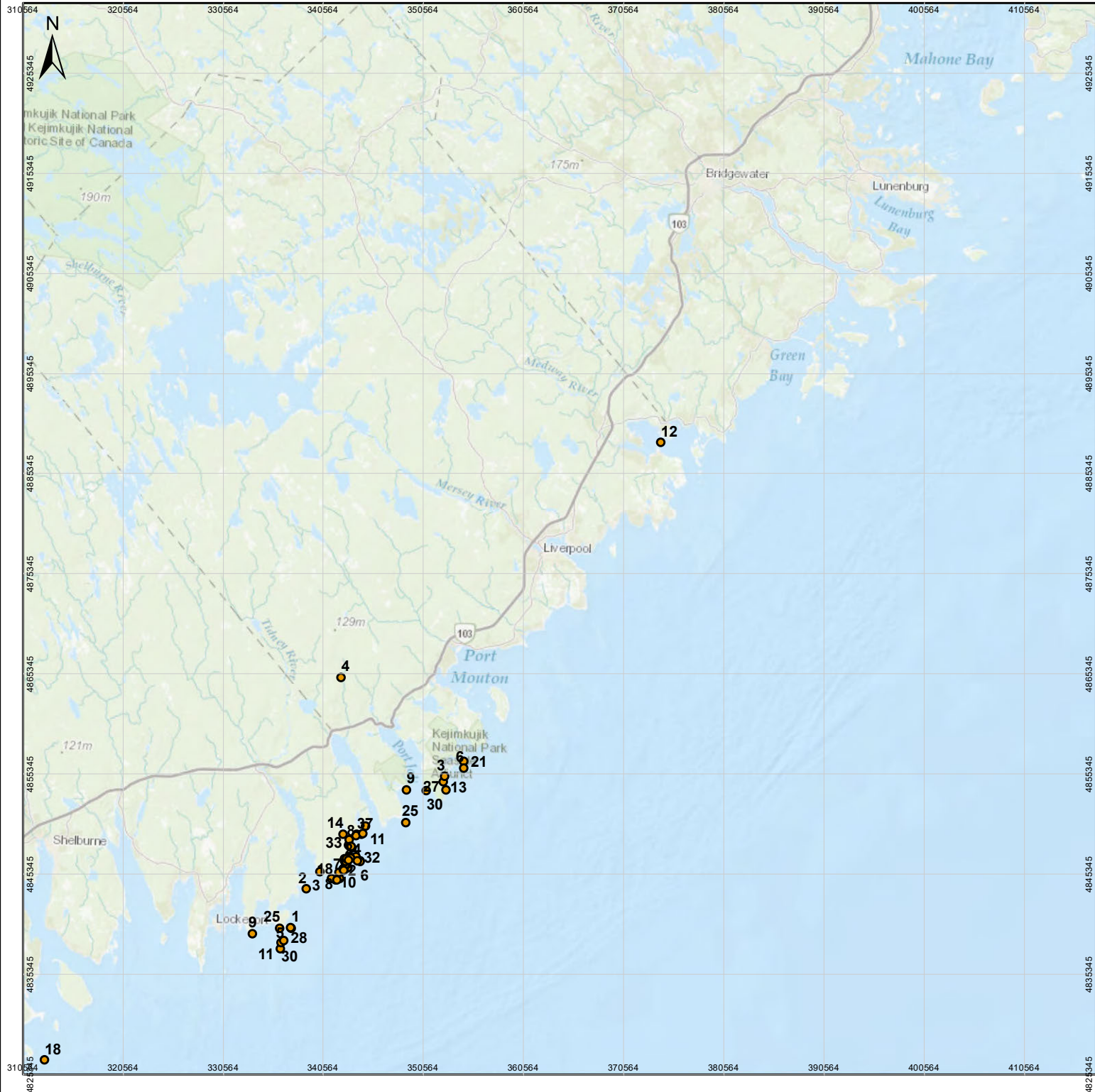
It states you “will provide additional information, including updated maps of Harlequin Duck overwintering habitat in the Liverpool Bay area, particularly those that overlap with the three lease sites, to support best site location to ensure that potential disturbance to overwintering Harlequin Duck and other seaducks is avoided/minimized.” Can you please send this so it can be shared with the applicant?

ECCC-CWS notes that upon further investigation, we were unable to locate any data for Harlequin Duck overwintering habitat in the Liverpool Bay area in our current inventories. We apologize for the confusion, but point to the information provided by the applicant (in 2021) and support their conclusion that the Liverpool Bay area is overwintering habitat for Harlequin Duck. Should more information become available, we will provide it to you.

Please find attached a map that includes Harlequin Duck survey observations in the southeastern Nova Scotia area, dating from 1966-2015 (with only one record pre-dating 2000). We have also included an accompanying datasheet that includes additional information (date, location, number observed, sex), should this be of interest.

Finally, with regards to the last comment, Kelly Cove Salmon did update their Wildlife Interaction Plan in 2022, which was done after the original response was provided to CWS. I have attached it here for your reference and apologies I did not send with our request for review last week. As you will see, this is more inclusive of a variety of species, not just those with designations. Through the department's Farm Management Plan Program, mitigation measures to avoid interactions with wildlife, including birds are identified by all licence/lease holders. ECCC-CWS' recommendations and mitigation measures have been shared with the applicant.

ECCC-CWS is satisfied with the information provided. No additional information is required at this time.



471

Environment and
 Climate Change Canada
 Canadian Wildlife Service

Environnement et
 Changement climatique Canada
 Service canadien de la faune

Liverpool, NS Harlequin Duck Observations

Queens County
Nova Scotia

Legend

- Harlequin Duck Counts



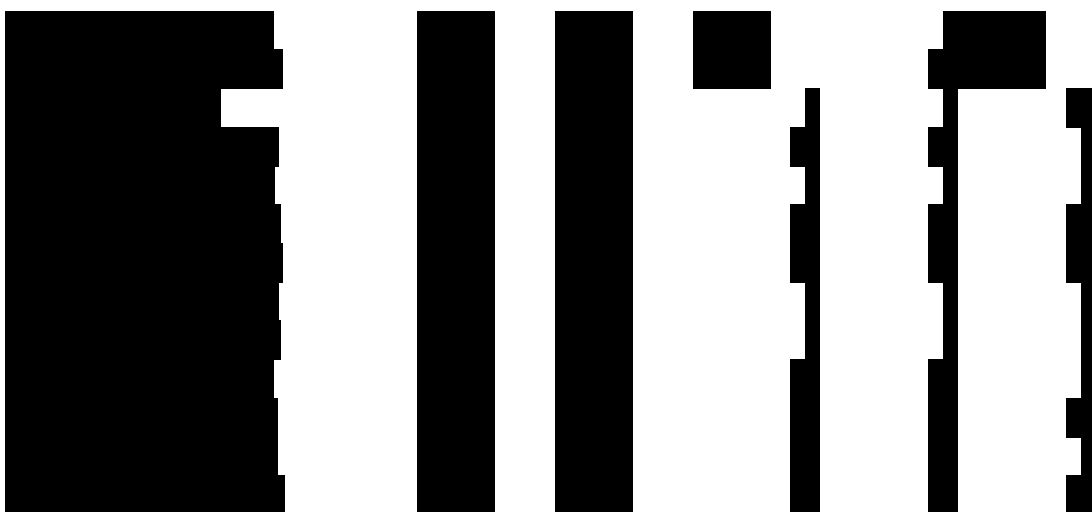
UTM Zone 20N
North American Datum 1983

0 10 20
Km

© 2023. His Majesty the King in Right of Canada
ESRI World Topographic Map ArcGIS 10.8 © 2023







APPENDIX G – NOVA SCOTIA DEPARTMENT OF ENVIRONMENT
(NOW NOVA SCOTIA DEPARTMENT OF ENVIRONMENT AND CLIMATE
CHANGE)

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: June 27, 2019 10:05 AM
To: shane.hood@inspection.gc.ca; david.macarthur@ec.gc.ca; rachel.gautreau@ec.gc.ca; Birch, Angela <Angela.Birch@novascotia.ca>; Miller, L (Dawn) <Dawn.Miller2@novascotia.ca>; Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>; Murrant, Darryl D <Darryl.Murrant@novascotia.ca>; Blackburn, Lori M <Lori.Blackburn@novascotia.ca>; Angela.Smith@canada.ca
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Attn: Network Review Agencies:

Attached please find the Boundary Amendment application and information for Kelly Cove Salmon AQ#1205 in Liverpool Bay, Queens County.

Please respond with your feedback by August 27, 2019.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
 Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
 Shelburne, NS BOT 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429
 Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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***Please refer to Application Package, Section 2.0 - Applicant's Aquaculture Development Plan, for documents sent to and reviewed by Nova Scotia Environment and Climate Change.**

NOTE: THIS EMAIL WAS DUPLICATED FOR AQ#1432 AND AQ#1433 AND SENT TO THE SAME RECIPIENTS.

From: Birch, Angela <Angela.Birch@novascotia.ca>

Sent: July 26, 2019 10:24 AM

To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>

Subject: RE: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Hi Lynn,

Here are the comments from NSE's compliance team.

Angela

Network Agency Review of an Aquaculture Application

Agency	Nova Scotia Dept of Environment
Division (if applicable)	Enforcement
Date	July 17, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1205 (Coffin Island), Queens County
Type of application	Boundary Amendment
Information Provided	Conservation Officer Gary Lowe/Regional Manager Jason Cleaves

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Concerns with development are that there have been complaints with this company of debris breaking loose and washing up on shore on/or near private lands. However, when notified about debris from site, the site manager has sent out workers and had site cleaned up with in a few days of being notified and pictures of clean up sent to local officers.

Required or Recommended conditions:

- 1) That instead of Styrofoam buoys being used for corner markers, recommend that heavier material inflatable floats/ buoys be used which would cause less/no debris of small Styrofoam balls left behind on land or water.
- 2) Corner blocks for site markers be placed by a qualified third party with highly accurate GPS technology

Public Notice and Disclosure

As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

Privacy Statement

The network review information collected as part of an aquaculture application will only be used or disclosed by Fisheries and Aquaculture for the purpose of deciding on the application.

All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Birch, Angela <Angela.Birch@novascotia.ca>

Sent: July 26, 2019 10:23 AM

To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>

Subject: RE: AQ#1432 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Brooklyn),
Queens County

Hi Lynn,

Here are the comments from NSE's compliance team.

Angela

Network Agency Review of an Aquaculture Application

Agency	Nova Scotia Dept of Environment
Division (if applicable)	Enforcement
Date	July 17, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1432 (Brooklyn), Queens County
Type of application	Marine Finfish Cage Cultivation (Atlantic Salmon)
Information Provided	Conservation Officer Gary Lowe/Manager, Jason Cleaves

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Concerns with development are that there has been complaints with this company of debris breaking loose and washing up on shore on/or near private lands. But also when notified about debris from site, the site manager has sent out workers and had site cleaned up with in a few days of being notified and pictures of clean up sent to Officer.

Required or Recommended conditions:

- 1) That instead of Styrofoam buoys being used for corner markers, recommend that heavier material inflatable floats/ buoys be used which would cause less/no debris of small Styrofoam balls left behind on land or water.
- 2) Corner blocks for site markers be placed by a qualified third party with highly accurate GPS technology

Public Notice and Disclosure

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All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Birch, Angela

Sent: July 26, 2019 10:22 AM

To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>

Subject: RE: AQ#1433 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Mersey Point), Queens County

Hi Lynn,

Here are the comments from NSE's compliance team.

Angela

Network Agency Review of an Aquaculture Application

Agency	Nova Scotia Dept of Environment
Division (if applicable)	Enforcement
Date	July 17, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1433 (Mersey Point), Queens County
Type of application	Marine Finfish Cage Cultivation (Atlantic Salmon)
Information Provided	Conservation Officer Gary Lowe

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Concerns with development are that there has been complaints with this company of debris breaking loose and washing up on shore on/or near private lands. But also when notified about debris from site, the site manager has sent out workers and had site cleaned up with in a few days of being notified and pictures of clean up sent to Officer.

Required or Recommended conditions:

- 1) That instead of Styrofoam buoys being used for corner markers, recommend that heavier material inflatable floats/ buoys be used which would cause less/no debris of small Styrofoam balls left behind on land or water.
- 2) Corner blocks for site markers be placed by a qualified third party with highly accurate GPS technology

Public Notice and Disclosure

As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

Privacy Statement

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All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Winfield, Lynn

Sent: July 26, 2019 10:44 AM

To: Birch, Angela <Angela.Birch@novascotia.ca>

Subject: RE: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Thanks Angela for the comments on the 3 Liverpool Bay sites.

Thanks,

Lynn

E. Lynn Winfield

Licensing Coordinator,

Nova Scotia Department of Fisheries and Aquaculture

APPENDIX H – NOVA SCOTIA DEPARTMENT OF AGRICULTURE

From: Winfield, Lynn
Sent: June 27, 2019 10:05 AM
To: shane.hood@inspection.gc.ca; david.macarthur@ec.gc.ca; rachel.gautreau@ec.gc.ca; Birch, Angela <Angela.Birch@novascotia.ca>; Miller, L (Dawn) <Dawn.Miller2@novascotia.ca>; Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>; Murrant, Darryl D <Darryl.Murrant@novascotia.ca>; Blackburn, Lori M <Lori.Blackburn@novascotia.ca>; Angela.Smith@canada.ca
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Attn: Network Review Agencies:

Attached please find the Boundary Amendment application and information for Kelly Cove Salmon AQ#1205 in Liverpool Bay, Queens County.

Please respond with your feedback by August 27, 2019.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
 Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
 Shelburne, NS BOT 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429
 Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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***Please refer to Application Package, Section 2.0 - Applicant's Aquaculture Development Plan, for documents sent to and reviewed by Department of Agriculture.**

NOTE: THIS EMAIL WAS DUPLICATED FOR AQ#1432 AND AQ#1433 AND SENT TO THE SAME RECIPIENTS.

From: Miller, L (Dawn) <Dawn.Miller2@novascotia.ca>
Sent: August 15, 2019 3:11 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Please find attached, the response from Agriculture for Boundary Amendment application 1205.

Regards,

Dawn Miller

Dawn Miller, MSc., P.Ag.
Program Administrator
Nova Scotia Department of Agriculture
176 College Road – Harlow Building
PO Box 890
Truro, Nova Scotia
B2N 5G6

Telephone: 902-893-6548
Fax: 902-893-0244
Mobile: 902-890-3377
E-mail: Dawn.Miller2@novascotia.ca

Network Agency Review of an Aquaculture Application

Agency	Agriculture
Division (if applicable)	Industry Protection
Date	15/08/2019
File No.	Kelly Cove Salmon Ltd. AQ#1205 (Coffin Island), Queens County
Type of application	Boundary Amendment
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Public Notice and Disclosure

As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

Privacy Statement

The network review information collected as part of an aquaculture application will only be used or disclosed by Fisheries and Aquaculture for the purpose of deciding on the application.

All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Miller, L (Dawn) <Dawn.Miller2@novascotia.ca>
Sent: August 15, 2019 3:51 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: AQ#1432 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Brooklyn),
Queens County

Please find attached, the response from Agriculture regarding application 1432.

Regards,

Dawn Miller

Dawn Miller, MSc., P.Ag.
Program Administrator
Nova Scotia Department of Agriculture
176 College Road – Harlow Building
PO Box 890
Truro, Nova Scotia
B2N 5G6

Telephone: 902-893-6548
Fax: 902-893-0244
Mobile: 902-890-3377
E-mail: Dawn.Miller2@novascotia.ca

Network Agency Review of an Aquaculture Application

Agency	Agriculture
Division (if applicable)	Industry Protection
Date	15/08/2019
File No.	Kelly Cove Salmon Ltd. AQ#1432 (Brooklyn), Queens County
Type of application	Marine Finfish Cage Cultivation (Atlantic Salmon)
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Public Notice and Disclosure

As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

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All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Miller, L (Dawn) <Dawn.Miller2@novascotia.ca>
Sent: August 15, 2019 4:15 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: AQ#1433 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Mersey Point), Queens County

Please find attached, the Aquaculture Network Review form from Agriculture for application 1433.

Regards,

Dawn Miller

Dawn Miller, MSc., P.Ag.
Program Administrator
Nova Scotia Department of Agriculture
176 College Road – Harlow Building
PO Box 890
Truro, Nova Scotia
B2N 5G6

Telephone: 902-893-6548
Fax: 902-893-0244
Mobile: 902-890-3377
E-mail: Dawn.Miller2@novascotia.ca

Network Agency Review of an Aquaculture Application

Agency	Agriculture
Division (if applicable)	Industry Protection
Date	15/08/2019
File No.	Kelly Cove Salmon Ltd. AQ#1433 (Mersey Point), Queens County
Type of application	Marine Finfish Cage Cultivation (Atlantic Salmon)
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Public Notice and Disclosure

As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

Privacy Statement

The network review information collected as part of an aquaculture application will only be used or disclosed by Fisheries and Aquaculture for the purpose of deciding on the application.

All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

APPENDIX I – NOVA SCOTIA DEPARTMENT OF MUNICIPAL AFFAIRS
(NOW DEPARTMENT OF MUNICIPAL AFFAIRS AND HOUSING)

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: April 27, 2021 8:39 AM
To: dnorman@regionofqueens.com
Cc: Smith, Gordon T <Gordon.Smith@novascotia.ca>; Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Subject: Proposed Aquaculture Boundary Amendment AQ#1205 and New Site Applications AQ#1432 and AQ#1433

Good Morning Mayor Norman and Council,

Please see the attached correspondence for your information.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
 Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
 Shelburne, NS B0T 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429
 Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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2021.04.26-Municipal Notification



2019.04.01 Lette Schedule_A_1205x.pdf



2021.04.26-Municipal Notification Lette



Schedule A-AQ1432.pdf



2021.04.26-Municipal Notification Lette



Schedule_A_1433.pdf

April 26, 2021

Via Email: dnorman@regionofqueens.com

Region of Queens Municipality
ATTN: Darlene Norman, Mayor & Council
PO Box 1264
249 White Point Road
Liverpool, NS
B0T 1K0

Dear Ms. Norman & Council:

**Re: Proposed Boundary Amendment Application No. 1205
Liverpool Bay (Coffin Island), Queens County**

In an effort to keep communities better informed about aquaculture activities in their area, the Province of Nova Scotia is continuing to contact municipalities directly to inform them of proposed applications for aquaculture sites.

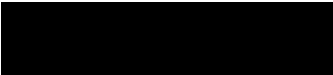
The purpose of this letter is to advise the Region of Queens Municipality of the proposed boundary amendment to AQ#1205 aquaculture site located in Liverpool Bay (Coffin Island), Queens County. You can view the Development Plan on our website at: <https://novascotia.ca/fish/aquaculture/Routine-disclosure-of-Kelly-Cove-Salmon-site-application-documents.pdf>.

This application is currently in the *Review Phase* of our Adjudicative Application Process. During this stage the Department reviewed the application to make sure all the necessary information was supplied, including the results of the public engagement from the *Scoping Phase*. The application has also been shared with the necessary federal and provincial departments for their input. Consultations with First Nations is also underway. Following the *Review Phase*, the application will be referred to the Nova Scotia Aquaculture Review Board for a decision. The Nova Scotia Aquaculture Review Board provides an opportunity for members of the public to participate in the public hearing process. Notification of the date of the public hearing will be made through the Department's website.

For your information I have enclosed the proposed Schedule "A" regarding this boundary amendment.

We do not require your feedback; however you are more than welcome to contact our department directly if you have any questions. You can reach me by phone at 902-875-7430 or by email Robert.Ceschiutti@novascotia.ca.

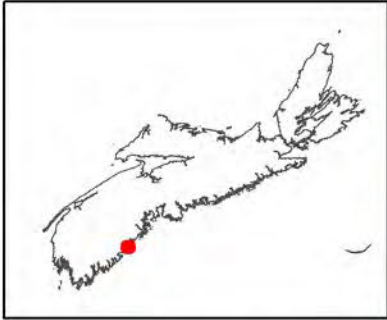
Sincerely,



Robert Ceschiutti,
Manager, Licensing and Leasing

Enclosures

c. Gordon Smith, Department of Municipal Affairs



Aquaculture Site
1205x

Centre
 Lat 44° 02' 31.08" Long -64° 38' 23.01"
 Corner 1
 Lat 44° 02' 46.61" Long -64° 38' 33.81"
 Corner 2
 Lat 44° 02' 47.41" Long -64° 38' 15.65"
 Corner 3
 Lat 44° 02' 14.90" Long -64° 38' 12.93"
 Corner 4
 Lat 44° 02' 14.11" Long -64° 38' 31.09"

DATUM NAD 83
 The above coordinates
 are from a legal survey



Application Information

Proponents : Kelly Cove Salmon Ltd.
 Site Location : Liverpool Bay
 Dimensions : Approx. 405m x 1005m x 405m x 1005m
 Area : Approx. 40.70 ha

- Proposed Application
- Other Issued Lease
- Other Proposed Lease
- ~ OMHW Mark
- Low Water Mark

Species: Atlantic Salmon

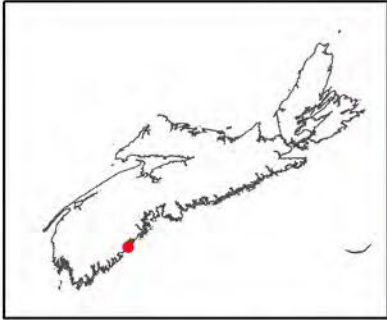
Chart No.
4211



Disclaimer

This map should not be used for navigation or legal purposes. It is intended for general reference use only.

MK-1205x-APR-2019



Aquaculture Site
1205x

Centre
 Lat 44° 02' 31.08" Long -64° 38' 23.01"
 Corner 1
 Lat 44° 02' 46.61" Long -64° 38' 33.81"
 Corner 2
 Lat 44° 02' 47.41" Long -64° 38' 15.65"
 Corner 3
 Lat 44° 02' 14.90" Long -64° 38' 12.93"
 Corner 4
 Lat 44° 02' 14.11" Long -64° 38' 31.09"

DATUM NAD 83
 The above coordinates
 are from a legal survey



Application Information

Proponents : Kelly Cove Salmon Ltd.
 Site Location : Liverpool Bay
 Dimensions : Approx. 405m x 1005m x 405m x 1005m
 Area : Approx. 40.70 ha

- Proposed Application
- Other Issued Lease
- Other Proposed Lease
- OMHW Mark
- NS Bathymetry
- Low Water Mark

Species: Atlantic Salmon

Chart No.
4211



Disclaimer

This map should not be used for navigation or legal purposes. It is intended for general reference use only.

MK-1205x-APR-2019

April 26, 2021

Via Email: dnorman@regionofqueens.com

Region of Queens Municipality
ATTN: Darlene Norman, Mayor & Council
PO Box 1264
249 White Point Road
Liverpool, NS
B0T 1K0

Dear Ms. Norman & Council:

**Re: Proposed Aquaculture Application No. 1432
Liverpool Bay, (Brooklyn), Queens County**

In an effort to keep communities better informed about aquaculture activities in their area, the Province of Nova Scotia is continuing to contact municipalities directly to inform them of proposed applications for aquaculture sites.


The purpose of this letter is advise the Region of Queens Municipality of a proposed aquaculture site located in Liverpool Bay (Brooklyn), Queens County. You can view the Development Plan on our website at: <https://novascotia.ca/fish/aquaculture/Routine-disclosure-of-Kelly-Cove-Salmon-site-application-documents.pdf>.

This application is currently in the *Review Phase* of our Adjudicative Application Process. During this stage the Department reviewed the application to make sure all the necessary information was supplied, including the results of the public engagement from the *Scoping Phase*. The application has also been shared with the necessary federal and provincial departments for their input. Consultations with First Nations is also underway. Following the *Review Phase*, the application will be referred to the Nova Scotia Aquaculture Review Board for a decision. The Nova Scotia Aquaculture Review Board provides an opportunity for members of the public to participate in the public hearing process. Notification of the date of the public hearing will be made through the Department's website.

Also, for your information I have enclosed the proposed Schedule "A" regarding the proposed Site.

We do not require your feedback; however you are more than welcome to contact our department directly if you have any questions. You can reach me by phone at 902-875-7430 or by email Robert.Ceschiutti@novascotia.ca.

Sincerely,



Robert Ceschiutti,
Manager, Licensing and Leasing

Enclosures

c. Gordon Smith, Department of Municipal Affairs

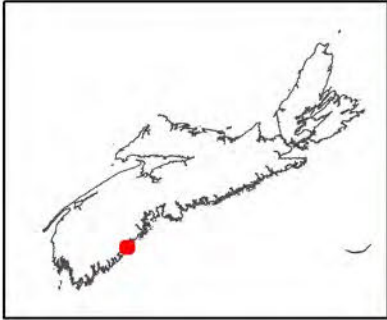
SCHEDULE A
GPS COORDINATE INFORMATION SHEET

Note: The coordinates and dimensions for this site have been taken a legal survey.

Application #:	1432		
Applicant:	Kelly Cove Salmon Ltd.		
Location:	Liverpool Bay	County:	Queens
Hydrographic Chart:	4211	Orthophoto #:	
Dimensions of site:	Approx. 405m x 1005m x 405m 1005m	Size:	Approx. 40.70 ha

Approximate Coordinates of Application:

Datum used:	NAD 83		
Centre coordinates (approx.)	Lat.	44° 02' 16.98"	
	Long.	-64° 39' 39.55"	
Corner #1	Lat.	44° 02' 28.73"	Corner #2
	Long.	-64° 39' 57.86"	Lat.
			Long.
			-64° 39' 15.52"
Corner #3	Lat.	44° 02' 05.12"	Corner #4
	Long.	-64° 39' 21.83"	Lat.
			Long.
			-64° 40' 04.17"



**Aquaculture Site
1432**

Centre
 Lat 44° 02' 16.98" Long -64° 39' 39.55"
 Corner 1
 Lat 44° 02' 28.73" Long -64° 39' 57.86"
 Corner 2
 Lat 44° 02' 17.42" Long -64° 39' 15.52"
 Corner 3
 Lat 44° 02' 05.12" Long -64° 39' 21.83"
 Corner 4
 Lat 44° 02' 16.42" Long -64° 40' 04.17"

DATUM NAD 83
 The above coordinates
 are from a legal survey



Application Information

Proponents : Kelly Cove Salmon Ltd.
 Site Location : Liverpool Bay
 Dimensions : Approx. 405m x 1005m x 405m x 1005m
 Area : Approx. 40.70 ha

- Proposed Application
- Other Issued Lease
- Other Proposed Lease
- OMHW Mark
- Low Water Mark

Species: Atlantic Salmon

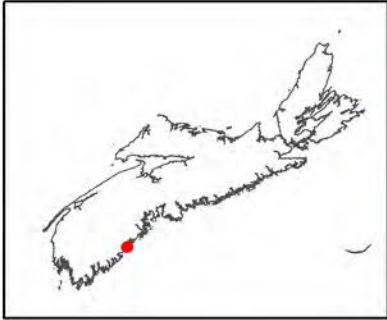
Chart No.
4211



Disclaimer

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MK-1432-APR-2019



**Aquaculture Site
1432**

Centre
 Lat 44° 02' 16.98" Long -64° 39' 39.55"
 Corner 1
 Lat 44° 02' 28.73" Long -64° 39' 57.86"
 Corner 2
 Lat 44° 02' 17.42" Long -64° 39' 15.52"
 Corner 3
 Lat 44° 02' 05.12" Long -64° 39' 21.83"
 Corner 4
 Lat 44° 02' 16.42" Long -64° 40' 04.17"

DATUM NAD 83
 The above coordinates
 are from a legal survey



Application Information

Proponents : Kelly Cove Salmon Ltd.
 Site Location : Liverpool Bay
 Dimensions : Approx. 405m x 1005m x 405m x 1005m
 Area : Approx. 40.70 ha

- Proposed Application
- Other Issued Lease
- Other Proposed Lease
- OMHW Mark
- NS Bathymetry
- Low Water Mark

Species: Atlantic Salmon

Chart No.
4211



Disclaimer

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MK-1432-APR-2019

April 26, 2021

Via Email: dnorman@regionofqueens.com

Region of Queens Municipality
ATTN: Darlene Norman, Mayor & Council
PO Box 1264
249 White Point Road
Liverpool, NS
B0T 1K0

Dear Ms. Norman & Council:

**Re: Proposed Aquaculture Application No. 1433
Liverpool Bay, (Mersey Point), Queens County**

In an effort to keep communities better informed about aquaculture activities in their area, the Province of Nova Scotia is continuing to contact municipalities directly to inform them of proposed applications for aquaculture sites.


The purpose of this letter is to advise the Region of Queens Municipality of a proposed aquaculture site located in Liverpool Bay (Mersey Point), Queens County. You can view the Development Plan on our website at: <https://novascotia.ca/fish/aquaculture/Routine-disclosure-of-Kelly-Cove-Salmon-site-application-documents.pdf>.

This application is currently in the *Review Phase* of our Adjudicative Application Process. During this stage the Department reviewed the application to make sure all the necessary information was supplied, including the results of the public engagement from the *Scoping Phase*. The application has also been shared with the necessary federal and provincial departments for their input. Consultations with First Nations is also underway. Following the *Review Phase*, the application will be referred to the Nova Scotia Aquaculture Review Board for a decision. The Nova Scotia Aquaculture Review Board provides an opportunity for members of the public to participate in the public hearing process. Notification of the date of the public hearing will be made through the Department's website.

For your information I have enclosed the proposed Schedule "A" regarding the proposte site.

We do not require your feedback; however you are more than welcome to contact our department directly if you have any questions. You can reach me by phone at 902-875-7430 or by email Robert.Ceschiutti@novascotia.ca.

Sincerely,



Robert Ceschiutti,
Manager, Licensing and Leasing

Enclosures

c. Gordon Smith, Department of Municipal Affairs

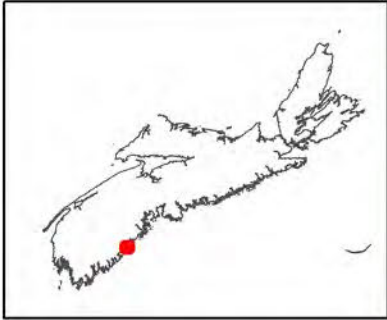
SCHEDULE A
GPS COORDINATE INFORMATION SHEET

Note: The coordinates and dimensions for this site have been taken a legal survey.

Application #:	1433		
Applicant:	Kelly Cove Salmon Ltd.		
Location:	Liverpool Bay	County:	Queens
Hydrographic Chart:	4211	Orthophoto #:	
Dimensions of site:	Approx. 405m x 1005m x 405m 1005m	Size:	Approx. 40.70 ha

Approximate Coordinates of Application:

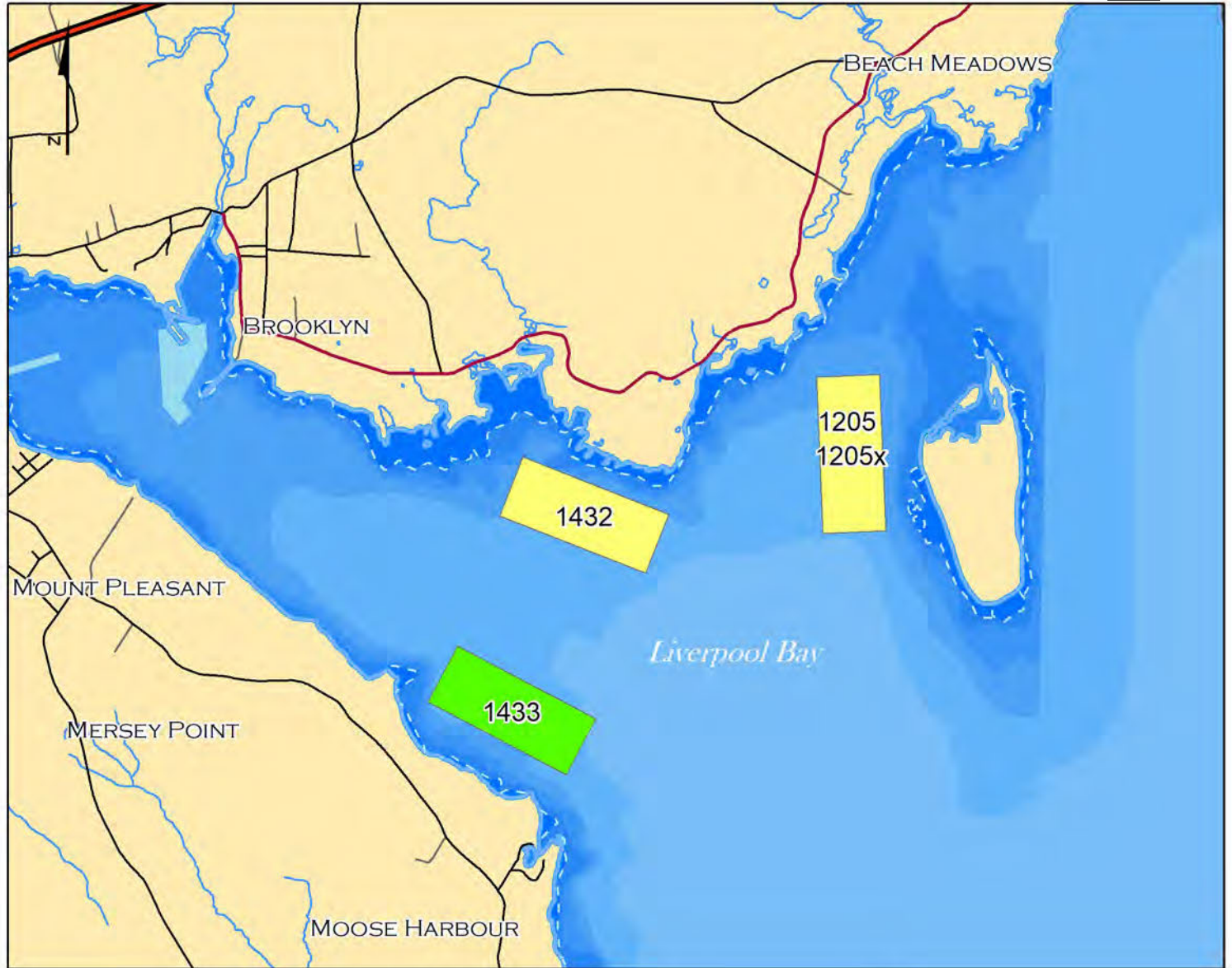
Datum used:	NAD 83		
Centre coordinates (approx.)	Lat.	44° 01' 35.90"	
	Long.	-64° 40' 00.47"	
Corner #1	Lat.	44° 01' 49.22"	Corner #2
	Long.	-64° 40' 15.68"	Lat.
			Long.
			-64° 39' 35.35"
Corner #3	Lat.	44° 01' 22.88"	Corner #4
	Long.	-64° 39' 43.51"	Lat.
			Long.
			-64° 40' 23.85"



**Aquaculture Site
1433**

Centre
 Lat 44° 01' 35.90" Long -64° 40' 00.47"
 Corner 1
 Lat 44° 01' 49.22" Long -64° 40' 15.68"
 Corner 2
 Lat 44° 01' 34.61" Long -64° 39' 35.35"
 Corner 3
 Lat 44° 01' 22.88" Long -64° 39' 43.51"
 Corner 4
 Lat 44° 01' 37.49" Long -64° 40' 23.85"

DATUM NAD 83
 The above coordinates
 are from a legal survey



Application Information

Proponents : Kelly Cove Salmon Ltd.
 Site Location : Liverpool Bay
 Dimensions : Approx. 405m x 1005m x 405m x 1005m
 Area : Approx. 40.70 ha

- Proposed Application
- Other Issued Lease
- Other Proposed Lease
- OMHW Mark
- Low Water Mark

Species: Atlantic Salmon

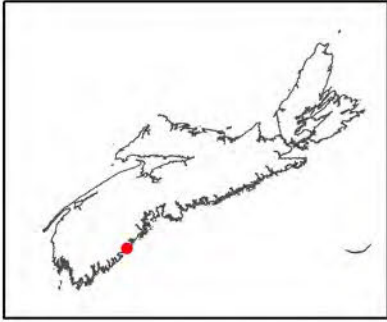
Chart No.
4211



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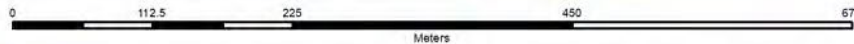
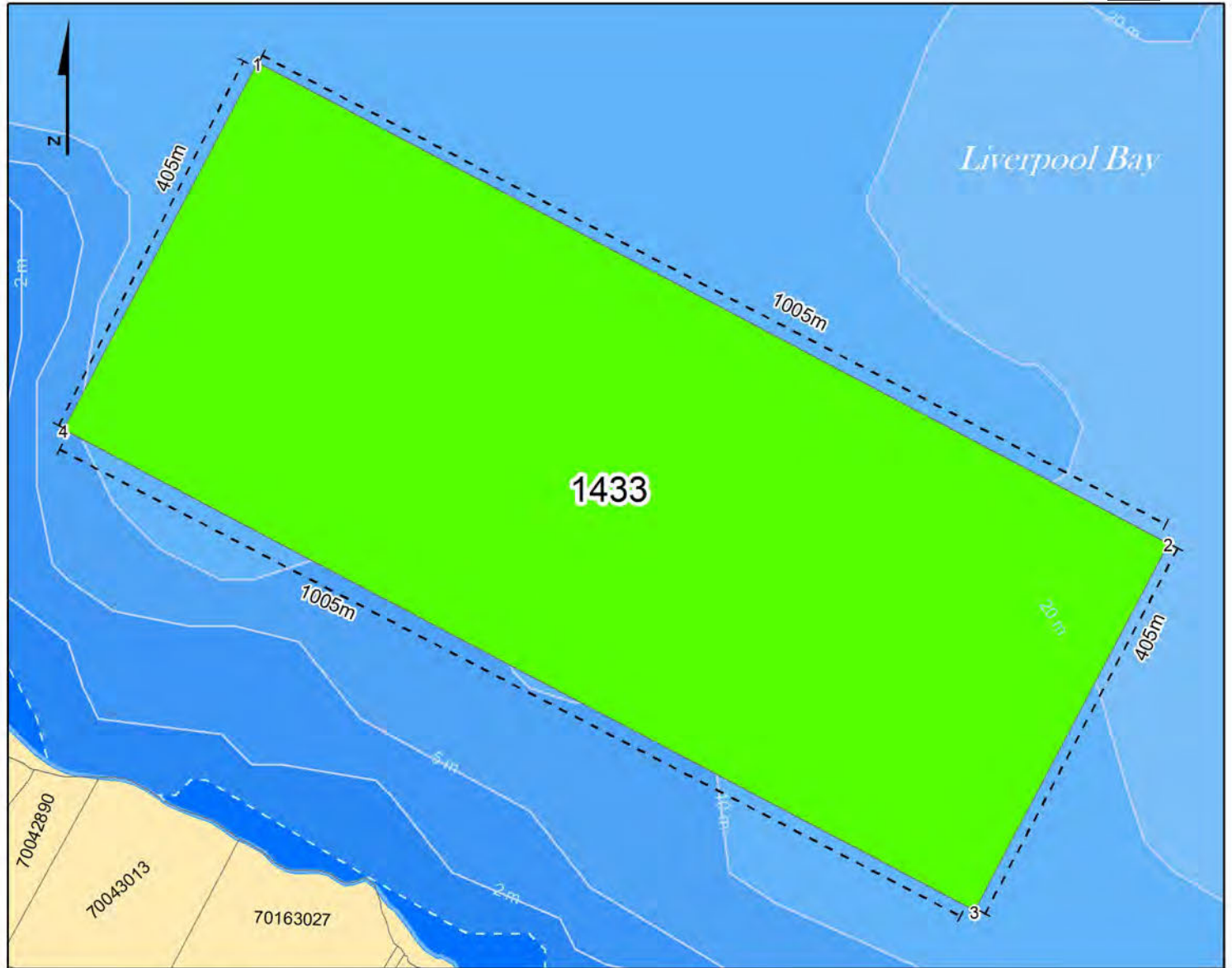
MK-1433-APR-2019



**Aquaculture Site
1433**

Centre
 Lat 44° 01' 35.90" Long -64° 40' 00.47"
 Corner 1
 Lat 44° 01' 49.22" Long -64° 40' 15.68"
 Corner 2
 Lat 44° 01' 34.61" Long -64° 39' 35.35"
 Corner 3
 Lat 44° 01' 22.88" Long -64° 39' 43.51"
 Corner 4
 Lat 44° 01' 37.49" Long -64° 40' 23.85"

DATUM NAD 83
 The above coordinates
 are from a legal survey



Application Information

Proponents : Kelly Cove Salmon Ltd.
 Site Location : Liverpool Bay
 Dimensions : Approx. 405m x 1005m x 405m x 1005m
 Area : Approx. 40.70 ha

- Proposed Application
- Other Issued Lease
- Other Proposed Lease
- OMHW Mark
- NS Bathymetry
- Low Water Mark

Species: Atlantic Salmon

Chart No.
4211



Disclaimer

This map should not be used for navigation or legal purposes. It is intended for general reference use only.

MK-1433-APR-2019

From: Smith, Gordon T <Gordon.Smith@novascotia.ca>
Sent: April 30, 2021 5:21 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Proposed Aquaculture Boundary Amendment AQ#1205 and New Site Applications AQ#1432 and AQ#1433

Hello Lynn:

I see that Fisheries and Aquaculture has reached out to the Municipality of the Region of Queens directly seeking their input on the amendments and the applications. Given that our interest, as the Department of Municipal Affairs, is to ensure that this happens, we have no further comment on this proposed amendment.

Cheers,
Gordon



Gordon Smith

Director of Planning, Province of Nova Scotia

★ Maritime Centre, 8th Floor North - 1505 Barrington St

✉ PO Box 216, Halifax, NS, B3J 2M4

☎ (902) 424-7918

✉ Gordon.Smith@novascotia.ca

Pronouns: Him / His

APPENDIX J - NOVA SCOTIA DEPARTMENT OF COMMUNITIES, CULTURE AND HERITAGE (NOW DEPARTMENT OF COMMUNITIES, CULTURE, TOURISM AND HERITAGE)

From: Winfield, Lynn
Sent: June 27, 2019 10:05 AM
To: shane.hood@inspection.gc.ca; david.macarthur@ec.gc.ca; rachel.gautreau@ec.gc.ca; Birch, Angela <Angela.Birch@novascotia.ca>; Miller, L (Dawn) <Dawn.Miller2@novascotia.ca>; 'Cottreau-Robins, Catherine M' <cottrecm@gov.ns.ca>; Murrant, Darryl D <Darryl.Murrant@novascotia.ca>; Blackburn, Lori M <Lori.Blackburn@novascotia.ca>; Angela.Smith@canada.ca
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County
Attn: Network Review Agencies:

Attached please find the Boundary Amendment application and information for Kelly Cove Salmon AQ#1205 in Liverpool Bay, Queens County.
 Please respond with your feedback by August 27, 2019.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
 Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
 Shelburne, NS B0T 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429

Email: Lynn.Winfield@novascotia.ca
NS Department of Fisheries & Aquaculture Website

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***Please refer to Application Package, Section 2.0 - Applicant's Aquaculture Development Plan, for documents sent to and reviewed by Communities, Culture, Tourism and Heritage.**

NOTE: THIS EMAIL WAS DUPLICATED FOR AQ#1432 AND AQ#1433 AND SENT TO THE SAME RECIPIENTS.

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: Friday, August 30, 2019 12:29 PM
To: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>; Boudreau, Louise O <Louise.Boudreau@novascotia.ca>
Cc: Blackburn, Lori M <Lori.Blackburn@novascotia.ca>
Subject: FW: AQ#1433 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Mersey Point), Queens County

Good Afternoon

Please be reminded that our office has not received comments from your Department for the proposed aquaculture site in Liverpool Bay (Mersey Point) AQ1433. Your comments are due on or before **September 6, 2019**.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture**

From: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Sent: September 11, 2019 12:26 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Weseloh McKeane, Sean <Sean.WeselohMcKeane@novascotia.ca>
Subject: RE: AQ#1433 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Mersey Point), Queens County

Please see attached review. katie

Network Agency Review of an Aquaculture Application

Agency	CCH
Division (if applicable)	Archives, Museums & Libraries
Date	Sept. 11, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1433 (Mersey Point), Queens County
Type of application	Marine Finfish Cage Cultivation (Atlantic Salmon)
Information Provided	archaeology

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Though there are no recorded archaeology sites in the area of the proposed aquaculture development, the larger vicinity has a number of recorded sites. There is general concern for impact to submerged archaeological resources when large anchors are placed on the sea floor. The concern is lessened if the anchors remain stationary and are not dragged.

If during the course of the development and operation of the cages, archaeological materials are observed, please contact the Coordinator of Special Places, Sean Weseloh McKeane, immediately.

Public Notice and Disclosure

As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

Privacy Statement

The network review information collected as part of an aquaculture application will only be used or disclosed by Fisheries and Aquaculture for the purpose of deciding on the application.

All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Sent: September 11, 2019 12:31 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Weseloh McKeane, Sean <Sean.WeselohMcKeane@novascotia.ca>
Subject: RE: AQ#1432 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Brooklyn),
Queens County

See review attached. katie

Network Agency Review of an Aquaculture Application

Agency	CCH
Division (if applicable)	Archives, Museums & Libraries
Date	Septe. 11, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1432 (Brooklyn), Queens County
Type of application	Marine Finfish Cage Cultivation (Atlantic Salmon)
Information Provided	Archaeology

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Though there are no recorded archaeology sites in the area of the proposed aquaculture development, the larger vicinity has a number of recorded sites. There is general concern for impact to submerged archaeological resources when large anchors are placed on the sea floor. The concern is lessened if the anchors remain stationary and are not dragged.

If during the course of the development and operation of the cages, archaeological materials are observed, please contact the Coordinator of Special Places, Sean Weseloh McKeane, immediately.

Public Notice and Disclosure

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All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: February 13, 2020 4:20 PM
To: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Subject: FW: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Good Afternoon Katie,
I have checked my files, but can't locate a response from you for this Boundary Amendment in Liverpool Bay AQ1205. I do have your response for the other 2 in Liverpool Bay (AQ#1432 and AQ#1433).

Can you check your records and advise?

Thanks,

Lynn

E. Lynn Winfield
Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture

From: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Sent: February 17, 2020 7:50 AM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Thanks for this Lynn. I cannot find it either. I will complete and send tomorrow. I was digging in the field when it was sent and likely missed it.

Katie

From: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Sent: February 18, 2020 1:19 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Hi Lynn,
Please see attached.

katie

Network Agency Review of an Aquaculture Application

Agency	CCH
Division (if applicable)	Archives, Museums & Libraries
Date	Feb. 18, 2020
File No.	Kelly Cove Salmon Ltd. AQ#1205 (Coffin Island), Queens County
Type of application	Boundary Amendment
Information Provided	Archaeology

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

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- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

I do not have any archaeological concerns with this boundary amendment at this time. However, if staff working this operation encounter any artifacts, please contact the Coordinator of Special Places at CCH to report.

Public Notice and Disclosure

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All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Sent: June 28, 2020 9:23 AM
To: Cross, Anna <Anna.Cross@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>;
Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Subject: Revised AQ review forms from CCH

Hi Folks,

See attached revised forms. As stated earlier, I have not revised the form for #1129 given that application has already been approved (See Memo sent by Megan Greenwood dated June 2, 2020).

Yours, katie

NOTE: THE REVISED FORM FOR AQ#1433 WAS STILL DATED SEPTEMBER 11, 2019.

Network Agency Review of an Aquaculture Application

Agency	CCH
Division (if applicable)	Archives, Museums & Libraries
Date	Feb. 18, 2020
File No.	Kelly Cove Salmon Ltd. AQ#1432 Liverpool Bay, Queens Co.
Type of application	Boundary Amendment
Information Provided	Archaeology

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

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- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

This study area is of elevated potential for archaeological resources. There are archaeological sites (shipwrecks) recorded in the wider vicinity.

Additional information has been provided by AQ.

It is recommended that the operators report any archaeology artifact findings that may occur in the course of the aquaculture operation. Please report the findings to the Coordinator of the Special Places Program at the Department of Communities, Culture and Heritage, 902-424-6475.

Public Notice and Disclosure

As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

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Network Agency Review of an Aquaculture Application

Agency	CCH
Division (if applicable)	Archives, Museums & Libraries
Date	Sept. 11, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1433 (Mersey Point), Queens County
Type of application	Marine Finfish Cage Cultivation (Atlantic Salmon)
Information Provided	archaeology

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

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- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Though there are no recorded archaeology sites in the area of the proposed aquaculture development, the larger vicinity has a number of recorded sites.

Additional information has been provided by AQ.

It is recommended that the operators report any archaeology artifact findings that may occur in the course of the aquaculture operation. Please report the findings to the Coordinator of the Special Places Program at the Department of Communities, Culture and Heritage, 902-424-6475.

Public Notice and Disclosure

As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

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From: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Sent: October 12, 2022 6:38 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: Liverpool Bay ARIA

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

Exercice caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Please see attached,
Jen

Jennifer Hewitt

Kelly Cove Salmon Ltd.

Division of Cooke Aquaculture INC

Compliance Manager, NS

Cell (902) 521-8604

134 North Street

Bridgewater, NS

B4V 2V6



A2022NS130_Liverp
ool Bay Aquaculture

LIVERPOOL BAY AQUACULTURE
ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT
QUEENS COUNTY



Submitted to:
Cooke Aquaculture
and the
Special Places Program

Submitted by:
Boreas Heritage Consulting Inc.

Heritage Research Permit:
A2022NS130

October 2022

PROJECT PERSONNEL

PRINCIPAL INVESTIGATOR: Sara J. Beanlands, M.A.

PROJECT MANAGEMENT: Sara J. Beanlands, M.A.

DESKTOP COMPONENT: Sara J. Beanlands, M.A.

Ella Stevens

REPORT PREPARATION: Sara J. Beanlands, M.A.

Ella Stevens

GIS / FIGURE DRAFTING: Stephen G. Garcin, M.A.

EXECUTIVE SUMMARY

Kelly Cove Salmon Ltd., the Canadian salmon farming division of Cooke Aquaculture Inc., has applied for two new aquaculture sites (Mersey & Brooklyn) and the expansion of an existing site (Liverpool) in Liverpool Bay, located within the greater Mi'kmaw territory of Kespukwitk, Queens County, Nova Scotia. In order to evaluate the potential for impacting archaeological resources during this work, Cooke Aquaculture has retained Boreas Heritage Consulting Inc. (Boreas Heritage) to conduct an Archaeological Resource Impact Assessment (ARIA) of the proposed Project development areas.

The ARIA was conducted in accordance with the terms of Heritage Research Permit A2022NS130, issued by the Nova Scotia Department of Communities, Culture, Tourism, and Heritage (CCTH) – Special Places Program (SPP), and was directed by Sara Beanlands, with the assistance of Ella Stevens (Acadia First Nation). The purpose of the Survey is to highlight areas of potential archaeological sensitivity associated with the proposed Project. As the proposed development footprints are currently submerged, the first phase of the ARIA involved a desk-based assessment only, so that an appropriate field component strategy could be devised.

Based on the results of the desk-based assessment, which examines the environmental context, the archaeological context, and the historical context of the Assessment Area, Boreas Heritage identified **two (2)** areas considered to exhibit high potential for encountering submerged archaeological resources (HPA-01 & HPA-02). The remaining portions of the Assessment Area are considered to exhibit low potential for encountering archaeological resources.

Based on the results of the ARIA, Boreas Heritage recommends the **two (2)** areas of high archaeological potential (HPA-01 & HPA-02), as described in this report, be avoided during any proposed development and/or ground disturbance activities associated with the proposed Project, to prevent accidental impacts to areas ascribed high archaeological potential. Additionally, if areas of high archaeological potential, or parts thereof, cannot be avoided during development activities related to the proposed Project, it is recommended these areas be subjected to subsurface archaeological sampling probes in order to confirm the presence or absence of archaeological resources. Furthermore, if any changes or deviations from the original plans relating to the proposed Project, as provided to Boreas Heritage for this Survey, are necessary, and are found to impact areas outside the Assessment Area described in this report, then additional archaeological resource impact assessment(s) may be warranted for amended portions of the proposed Project. Finally, it is recommended that the remainder of the Assessment Area, as described in the report, be cleared of any requirement for further archaeological investigation and that development within these areas may proceed as planned.

TABLE OF CONTENTS

PROJECT PERSONNEL	i
EXECUTIVE SUMMARY	ii
TABLE OF CONTENTS.....	iii
LIST OF FIGURES	iii
LIST OF PLATES	iv
LIST OF TABLES.....	iv
1.0 INTRODUCTION	1
2.0 ASSESSMENT AREA	2
3.0 METHODS.....	5
3.1 Desktop Component – Methods	5
3.2 Respecting Mi'kma'ki.....	7
4.0 RESULTS.....	8
4.1 Desktop Component.....	8
4.1.1 Results – Environmental Context	8
4.1.2 Results – Prehistory of the Maritime Provinces.....	12
4.1.3 Results – Archaeological Context.....	17
4.1.4 Results – Historical Context – Indigenous.....	25
4.1.5 Results – Historical Context – Non-Indigenous.....	32
4.1.6 Results – Archaeological Potential Modelling.....	35
4.1.7 Results – Archaeological Potential	35
5.0 CONCLUSIONS and RECOMMENDATIONS	42
6.0 REFERENCES	43
APPENDIX A.....	51
Heritage Research Permit.....	52

LIST OF FIGURES

Figure 1: <i>Assessment Area</i>	3
Figure 2: <i>Detailed Assessment Area</i>	4
Figure 3: <i>Archaeological Potential Model</i>	36
Figure 4: <i>Approximate Shoreline Reconstruction</i>	37
Figure 5: <i>High Potential Areas</i>	39

LST OF PLATES

Plate 1: <i>View southeast of existing Liverpool aquaculture site</i>	1
Plate 2: <i>View north of existing Liverpool aquaculture site</i>	2
Plate 3: <i>The Maritime region ca. 8,000 BP</i>	9
Plate 4: <i>Sa'qiwe'k L'nu'k point</i>	13
Plate 5: <i>Rhyolite flake</i>	14
Plate 6: <i>Susquehanna point</i>	15
Plate 7: <i>Mi'kmaw ceramic vessel fragment</i>	16
Plate 8: <i>Transportation and portage routes throughout Kespukwitk</i>	26
Plate 9: <i>Champlain's 1613 map of 'Por du Rossignol' showing location of Mi'kmaw encampment on Coffin Island</i>	28
Plate 10: <i>View north of existing Brooklyn breakwater and former location of trading post at Fish Point</i>	30
Plate 11: <i>View north of Fralick Cove</i>	32
Plate 12: <i>Interpolated 3-D surface map of proposed Brooklyn site</i>	38
Plate 13: <i>Interpolated 3-D surface map of Liverpool site</i>	40
Plate 14: <i>Interpolated 3-D surface map of Mersey Point site</i>	41

LIST OF TABLES

Table 1: <i>Archaeological Periods for the Maritime Provinces</i>	12
Table 2: <i>Previously registered MARI sites within 10 km of the Assessment Area</i>	18
Table 3: <i>Mi'kmaw placenames within 20 km of the Assessment Area</i>	27

1.0 INTRODUCTION

Kelly Cove Salmon Ltd., the Canadian salmon farming division of Cooke Aquaculture Inc., has applied for two new aquaculture sites (Mersey & Brooklyn) and the expansion of an existing site (Liverpool) in Liverpool Bay, located within the greater Mi'kmaw territory of Kespukwitk, Queens County, Nova Scotia (*Plate 1*). In order to evaluate the potential for impacting archaeological resources during this work, Cooke Aquaculture Inc. has retained Boreas Heritage Consulting Inc. (Boreas Heritage) to conduct an Archaeological Resource Impact Assessment (ARIA) of the proposed Project development areas.

The ARIA was conducted in accordance with the terms of Heritage Research Permit A2022NS130 (*Appendix A*), issued by the Nova Scotia Department of Communities, Culture, Tourism, and Heritage (CCTH) – Special Places Program (SPP), and was directed by Sara Beanlands, with the assistance of Ella Stevens (Acadia First Nation). The purpose of the Survey is to highlight areas of potential archaeological sensitivity associated with the proposed Project. As the proposed development footprints are currently submerged, the first phase of the ARIA will involve a desk-based assessment only, so that an appropriate field component strategy can be devised. The desk-based assessment outlines the environmental, archaeological, and historical context of the Assessment Area. This report includes an overview of the methods applied during the Survey, a summary of the results of the Survey, and archaeological resource management recommendations for the proposed Project.



Plate 1: View southeast of existing Liverpool aquaculture site.

2.0 ASSESSMENT AREA

The Assessment Area includes two proposed new aquaculture sites (Mersey & Brooklyn) and the expansion of an existing site (Liverpool) in Liverpool Bay, located within the greater Mi'kmaw territory of Kespukwitk, Queens County, Nova Scotia (*Figures 1 & 2*).

The Liverpool marine aquaculture site #1205 is situated in Liverpool Bay, on the western side of Coffin Island. The current lease has dimensions of approximately 200 metres x 200 metres, comprising a total area of approximately 4 hectares (*Plate 2*). The proposed boundary amendment extends the lease boundaries to add six additional cages south of the existing grid and to accommodate all below surface gear. The dimensions of the proposed lease are approximately 405 metres x 1005 metres, comprising a total area of approximately 40.7 hectares. The proposed new Mersey Point aquaculture site is situated in Liverpool Bay, between Black Point and Moose Harbour. The proposed lease has dimensions of approximately 405 metres x 1005 metres, comprising a total area of approximately 40.7 hectares. If approved, the proposed lease would have a 2 x 10 cage grid configuration. The proposed new Brooklyn aquaculture site is situated in Liverpool Bay, southwest of Eastern Head. The proposed lease has dimensions of approximately 405 metres x 1005 metres, comprising a total area of approximately 40.7 hectares. If approved, the proposed lease would have a 2 x 10 cage grid configuration.



Plate 2: View north of existing Liverpool aquaculture site.

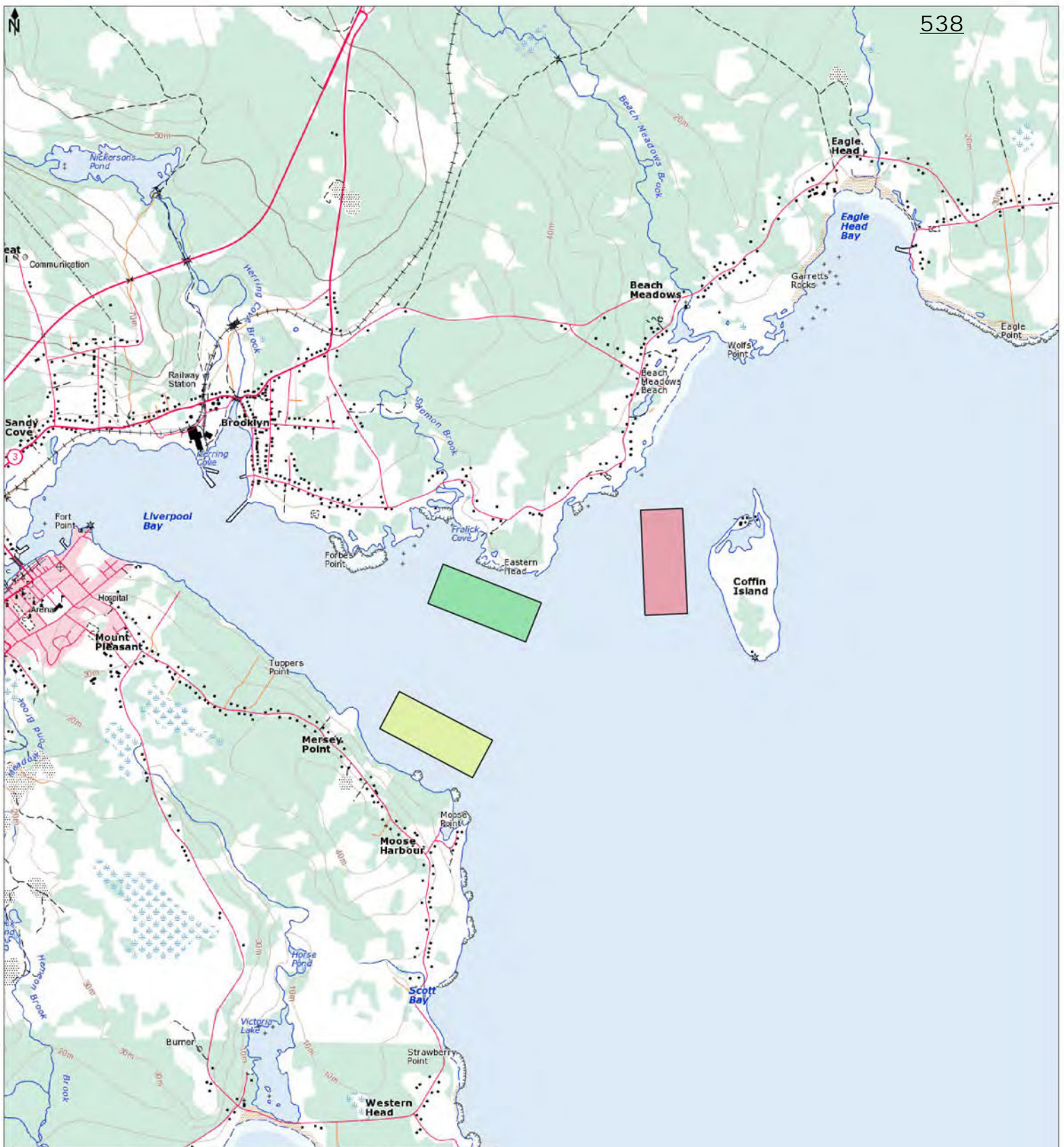


Figure 1 - Assessment Area

Cooke Aquaculture Sites
 Archaeological Resource Impact Assessment
 Queens County

- Mersey Location
- Brooklyn Location
- Liverpool Location

Notes:
 NAD 83 UTM Zone 20
 Base Map: NRCAN

0 500 1,000 m
 1:50,000

BOREAS
 HERITAGE

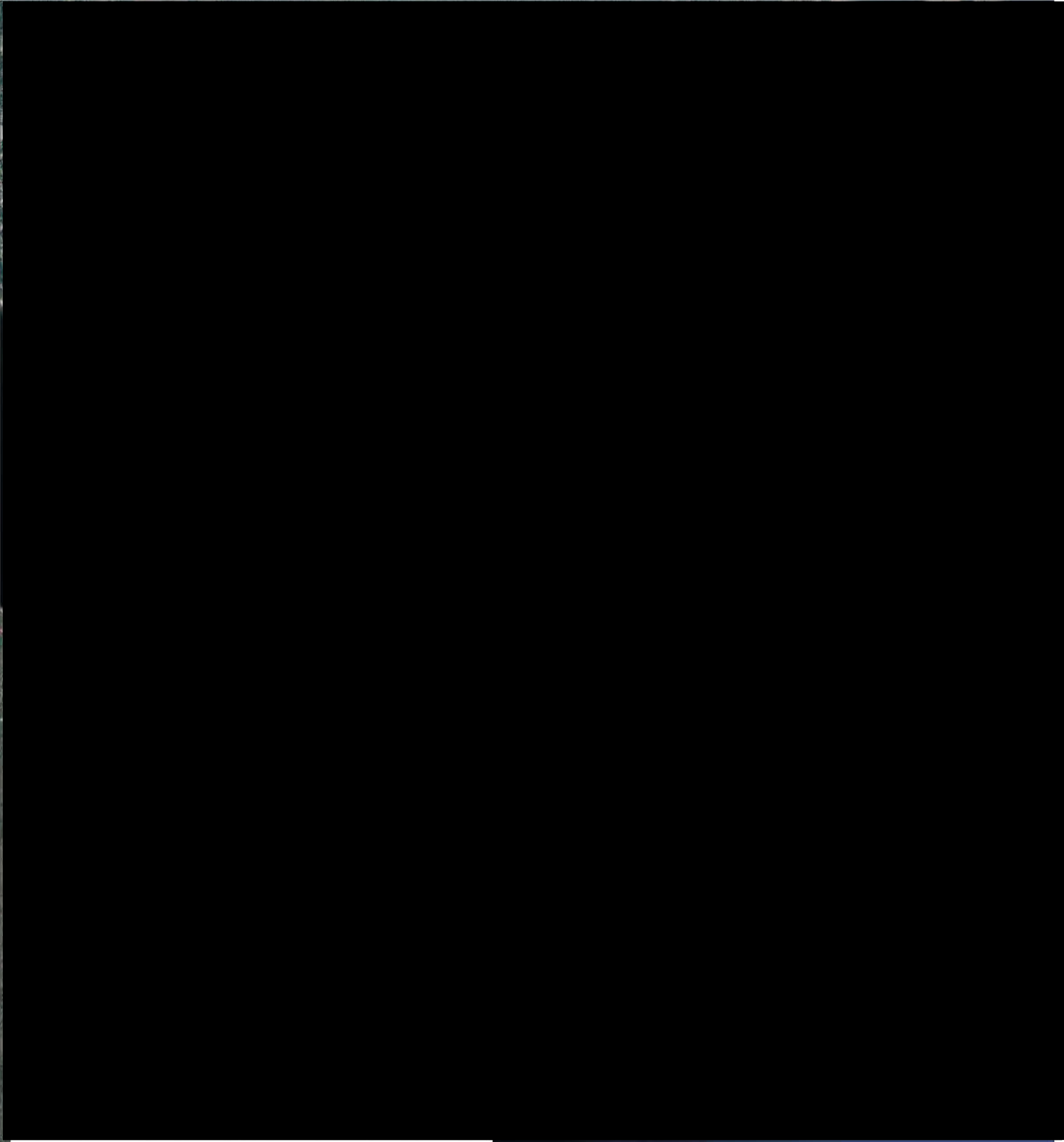


Figure 2 - Detailed Assessment Area

Cooke Aquaculture Sites
Archaeological Resource Impact Assessment
Queens County

-  Mersey Location
-  Brooklyn Location
-  Liverpool Location
-  Archaeological Site

Notes:
NAD 83 UTM Zone 20
Base Map: Google

0 250 500 m
1:25,000

BOREAS
HERITAGE

3.0 METHODS

The objectives of the Survey are to (1) evaluate archaeological potential within the Assessment Area, (2) identify and delineate areas considered to exhibit high potential for encountering archaeological resources, (3) provide detailed and accurate information on the results of the Survey, and (4) offer comprehensive recommendations so that appropriate archaeological resource management strategies can be devised. As the proposed development footprints are currently submerged, the first phase of the ARIA will involve a desktop component (background screening) only. A guided boat tour of Liverpool Bay, including the existing Liverpool aquaculture site and was provided by Cooke Aquaculture Ltd. on September 27, 2022.

3.1 Desktop Component – Methods

The purpose of the desktop component of the Survey is to identify areas considered to exhibit high potential for encountering archaeological resources within the Assessment Area. Any areas of elevated archaeological potential identified during the desktop component are targeted during the field component of the Survey. Areas confirmed to exhibit high archaeological potential during the field component of the Survey are delineated and designated as High Potential Areas (HPA). The results of the desktop component provide interpretative and evaluative context for any potential archaeological resources identified during the field component of the Survey. It is also noted that, as per Heritage Research Permit requirements, the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO) was advised of the proposed Project as part of the desktop component for the Survey.

The desktop component of the Survey examines three elements: the environmental context, the archaeological context, and the historical context of the Assessment Area. The environmental context, including analysis of bathymetric data, is examined to identify past and current environmental influences or conditions that may elevate archaeological potential within the Assessment Area (e.g.: topography, local resources, and potential for agriculture). The archaeological context of the Assessment Area is examined to identify how people used and occupied the surrounding landscape based on evidence from previously registered archaeological sites and past archaeological work conducted near the proposed Project. The historical context of the Assessment Area is examined to identify how people used and occupied the local area based on evidence from published archival documents, ethno-historic records, local oral traditions, historic maps, local and/or regional histories, scholarly texts, and available property records.

In Nova Scotia, the Maritime Archaeological Resource Inventory (MARI) is maintained by the Nova Scotia Museum, on behalf of CCTH. Reports from past archaeological assessments and academic research conducted near the Assessment Area provide archaeological context, which informs the interpretation and evaluation of any potential archaeological resources identified during the field component of the Survey. Additionally, the desktop component of the Survey involves a general review of topographic maps, coastal charts, and aerial photographs related to the Assessment Area, to identify

topographical and hydrological attributes that correlate with high archaeological potential (e.g., waterfalls/rapids as focal points for fishing or requiring portage, submerged marine terraces representing former coastline). These attributes are also incorporated into the archaeological potential model (APM), developed by Boreas Heritage.

The model described above has been developed by analysing a range of natural and cultural attributes considered to have influenced past patterns of land use and settlement, and by extension, archaeological potential across the landscape. The attributes include proximity to water (essential for drinking and transportation), slope, aspect, and elevation, as well as proximity to known archaeological sites. The result of the modelling is a continuous depiction of archaeological potential within the Assessment Area. It is important to note, however, that people have lived in what is now Nova Scotia for more than 12,000 years and have persisted through a series of climate shifts, including changes in annual precipitation and temperatures. The modern bioclimatic scheme, which incorporates several of the variables used to assess archaeological potential, can only be assumed to be reliable for current environmental conditions. Bioclimatic variations may have changed the past nature of variables, such as aquatic features or forest cover. As a result, appropriate caution must be exercised when relying solely upon the models, which depend on contemporary biophysical characteristics. The APM should only be employed in conjunction with the detailed results of the desktop component of the Survey and augmented or refined following the results of the field component of the Survey.

In general, 21st century maps, satellite imagery and GIS data reflect the land and coastline as they are today. Where possible, the APM uses topographic data that reflects the historic, unmodified landforms as they were in the past. Modifications such as causeways, canals, and reservoirs, as well as shoreline reclamation and development, have significantly reshaped the modern landscape. The APM takes these variables into account and provides a continuous representation of the predicted archaeological potential across the entire landscape. Areas of high archaeological potential are highlighted in red, and areas of low archaeological potential are represented in green. The APM is designed only for use in conjunction with the combined results of the desktop and field components of the Survey and should not be viewed as a stand-alone archaeological assessment tool. In addition to the terrestrial APM, Boreas Heritage created an approximate shoreline reconstruction map based on available and conceptual data regarding sea level rise during the Holocene and Late Holocene.

Boreas Heritage applies background research methods that compile context information from a diverse range of sources. The historical and cultural information is integrated with the environmental and physiographic data to identify areas of archaeological potential within the Assessment Area and to provide a framework for the initial interpretation of any archaeological resources encountered during the field component of the Survey. Combined, these critical lines of inquiry inform the results of the Survey and provide context for the Assessment Area as it relates to episodes of past human land-use, cultural interaction, settlement, and development.

3.2 Respecting Mi'kma'ki

Boreas Heritage recognizes and acknowledges the Indigenous Peoples of Atlantic Canada as treaty partners. We are honoured to work and live on the unceded, ancestral, and traditional lands of the Beothuk, Innu, Labrador Inuit, L'nuk/Mi'kmaq, Passamaquoddy, and Wolastoqiyik. We offer our support as allies to First Nation representatives, businesses, and communities as they build capacity and progress toward self-determination. We also recognize that archaeological methods can dishonour Ancestral places and inflict harm on descendent communities (Lelièvre et al 2020).

The Liverpool Bay Aquaculture Assessment Area is located within the greater Mi'kmaw territory of Kespukwitk. Having listened to Mi'kmaw leadership, Elders, and community representatives, we understand that respect is a basic element of Mi'kmaw spirituality, and we embrace the belief that all things on earth have a spirit.

Before beginning any archaeological field work within Mi'kma'ki, all Boreas Heritage staff, and crew, participate in an offering of tobacco. While standing in a circle, each team member respectfully acknowledges the land and the Ancestors and expresses gratitude for the opportunity to work in Mi'kma'ki. When an Indigenous member of our team is present, we also participate in 'smudging', which involves burning medicine to produce smoke, and using the smoke for daily spiritual cleansing.

Recognizing that archaeological field methods can be destructive to the land and natural soils, some of which have taken over 10,000 years to develop, Boreas Heritage believes that when we remove something from the land, we must give something in return. At the completion of each shovel test, and before the unit is backfilled, an offering of tobacco is placed within the unit to honour the land that has been disturbed during the archaeological testing programme. If Mi'kmaw material culture is recovered, it is immediately wrapped in red cloth and sprinkled with tobacco in honour of the sacred nature of the Ancestor's belongings and the spirit that is contained therein.

Boreas Heritage is committed to using methods that respect and honor the values of the communities within which we work.

4.0 RESULTS

4.1 Desktop Component

The following sections outline the results of the desktop component of the Assessment, with focus on the environmental context, the archaeological context, and the historical context of the Assessment Area. The desktop component assists in the identification and delineation of areas considered to exhibit elevated archaeological potential and provides a foundation for the initial interpretation of any archaeological resources that may be encountered during subsequent field components of the Assessment.

4.1.1 Results – Environmental Context

It is important to understand the physiographic attributes and environmental characteristics of the land in order to effectively interpret patterns of human settlement over thousands of years. Geological, topographic, hydrographic, and ecological factors have influenced the land use patterns of precontact and historic period Indigenous peoples, as well as later historic period settlers. These factors are key to identifying and evaluating the archaeological potential of the Assessment Area. Specific considerations for determining archaeological potential applied during the desktop and field components of the Assessment include the slope and drainage of landforms, available mineral resources, soil types and agricultural value, access to potable water, access to travel corridors (networks of footpaths and roadways, navigable coastline, and inland waterways), and the accessibility, seasonal variation and diversity of targeted flora and fauna species. The following paragraphs describe the environmental attributes specific to the Assessment Area.

At the end of the Last Glacial Maximum (LGM), *ca.* 20,000 BP, much of the northern hemisphere was covered in a vast glacier complex made up of three coalescent ice masses, collectively known as the Laurentide Ice Sheet. The ice, which depressed the earth's crust by at least 300 metres and stored a sea-level equivalent of approximately 50 metres, covered much of Canada and the northern United States until it began to retreat approximately 15,000 years ago (Stokes 2017). Initial glacial retreat coincided with the Allerød interstadial, a warm period that occurred between 16,000 and 12,800 years ago and ended with the onset of the Younger Dryas stadial, a cold period that occurred between 12,900 and 12,000 years ago.

During the Allerød interstadial, climatic warming reduced most of the ice sheets over present-day Nova Scotia and New Brunswick, except those which lingered in the Cobequid, Antigonish and Cape Breton Highlands. As the ice began to melt and retreat, land areas gradually became exposed and vegetation developed, attracting late Ice Age fauna, such as mastodon. At the same time, deglaciation created a complex interplay between emerging land (local isostatic effects) and relative sea levels (global eustatic effects). The Younger Dryas stadial saw a substantial drop in temperature and a localized re-advancement of remnant ice in Atlantic Canada. Any extant glaciers were reformed, and tundra vegetation was rejuvenated. Although the ice was an important constraint on the migration and dispersal of flora and faunal during this period, plant and animal life soon returned as the onset of warming ended the Younger

Dryas. Vegetation gradually colonized the newly exposed ground, facilitating the migration of caribou and other fauna, which were, in turn, followed by the earliest known human presence in the region (Pielou 1991:2; Stea 2011:55). Deglaciation of what is now known as Nova Scotia appears to have been virtually complete by 11,000 BP (Stea & Mott 1988:184).

Relative sea level rose rapidly during the early Holocene period at a rate of approximately 1.2 metres per century (or approximately 12 millimetres per year) until about 6,000 years ago, at which time it diminished to approximately 1.8 millimetres per year (Force 2013:34). Another notable climate variation occurred approximately 8,200 cal BP (**Plate 3**), representing a global cooling of 4°C thought to be associated with a large influx of freshwater into the North Atlantic during the collapse of the Laurentide Ice Sheet (Neil & Gajewski 2019:23). Indeed, shifts in climate coincide with culturally significant periods of human occupation in Mi'kma'ki and those dependent on coastal ecosystems would have been vulnerable to sea level changes (Neil & Gajewski 2019:21). As a result, it is important to understand the changing coastline in regions where precontact occupation was tied to the coast.



[Shaw et al. 2006]

Plate 3: The Maritime region ca. 8,000 BP.

The sea level curve indicates that relative sea level rose by approximately 20 metres in Nova Scotia between 7,000 and 3,500 cal BP. At approximately 1,750 cal BP, sea level was approximately 1.3 metres lower than the present day, suggesting a stabilization of coastal submergence, which has facilitated the preservation of archaeological sites from this time period (Neil & Gajewski 2019:24). Between 100 CE and 1800 sea level rose at 17 centimetres per century, and between 1900 and 1920 sea level rise increased to 3.2 millimetres per year (Gehrels et al. 2005).

The eustatic rise in Atlantic Canada was complicated by post-glacial crustal rebound and these and other factors, such as storm events and erosion, have led to the reconfiguration and/or submergence of coastal areas and, in many cases, the entire disappearance of coastal landforms, including potential evidence of early occupations and archaeological sites. According to Shaw, who studied the impacts of rising sea level during the Holocene and Late Holocene, fragmentary evidence of coastline environments has been found offshore (Shaw et al. 1993). At about 10,000 radiocarbon years BP, the average position of the coastline was 10 kilometres seaward of its present location and by 5,000 years BP the shores were at 1.5 kilometres (Bundy et al. 2014:20). Thus, the coastline has evolved significantly through time and the coastal orientation of precontact archaeological sites must be considered in light of the changing configuration and position of the coastline since the last glaciation (Neil & Gajewski 2019:21).

Higher ground and elevated positions, surrounded by low or level topography, often indicate past settlement and land use. Other geographic features, such as eskers, drumlins, sizable knolls, plateaus, and distinctive land formations (e.g., rock outcrops, caverns, mounds) are also strong indications of archaeological potential. The Assessment Area is located within the greater terrestrial region of the Atlantic Coast – Quartzite Headlands – Capes and Bays (841). The bedrock geology is dominated by greywacke into which several bodies of granite have intruded, creating hummocky terrain with limited relief. The coastline is indented with well developed capes and long narrow bays, which represent drowned river estuaries, and the sediment along the coast is generally composed of local sand, carried landward from offshore and deposited during the post-glacial marine transgression (Davis & Browne 1996:204). The glacial till deposits are variable in thickness but are generally less than 3 metres deep and bedrock is exposed in areas along the coastline. The soils in the area of Liverpool are dominated by *Danesville* sandy loam, described as a dark grayish brown sandy loam over dark yellowish brown sandy loam, often mottled, with an olive gray sandy loam till, also generally mottled (Cann et al. 1959:20-29). These soils are generally undulating to gently rolling, and typically make good farmland.

Most of the nearshore zone is generally characterized by rugged and hard bedrock outcrop terrain, commonly covered with a variety of sediment types that reflect the geologic evolution of the area (Bundy et al. 2014:4). Glaciation has left isolated but locally expansive glacial deposits (till) overlying proglacial deposits (poorly sorted sediment). The transgression by the sea during sea-level rise, which is still active in headland areas, eroded much of the glacial sediment, leaving an abundance of gravel with cobbles and boulders overlying the till, bedrock, or both (Bundy et al. 2014:4). The inner shelf region, including Liverpool Bay, was largely mapped, albeit conceptually, as undifferentiated sand and gravel deposits

(Sable Island Sand and Gravel), formed when washed in a paleo-coastal environment during the post-glacial rise in sea-level noted above (Bundy et al. 2014:4).

Proximity to water, for drinking, resource exploitation and transportation, is a key factor in identifying precontact and historic Mi'kmaw, as well as early Euro-Canadian and African Canadian, archaeological potential. Partially sheltered by Coffin Island, Liverpool Bay measures approximately 6 kilometres long and 2 kilometres wide and has a maximum depth of 40 metres (Howarth et al. 2019:673-674). The Mersey River discharges into the northwest of Liverpool Bay and has the largest out-flow and watershed of all Nova Scotian rivers, draining more than 3,000 km² of forest, bogs, barrens, wetlands, streams, and lakes. The Mersey River, extending approximately 146 kilometres, flows through generally uniform terrain with occasional low ridges and drumlins. The river follows a series of slow flowing chain-lakes and stillwaters, interrupted by shallow boulder-filled rapids and low waterfalls where the river cuts across slate ledges and the harder bedrock (Davis & Browne 1996:47). The Mersey River provided a corridor for transportation, including access to the Bay of Fundy, which allowed the Mi'kmaq to unlock the interior of the province as a vast resource base.

Resource areas, including food or medicinal plants, and migratory routes and spawning areas, are also considered characteristics that indicate archaeological potential. The section of rocky shore along the Liverpool coastline is on the route for migratory waterfowl and shorebirds (Davis & Browne 1996:205). Black Ducks, scaups, Common Goldeneye, Canada Goose, Oldsquaw, Common Eider, loons, scoters, Red-breasted Merganser, Harlequin Duck, Piping Plover, gulls, cormorants, Black Guillemot, Arctic and Common terns, Leach's Storm-petrel, Osprey and Great Blue Heron all either occupy, winter or breed within the greater region (Davis & Browne 1996:205). The forest is largely comprised of White Spruce and Balsam Fir, with maples, birch, and poplars (Davis & Browne 1996:204). Recent research, including analysis of a high-resolution pollen record from Path Lake, located approximately 600 metres from the north-western shoreline of Port Joli Harbour, has demonstrated that a post-glacial forest dominated by a mixed-forest canopy of *Pinus* (pine), *Tsuga* (hemlock), *Betula* (birch) and *Quercus* (oak) characterized the early to mid-Holocene. Shallow water aquatic and wetland taxa subsequently increased after 3,400 BP, including a growth in boreal species (spruce and fir) around 900 BP, in response to a gradual transition towards wetter climactic conditions (Neil et al. 2014:207).

In the interior, along the Mersey River, the undulating terrain south of the Lake Rossignol Reservoir supports Eastern Hemlock and Red Spruce, with some shade-tolerant hardwoods on well-drained sites, including Yellow Birch. Areas with deeper organic soils are characterized by the growth of Red Maple and Ash, while areas with shallower organic deposits support mostly larch and Interrupted Fern (Davis & Browne 1996:54). Snowshoe Hare and bobcat are relatively common, while Black Bear occur where berry bushes are abundant, particularly upon the barrens. There are also large concentrations of Whitetail Deer. The rivers and lakes of the region are generally acidic, with low oxygen levels, which results in a low productivity (Davis & Browne 1996:54). Brook Trout are still common throughout the Mersey River, although the introduction of Smallmouth Bass and particularly Chain Pickerel are a threat to this species.

Historically, the Mersey River was a popular destination for fishing Atlantic salmon but, according to the Mi'kmaw guide Henry Peters, “they built fish ladders” and “very few of the salmon would go up these” (Parker 1990:101). The Mersey and Lake Rossignol area also “accounted for close to 50 percent of the moose kills reported from 1908 to 1937” (Parker 1990:6). With the flooding of Lake Rossignol in the 20th century, the habitat on which the moose depended around Lake Rossignol was lost --- particularly ground hemlock. The loss of this food source meant malnutrition for the moose that lived within the landscape of the Mersey, and a sudden decline in their numbers (Parker 1990:101).

4.1.2 Results – Prehistory of the Maritime Provinces

There is a general consensus regarding the broad patterns of regional cultural history in north-eastern North America, and recognized terminology has been established for precontact development periods based on current archaeological knowledge (**Table 1**). Although our understanding of the prehistoric archaeology of the Maritimes is fragmented, available archaeological data reveals evidence of Indigenous occupation spanning most of the time period from the retreat of the last glacier to European contact and beyond. The prehistory of the region is thus discussed within the parameters of the existing cultural history framework. Prehistoric cultures are defined by a shared technology, settlement and subsistence patterns, and social systems, including political and religious beliefs, existing during a specific time period (Deal 2016:28). It is important to note, however, that the cultural history sequence and terminology presented below has been imposed exclusively by archaeologists and does not reflect Mi'kmaw perceptions of the past. Although an historical timeline has been developed for Nova Scotia (Lewis 2006; **Table 1**) that is more attuned to Mi'kmaw awareness and culture, it cannot be presumed to fully accommodate all Mi'kmaq within the Maritimes.

Table 1: Archaeological Periods for the Maritime Provinces

Archaeological Period	Date Range (BP = before present)	Mi'kmaq
Precontact Period	ca. 13,000 – 500 BP	
Palaeo Period	ca. 13,000 – 9,000 BP	<i>Sa'qiwe'k L'nu'k</i> The Ancient People
Early	ca. 13,000 – 10,000 BP	
Late	ca. 10,000 – 9,000 BP	
Archaic Period	ca. 9,000 – 3,000 BP	
Early	ca. 9,000 – 7,000 BP	<i>Mu Awsami Kejikawe'k L'nu'k</i> The Not So Recent People
Middle	ca. 7,000 – 5,000 BP	
Late	ca. 5,000 – 3,000 BP	
Terminal	ca. 4,000 – 3,000 BP	
Woodland Period	ca. 3,000 – 500 BP	
Early	ca. 3,000 – 2,000 BP	<i>Kejikawe'k L'nu'k</i> The Recent People
Middle	ca. 2,000 – 1,000 BP	
Late	ca. 1,000 – 500 BP	
Historic Period	ca. 1500 – Present (AD)	
Contact Period	ca. 1500 – 1600 AD	<i>Kiskukewe'k L'nu'k</i>
Early	ca. 1600 – 1750 AD	
Late	ca. 1750 – 1900 AD	
20 th Century / Recent	ca. 1900 – Present	

Sa'qiwe'k L'nu'k

In north-eastern North America, the Sa'qiwe'k L'nu'k or Palaeo-Indian period generally begins approximately 13,000 years ago. Based upon the established sequence of diagnostic projectile point styles, the period can be divided into Early and Late subperiods, and several regional phases have also been identified (Deal 2016:35). Artifacts associated with the Sa'qiwe'k L'nu'k have been recovered throughout the Maritimes, however, the region's acidic soil chemistry dissolves perishable materials, such as wood and bone, thus preventing the preservation of a complete Palaeo-Indian toolkit. Indeed, relatively few Sa'qiwe'k L'nu'k sites have been excavated in the northeast.

The movement and melting of the glaciers changed sea levels, temperature, and precipitation, and greatly influenced the animals and plants that could survive in the region. Climatic changes associated with the Younger Dryas dramatically altered floral and faunal colonization patterns, which undoubtedly influenced human resource procurement strategies and migration patterns. Tundra vegetation, characterized by sedges, willows, grasses, sage, alders, and birch, developed behind retreating ice and was well-suited to the emerging peri-glacial landscape. This new environment attracted migrating caribou herds, followed by people of the north-eastern Palaeo-Indian tradition.

Although the early human occupation of the Maritimes coincides with the Younger Dryas stadial, it is possible that humans followed late Ice Age fauna into the region at the end of the Allerød (Stea 2011:58). In any case, the earliest evidence of human presence in what is now Nova Scotia is the Debert-Belmont complex, representing one of the largest and most intact Sa'qiwe'k L'nu'k sites in North America and the oldest sites of human habitation in Eastern Canada (Rosenmeier et al. 2012:113). The inhabitants of Debert and other Palaeo-Indian sites in the region are generally described as mobile hunter-gatherers dependent upon migrating caribou herds, however there is evidence to suggest the presence of a biologically rich habitat that supported diverse subsistence patterns (Deal 2016:40).

The diagnostic artifact of the Sa'qiwe'k L'nu'k is the fluted projectile point, which has a central channel, or flute, running up both faces of the point from the base. This distinctive flute likely facilitated hafting onto a spear or lance (Bourque 2001:20). It is interesting to note that points recovered from Debert are considered a distinct variant of the classic Early Palaeo-Indian form (Tuck 1984). In addition to fluted projectile points and manufacturing debris, other tool forms from the period are known, including graters, bifacial knives, and spurred scrapers, suggesting a range of living activities, including hunting and processing. Isolated finds with characteristics of Palaeo tool assemblages have been recovered from across the Maritimes and, although lacking temporal control, illustrate widespread distribution of Sa'qiwe'k L'nu'k throughout the region (*Plate 4*).



Plate 4: *Sa'qiwe'k L'nu'k point.*

With the gradual onset of warmer temperatures at the end of the Younger Dryas, the tundra-like vegetation was replaced by wide- spread closed forests, including temperate conifer and deciduous populations, more suitable to solitary cervids like moose and deer. The Sa'qiwe'k L'nu'k had to respond and adapt to this changing environment and develop new procurement strategies, including changes to their lithic tool kit (Deal 2016:43). The most significant and discernible change is the replacement of the fluted projectile points with non-fluted forms, generally used to signify the beginning of the Late Palaeo-Indian period (Deal 2016:43). Based on this changing technology, two distinct groups have been tentatively identified in the Maritime region; one manufacturing parallel-flaked, lanceolate, unfluted projectile points and the other using small triangular projectile points (Deal 2016:49). Although isolated artifacts have been recovered from coastal locations suggesting seasonal use of coastal resources, acidic soils and sea-level rise have prevented a broader understanding about the nature and associated lifeways of Sa'qiwe'k L'nu'k culture. Indeed, the margins between the Late Palaeo-Indian period and the Early Archaic period are poorly defined.

Mu Awsami Kejikawe'k L'nu'k

Our understanding of the Mu Awsami Kejikawe'k L'nu'k or Archaic period is also somewhat limited. The period has been divided into Early, Middle, and Late subperiods, representing a mosaic of cultures spanning the millennia between the Late Palaeo-Indian period and the appearance of ceramics. Evidence related to Mu Awsami Kejikawe'k L'nu'k in the Maritimes is poorly represented in the archaeological record before the appearance of Late Archaic cultures around 5,000 BP, although there is some evidence for continuous occupation in coastal areas (Tuck 1991). A rapid climatic warming around 8,000 years ago, known as the Hypsithermal interval, led to an increasingly diverse forest. Boreal species began to decline while pine, birch, and oak spread throughout the region, attracting a variety of fauna, including moose, deer, bear, and other smaller mammals. Site locations in the Maritimes suggest an interior lacustrine and riverine settlement pattern, along with coastal adaptation and occupation; however, sea levels for the

region at 7,000 years ago were approximately 30 metres below present level and virtually all Early Archaic coastal sites have been eroded by sea-level rise and attendant shoreline erosion (Deal 2016:54; Bourque 2001:39). Evidence also suggests a variable subsistence pattern based on terrestrial mammals, anadromous, and catadromous fish species and sea mammals (Deal 2016:58).

Early and Middle Mu Awsami Kejikawe'k L'nu'k preferred manufacturing stone tools from raw materials such as quartz and rhyolite (*Plate 5*), and an abundance of



Plate 5: *Rhyolite flake.*

quartz-flaking debris is one of the hallmarks of Early Archaic sites. The period is also characterized by the development of ground stone tools, such as full-channelled gouges and rods used, at least in part, for woodworking, adzes, hand spears, atlatls, and specialized mortuary artifacts (Deal 2016:58). Furthermore, a high degree of specialization is apparent, including tools and ornaments made of ground slate, bone, and ivory, as well as evidence of increased trading activity. Mortuary practices also become evident in the archaeological record of the Maritime Peninsula in the Early Archaic period (Bourque 2001:42). Diagnostic projectile point styles include stemmed and bifurcate-base points.

During the Late Archaic period, a hemlock and oak forest developed in Nova Scotia and New Brunswick, followed by a spruce, birch and beech forest, which is associated with a decrease in temperature around 4,000 BP (Deal 2016:54). At the same time, there appears to be a rapid re-emergence of evidence for the presence of Indigenous people in the Maritime region, although it is important to note that the modern shoreline was established approximately 3,000 years ago, thus providing more opportunity for encountering Late Archaic period material culture. The Late Archaic period includes two distinctive cultural traditions; one that is primarily a coastal marine adaptation, sometimes referred to as the Maritime Archaic tradition, and one that is interior adapted, known as the Laurentian Archaic tradition. Similar tool forms associated with both traditions suggest a shared technology and interlocking trade networks. Site assemblages include adzes, gouges, plummets, and ulus but the main diagnostic tool form of this period is the slate bayonet, which is often associated with burials (Deal 2016:60-65).

The final Archaic tradition in the Maritimes is often referred to as the Terminal Archaic period. Between 4,000 and 3,000 years ago, a distinct tradition with markedly different technology, subsistence practices and mortuary rituals, known as the Susquehanna tradition, emerged across the Northeast. The mechanism by which these characteristic features reached the Maritimes, whether by migration or cultural diffusion, has yet to be determined. Nevertheless, artifacts associated with the Susquehanna tradition have been identified throughout Nova Scotia and New Brunswick. A settlement-subsistence system that made seasonal use of both coastal and interior resources is evident and interior Susquehanna sites were generally located where fish were plentiful and especially where the seasonal capture of anadromous fish was relatively easy (Tuck 1991; Bourque 2001:62). These sites are characterized by a distinctive tool making tradition, including broad-bladed, broad-stemmed projectile points (*Plate 6*), drills, polished stone atlatl weights and grooved axes.



[Parks Canada]

Plate 6: *Susquehanna point.*

Kejikawe'k L'nu'k

The Kejikawe'k L'nu'k or Maritime Woodland period is the last major cultural episode in the Maritimes prior to European contact and has been divided into Early, Middle, and Late subperiods. Although cooking containers made of wood or bark were used during earlier periods, the Maritime Woodland period is defined by the introduction and full-scale adoption of pottery by Indigenous peoples in the region. The Early Maritime Woodland period is characterized by cylindrically shaped, pointed based vessels, which were textured with fabric impressions. The appearance of this early pottery may be associated with large seasonal gatherings, more complex mixtures of food sources and the preparation of aquatic resources (Deal 2016:84). Over the next two millennia, pottery style underwent a series of changes and more numerous and larger vessels appeared during the Middle and Late Maritime Woodland periods (*Plate 7*). The salient characteristics of the Middle period are thin-walled, grit-tempered vessels decorated with pseudo-scallop or fine dentate stamping techniques, while the quality of Late period pottery declined with vessels becoming thicker, courser and less well fired (Davis 1991a). Later vessels feature a more spheroidal shape, and the last major decorative form is known as cord-wrapped stick, which remained the dominant decorative technique until ceramic usage terminated shortly before sustained European contact (Rutherford 1991). Indeed, decoration and temper are considered temporal indicators.



Plate 7: *Mi'kmaw ceramic vessel fragment.*

The archaeological record suggests significant population growth during the period with the highest concentration of known occupation sites found along the coasts, perhaps representing locations of long-term occupation. Interior sites may represent more specialized locations associated with the procurement of single resources, such as anadromous fish and eels, and residue analysis indicates a predominately marine diet in traditional Mi'kmaw territory (Davis 1991a). The Maritime Woodland period lithic industry is defined by regional variation and characterized by changes in flint-knapping and raw materials. Distinctive projectile point

styles have been associated with the appearance of bow-and-arrow technology, which had replaced the use of the spear-thrower by the time of European contact (Bourque 2001:91). Shellfish exploitation also emerged as an important socio-economic activity and coastal shell middens were common features associated with Kejikawe'k L'nu'k occupation in the region.

Elaborate mortuary rituals flourished during the Early Maritime Woodland period and both Meadowood- and Adena-related burial sites have been discovered in the region. Meadowood burials, which resemble those of the same tradition in New York State, include side-notched projectile points, cache blade, slate

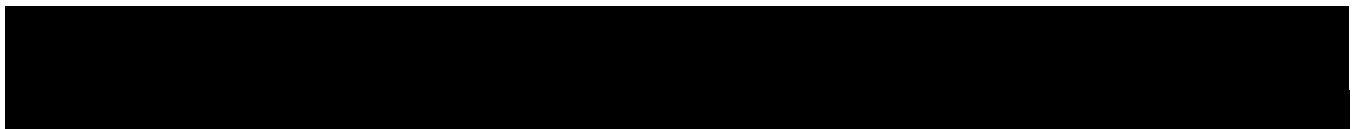
gorgets, and bird stones, and are often located near habitation sites or on the coast (Deal 2016:87). Adena-related burials, also referred to as the Middlesex Phase, are often, although not exclusively, identified by the presence of burial mounds and include various exotic grave offerings, such as stemmed points, gorgets, block-ended tubular pipes, celts and copper beads. Stemming from the Ohio Valley, numerous Adena burial sites have been identified throughout the region, including the Augustine burial mound in New Brunswick; however, there is limited evidence to suggest these burial practices reflect a physical movement of people into the region. The absence of habitation sites associated with a peripheral culture suggests this cultural manifestation represents a diffusion of Adena ritual elements into the region, which were adopted by local peoples (Deal 2016:93). This scenario also implies contact, direct or otherwise, with extra-regional groups and external influences (Rutherford 1991). Nevertheless, these elaborate burial practices did not survive into the Middle Maritime Woodland period and were replaced by simple primary burials with limited grave inclusions (Deal 2016:102). The later period is also characterized by the exploitation of a wider range of local resources and inter-regional trade (Deal 2016:103).

Protohistoric Period

The Middle and Late Maritime Woodland periods represent a pattern of settlement and subsistence that persisted until European contact. The initial period of contact, heavily influenced by European fishermen and traders, is often referred to as the Protohistoric period, generally held to begin in the 16th century. Our understanding of Mi'kmaw lifeways during this period is enhanced by available ethnographic sources, as well as archaeological evidence, often in the form of “copper kettle burials”. Single component Protohistoric period sites are rare in the archaeological record, as local Indigenous populations continued to occupy Late Maritime Woodland period sites; however, subsistence patterns were dramatically altered by the mid-16th century. By this time, “Mi'kmaw groups who normally wintered on the coast, were spending the late winter and early spring inland to harvest furs and moving to the coast in the late spring and summer to trade with the Europeans” (Deal 2001).

Although this period is often represented in the archaeological record by the presence of trade beads and copper tinkling cones, the most distinct sites are associated with the Copper Kettle Burial tradition, dating from around 1500 to the late 1600s (Deal 2001). This tradition has been associated primarily with the Mi'kmaq, who occupied most of the region's coastal areas and were heavily involved in the fur trade. Copper Kettle Burial sites are marked by overturned kettles and caches of European manufactured trade goods, including glass beads, iron swords, knives, and daggers (Deal 2001). By the end of the 17th century, contact has resulted in the introduction of European goods, a destabilized human-ecosystem and a wave of epidemics that devastated Indigenous populations.

4.1.3 Results – Archaeological Context



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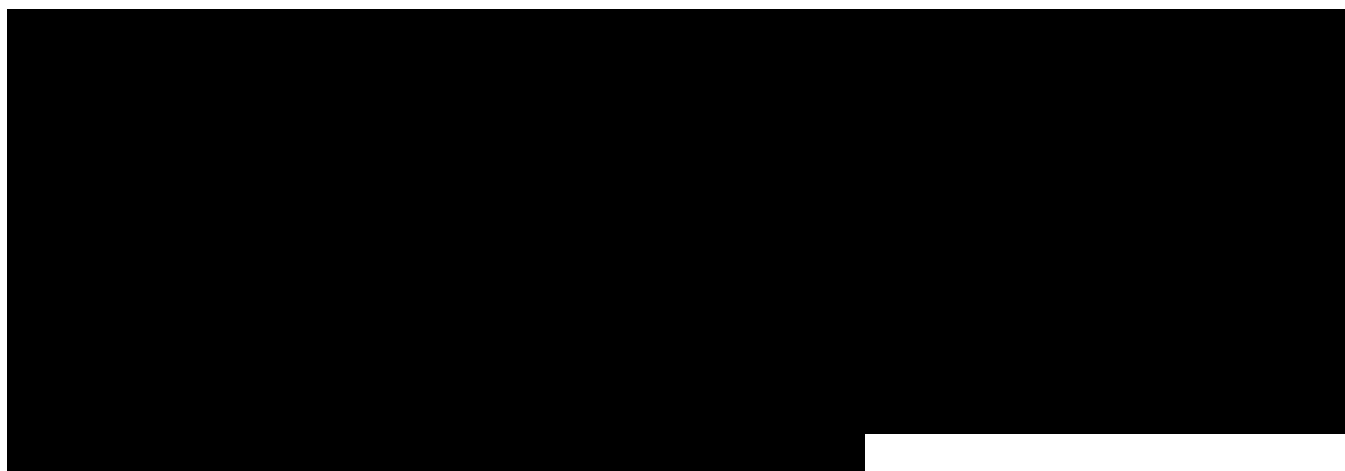
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[REDACTED]



4.1.4 Results – Historical Context – Indigenous

The Assessment Area is located within the traditional Mi'kmaw territory of Kespukwitk, meaning 'lands' end'. The area of Liverpool was called Oqomkikiaq, which has a number of translations, including 'a dry sandy place', which aptly describes the mouth of the river at Sandy Cove. Sources indicate that at least five summer villages were located in the territory, including LaHave River, Liverpool, Port Mouton, Cape Sable, and Port Royal. Historic Mi'kmaw occupation is also documented at St. Mary's Bay, near Cape Forchu/Yarmouth, at Bear River, and at Indian Point (near LaHave) (Hoffman 1955:522). The region represented a productive and diverse ecosystem, providing a resource base for the Mi'kmaq and their Ancestors for millennia prior to the arrival of European settlers. The network of navigable rivers, streams, coastal routes, portage routes, and footpaths facilitated travel, and allowed fluid movement and access to

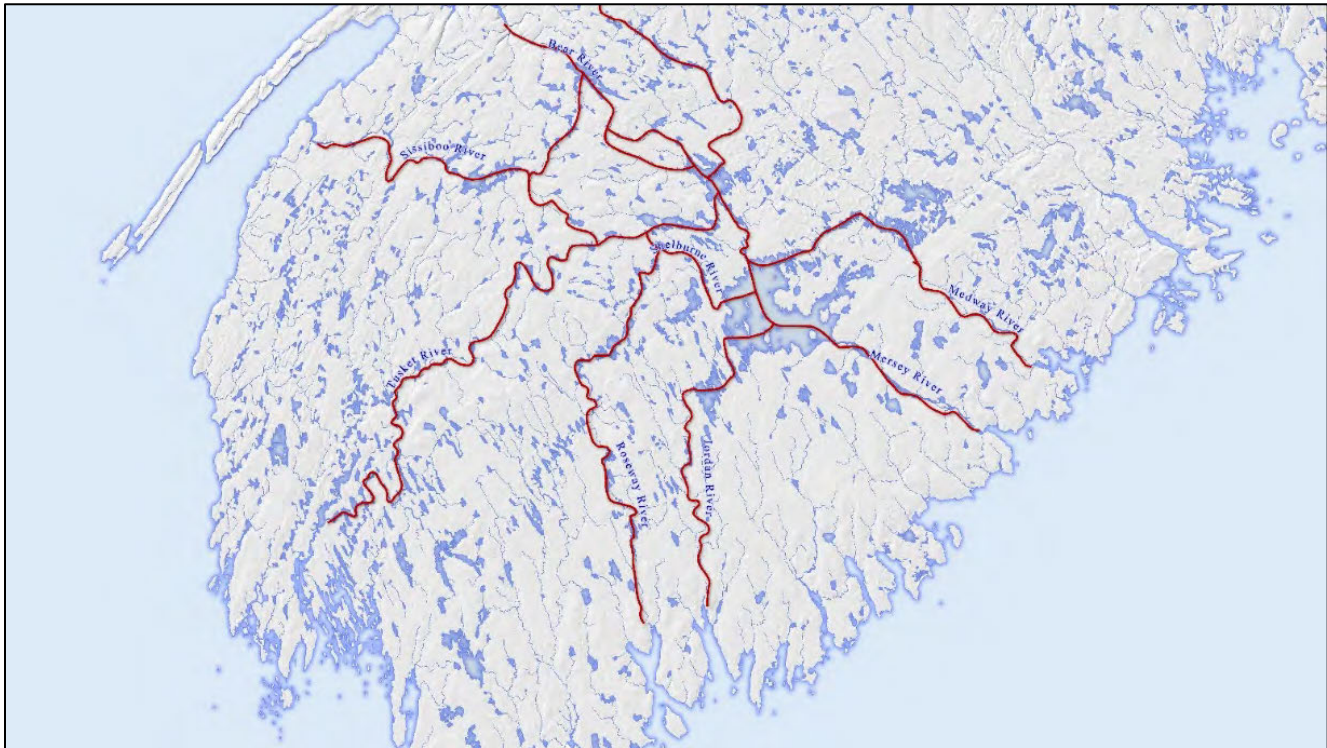


Plate 8: *Transportation and portage routes throughout Kespukwitk.*

overlapping resource areas throughout Mi'kma'ki (**Plate 8**). These conduits also facilitated interaction and trade with neighbouring groups. The Mi'kmaq seasonally moved throughout the greater region between areas where shelter and resources, including food and medicinal plants, were available and annually migrated between hunting and fishing grounds (Chute 1999).

Mi'kmaw placenames, those which have survived the influx of European travellers and settlers, demonstrate the Mi'kmaq had a significant understanding of the local landscape and resources. Mi'kmaq placenames are known for at least 14 landmarks within a 20 kilometre radius of the Assessment Area (**Table 3**), including descriptions of the landscape (large gap, at the rapids, at the narrows, a dry sandy place, barren place, at the dip, at the deep hole in the river, sandy river, flow red, at the clearing), reference specific human experience on the land (at St. Andrews), and indicate local species and resources (the place of the caribou calves, at the little hemlock river, mushroom). It is also interesting to note that a Glooskap legend, recorded by Charles Leland in 1884, references the Liverpool Bay area: “When Glooskap came to the camp, which was at Ogumkegeak, now called Liverpool, he found no one” (Leland 1884:37). The legend goes on to describe how toads originated at Ogumkegeak, having been picked off the head of an old sorceress by Glooskap.

Before European disruptions, Mi'kmaw lifeways involved maritime adaptations and seasonal mobility oriented to intercept available marine and freshwater aquatic resources (Lewis 2007). The Mi'kmaq followed a general seasonal pattern, living on the coasts during the spring and summer, moving upriver

Table 3: Mi'kmaw placenames within 20 km of the Assessment Area

Modern Placename	Mi'kmaq Placename	Translation	Source
Mersey River	<i>Ogômgigiag</i>	Large gap	Pacifique 1934:296
Mersey Rapids	<i>Kesu'skuk</i>	At the rapids	MPN 2019, Pacifique 1934:296
Milton	<i>Kepe'k</i> <i>Gepeg gisna Goipegeg</i>	At the narrows <i>or</i> Narrows (at the falls)	MPN 2019, Pacifique 1934:296
Liverpool	<i>Oqomkikiaq</i> <i>Ogomkigeak</i>	A dry sandy place	MPN 2019, Rand 1875:91
Brooklyn	<i>Qamaku'jk</i> <i>Gatgotjg</i>	Across the small waterway <i>or</i> Barren place	MPN 2019, Pacifique 1934:296
Herring Cove Brook	<i>Qalipu'jue'katik</i> <i>Glipotjoegatig</i>	The place of the caribou calves <i>or</i> Little caribou place	MPN 2019, Pacifique 1934:296
Jones Creek	<i>Waloqomkejg</i> <i>Oalôgômgetjg</i>	At the dip <i>or</i> Unknown	MPN 2019, Pacifique 1934:297
Port Mouton	<i>Waloqmkuk</i> <i>Oalgamgog</i>	At the deep hole in the river <i>or</i> Sand holes	MPN 2019, Pacifique 1934:297
Broad River	<i>Oalogomgeg</i>	Sandy river	Pacifique 1934:297
Little Hemlock River	<i>Ksu'skipukwasi'sk</i>	At the little hemlock river	MPNDA 2019
Mill Village	<i>Antele'katik</i> <i>Antlegatig</i>	At St. Andrews	MPN 2019, Pacifique 1902:23
Port Medway River	<i>Mekwamkipukwek</i>	Flow red (due to red sand bottom)	MPNDA 2019
Port Medway	<i>L'ketuk</i>	Mushroom	Pacifique 1934:295, MPNDA 2019
Broad Cove	<i>Memwaske'katik</i>	At the clearing	MPNDA 2019

and inland during the fall and winter, though this pattern varied by geographic region. In 1611, Father Biard indicates the Mi'kmaq hunted calving seals in January, not only for their flesh and fur, but for fat to sustain them throughout the year (Whitehead 1991:34). Black Bear and Moose were also hunted in late autumn and winter and valued for their fur, flesh, and fat. Emphasis was placed on a sustainable form of living, to ensure food for future generations (Whitehead 1991:10).

It is possible that a French merchant by the name of Etienne Bellanger encountered the Mi'kmaq at Indian Gardens in 1583 (Quinn 1962). It is recorded that while exploring the coastline of what is now Nova Scotia, intending to establish trade with the Mi'kmaq, Bellanger entered a river “not far from Cape Sable” and encountered a Mi'kmaw village consisting of 80 houses covered in bark. Raddall has suggested this was most likely the Mersey River and the village of Indian Gardens (Raddall). If this is, indeed, the case it represents some of the earliest known European contact with the Mi'kmaq in Nova Scotia. What is known is that Samuel de Champlain and Pierre Dugua de Mons arrived in Ogumkegeak in 1604 and later mapped the location of a Mi'kmaw encampment on Coffin Island (*Plate 9*). This site may correspond to BaDd-01, which Erskine identified, suggesting use of the island by the Mi'kmaq for millennia.



Plate 9: Champlain's 1613 map of 'Por du Rossignol' showing location of Mi'kmaw encampment on Coffin Island.

Following intermittent and later sustained European contact (ca. 1500 – 1650 AD), the Mi'kmaq shifted from long-established and sustainable food harvesting practices to subsistence patterns based on trading furs for European commodities. Whether the shift was by choice or necessity, the consequences were significant as overhunting led to stress within Mi'kmaq society. By the mid-17th century, and throughout the 18th century, the fur trade had evolved from opportunistic exchanges with fishermen-entrepreneurs on the beach or at anchor.

The Mersey River was an important transportation and trade route during the colonial period and played a role in early fur-trading in the region. Evidence of travel along the interior waterways of southwestern Nova Scotia during the early 17th century is found in historic documents (Biggar et al. 1971:237; Grant & Biggar 1911:229, Morse 1935). In the early 17th century, Champlain describes sailing into Liverpool Bay, which they called Port du Rossignol, and arresting the ship of a Frenchman named Captain Rossignol for illegally trading fur with the Mi'kmaq (Biggar et al. 1971:237; Grant & Biggar 1911:229). According to Mi'kmaq oral history, several local family names point to interactions with French traders in the early 17th

century (Parker 1990:95). The reference to Captain Rossignol and his crew travelling up the Mersey River to trade with the Mi'kmaq may represent the first record of an expedition into the interior of Kespukwitk by Europeans. More impressively, it seems to represent a strand of Mi'kmaw oral history that has been passed on and retold for 400 years (Pentz 2008:164). A number of European trade items dating to the Kiskukewe'k L'nuk (*ca.* 1500 - 1763), have been recovered from archaeological sites on the Mersey River, including a series of glass trade beads from Indian Gardens, which appear to have been brought into the area between 1580 and 1620. These and other early trade beads found within KNPHS and by collectors on Lake Rossignol (BaDh-02), provide evidence of early trans-Atlantic trade (Myers 1973: Christianson 1985a:9, Pentz 2013 Appendix C – BaDh-02:4).

It appears that the Brooklyn area, known as Katqu'jk, meaning ‘across the small waterway’ (often referred to as Kat Kootch by settlers and later called Herring Cove), was a major place for trade. It is recorded that a Mi'kmaw encampment was located at Fish Point in 1635, “where they assembled to dispose of their furs to French and Spanish traders” (More 1873:58). This trade continued into the 18th century, as noted in 1715 when Gov. Caulfeild instructed “make diligent inquiry as to what provocation the Indians had, especially in the ports of “Pugmagoe [Pubnico], Cape Sables, Port Rossway [Port Rossignol/Liverpool], Lahave, Merligeesh [Lunenburg] and Shebuctoe [Halifax],” as these would be the “most likely places for Meeting with ye Said Indians” (MacMechan 1900:21). It is believed that Fish Point is now the location of the wharf and breakwater in Brooklyn (*Plate 10*), and there are references to trading activity continuing here into the 19th century (Dexter 1934:2). According to Dexter, “The Indians had their camping ground nearby the point and the boats came to get from the Indians what they alone were the makers of” (Dexter 1934:2). It is also assumed this, and the surrounding area, were occupied by the Mi'kmaq during the precontact period. It is also worth noting the presence of rock carvings in the bedrock outcrop adjacent to the breakwater. Although the existing etchings represent names and carvings from the early 20th century, they may be a continuation of earlier activity, as demonstrated at the petroglyph site at Fairy Bay.

Early French entrepreneurs were familiar with the interior river systems of Kespukwitk, including the Mersey River, and used local Mi'kmaq as guides. Such was the case in 1686 when Jacques de Meulles, the Intendant of New France, made the first documented journey through the interior of Nova Scotia from Port Royal to Port Rossignol (Liverpool), by way of the Mersey, with two Mi'kmaw guides (Morse 1935:110-111; Morrison & Friend 1981:8, Pentz 2008:26-28). According to Pentz,

The Mersey/Allains Corridor ... represents one of several major canoe routes that formed a network of water highways in southwest Nova Scotia used by the Mi'kmaq during the post-contact period. Historic evidence of interior fur-trading and guiding by the Mi'kmaq, as well as early cartographic representations of interior river systems based to a large extent on local traditional knowledge, indicate the Mi'kmaq were fully familiar with and utilized the interior waterways of southwest Nova Scotia during the seventeenth century (Pentz 2008:33-34).



Plate 10: *View north of existing Brooklyn breakwater and former location of trading post at Fish Point.*

With the establishment of coastal areas by the British, trade with the interior declined, as did the Indigenous population, and by the time Liverpool was settled in 1759, only a few Mi'kmaw families remained (Rand 1875:91; Deal et al. 1987:151; Morrison & Friend 1981:100). Indeed, excavation at Indian Gardens revealed an absence of cultural material from the 18th century and some researchers have suggested the settlement was abandoned in 1759 following an outbreak of typhus. According to Raddall, Mi'kmaw families had encountered soldiers from Duc d'Anville's expedition at a summer camp along the shores of the Bedford Basin in 1746. The expedition had been sent from France to recapture Louisbourg, and many of the troops being transported fell ill before the reaching Kjipuktuk (Chebucto Bay). The Mi'kmaq carried provisions infected with typhus back to the interior, and to Indian Gardens, which devastated the population (Christianson 1985b; Raddall 1959). When Simeon Perkins recorded the first exploration of the Mersey River by a party of settlers from Liverpool in 1798, there was no mention of Indian Gardens, although there is reference to small groups of Mi'kmaq gathered along the coast (Raddall). Poonhook Lake (IR 10) was established in 1843 and the first official resident arrived in 1981.

By the mid-18th century, “[the] Mi'kmaq were suffering both the indifference and political machinations of their French co-religionists and the campaigns of the English, who loosed their Mohawk allies against them” (Whitehead 1991:77). In 1761, the Mi'kmaq negotiated a truce with the English and, though a measure of peace was formed, the erosion of the traditional Mi'kmaw way of life continued, with devastating effect to the people:

By 1761.... the great numbers of Loyalist settlers, fleeing the American Revolution, made vast inroads on traditional Mi'kmaw lands. Game was no longer plentiful; salmon rivers were blocked by dams and choked with sawdust. The fur-trade was in decline, and smallpox epidemics swept the Maritimes. The Mi'kmaq, their seventeenth-century population already reduced by approximately 90 percent, were particularly hard hit....a change which had begun in 1500. (Whitehead 1991:77)

By the turn of the 19th century, the Mi'kmaq in Nova Scotia were in dire conditions. Despite earlier guarantees to access traditional hunting territories, the expansion of European settlements and destruction of the natural environment denied Mi'kmaw access to important resources (Wynn 2005:23). The colonial government of the time did little to alleviate the worsening conditions, and policies generally focused on the assimilation of the Mi'kmaq into settler society. An annual relief fund was set aside in 1786, however the sum was small, and was never enough to address the problem of food scarcity, clothing, and lack of medical services (Paul 2008:197). The land set aside was largely isolated and/or ill-suited for agriculture or commercial purposes. Joseph Howe, who was then Commissioner for Indian Affairs, established Ponthook Lake Indian Reserve #10, located in the vicinity of the Indian Gardens Complex, in 1843, and declared that 1,015 acres around Kejimkujik Lake were also to be set aside as Reserve lands (Kejimkujik Lake / Maitland IR 7).

Annual reports from the Department of Indian Affairs for the years 1898 to 1904, 1909 and 1912 indicate the “Maitland” community (IR 7) was unoccupied. Indeed, portions of IR 7 were surrendered to the Kedgemakogee Rod & Gun Club in 1917, while other portions were leased for logging in 1908 and 1917. According to John Francis, there were a number of Mi'kmaw families living in the immediate vicinity of Milton in the late 19th century (Morrison & Friend 1981:84). Areas along the eastern and western shoreline of what is now Lake Rossignol were also part of the traditional hunting territory of Joe Maltai and his father, Old Joe Maltai, while Peter, Jack and Jim Glode, and Frank Charles, traditionally used lands farther up the river between Kejimkujik and Milford (Speck 1922:100-101; Morrison & Friend 1981:14).

The Mi'kmaq continued to live in the Liverpool area and archival documents indicate there was a village “back of Cobb’s barn, on the hill west of Campbell’s field, by the Cunningham Clear road” (Smith). A review of the 1888 A.F. Church map places the location of this village where the Queens Place Emera Centre now stands. Indeed, the remains of the “Old Cobbs Barn Road” still exists adjacent to the Emera facility. According to William Henry Smith (1867-1955), “they occupied themselves in making baskets and axe handles, but they also would make bows and arrows for the boys, and, most important, they were adept at adding to the good uppers of an old pair of long leather boots a moccasin bottom”. Smith went on to say that “A generation earlier, the camp was reported to have been much larger” (Smith). It is likely that this location, now known as Sandy Cove, was an extension of the Fish Point trading post and was undoubtedly occupied during the precontact period as well.

Smith also records the continuing practice of procuring medicinal plants by the local Mi'kmaq, noting that “for some time had been observing Indian, of perhaps fifty-five or sixty ... Coming slowly around Henderson’s shore ... and appear to be digging for something ... I noticed that he had a goodly-sized bottle filled with roots, and that they were white. He told us that his wife had rheumatics, that he had been digging roots which he was going to steep in rum, to make a liniment for her ailment” (Smith).

Another area of interest noted by Smith was an “Indian camp site” located “where the late Philip Yarn built his new house, the one presently occupied by Fred Braine, the Freemans used a road leading to what is known as Freemans Cove, where John and Joseph Freeman kept their boats”. Here, Smith was told of a site that the “Indians once used, camping there when fishing down the harbour” (Smith). This area was still being used by at least one local Mi'kmaq, known as “Scaby Lou”, whom Smith described as “perhaps the best known of our old Indians” (His real name was likely Louis Gload). Evidently, he “made himself a small wigwam, and fished for a few days” and “used this site for short periods only; when he really went fishing for an extended period, with other Indians he would camp at Frellick’s Point, and fish out of that cove” (Smith). Furthermore, Smith recorded that “At least one quartz arrowhead has been found near a spring at the head of Frellicks Cove, and it may be that Scaby Lou, in going there, was but following in the footsteps of his forefathers”. Indeed, this cove, now known as Fralick Cove, is located on the shoreline adjacent to the proposed Brooklyn Aquaculture Assessment Area (*Plate 11*).

In 1883, T. Butler, Agent for District 3 (Queens Co) reported that “the Mi'kmaq of Queens Co. have been “fairly successful in salmon fishing during the past summer getting 40 to 50 cents per pound for their fish” (Canada 1884). More also notes that the census of 1861 stated the presence of 84 Mi'kmaq in Queens County. Despite the hardship and suffering endured during the 19th and 20th centuries, many Mi'kmaq communities persisted in a migratory lifestyle, and maintained a distinctive identity against the threat of cultural erosion.

4.1.5 Results – Historical Context – Non-Indigenous

Interpreting early European contact with the Indigenous people in eastern Canada is restricted by a lack of accurate, unbiased, and detailed historic records from this influential period (Quinn 1981:1-9). Whether or not John Cabot set foot on Cape Breton in 1497, the shores of eastern Canada were well known to large numbers of European fisherman and whalers who made annual voyages across the Atlantic Ocean by the early 1500s (Johnston 2004:24-25; Quinn 1981:2). An account from 1578 indicates that off the coast of Newfoundland there were generally 100 Spanish vessels taking cod, another 20-30 Spanish vessels hunting whales, 50 Portuguese vessels, 150 sail of French and Bretons and 50 English (Brown 1869:34; Johnston 2004:25). Certainly, vessels traversed the Northumberland Strait, including Basque fisherman, who established seasonal cod and whaling camps in Cape Breton in the 15th and 16th centuries. Heavy competition, storms and imprecise navigation would lead some vessels to explore and exploit other areas. Without a doubt, the seamen would have come ashore occasionally for equipment repairs, to obtain fresh



Plate 11: *View north of Frallick Cove.*

water, to hunt game, or to trade with the Mi'kmaq (Johnston 2004:25; Quinn 1981; Whitehead 1991:17-18).

In 1534, the Mi'kmaq of the Gaspé peninsula, waving furs for trade, met Jacques Cartier, indicating they were already familiar with Europeans who wanted furs and were willing to exchange manufactured goods to obtain them (Johnston 2004:27; Quinn 1981:18). In the early 1500s, trade between European fishermen and Indigenous people in Atlantic Canada existed as a secondary enterprise, conducted on the beach or while at anchor, but, by the 1540s, these exchanges were being pursued independently as commercial ventures (Johnston 2004:28; Turgeon 1990:84). Some of these interactions between Europeans and Indigenous people resulted in mutually beneficial exchanges, while others failed miserably through misunderstanding and mistrust, quickly escalating to violence (Whitehead 1991:17-18).

Liverpool played an important role in early fur-trading in the region, prompting permanent European settlement in the mid-18th century. In 1759, settlers from Massachusetts arrived and took to fishing, lumbering and shipbuilding to make their livelihoods. Charles Lawrence, Governor of Nova Scotia, granted the township 10,000 acres, extending fourteen miles inland. A year after it's settling, Liverpool was being described as a boom town within North America (Sheppard 2001:x). Like Halifax, the land around Liverpool, with its poor soil and cool, moist summers, was generally unfavorable for farming (Bird 1955:397). Thus, rather than developing into an agricultural settlement, like the Planter settlements within

the Annapolis Valley, Liverpool became home to those who sought a life at sea. In 1761, two years after its official settlement, Charles Morris noted the presence of 90 families, stating:

The present inhabitants [...] subsist chiefly by the Fishery and by the Lumber Trade, They have built Seventy Houses, have employed Seventeen Schooners in the Fishery and made about eight thousand Quintals of Fish beside which they have made a considerable quantity of Shingles, Clapboards, Staves and erected a Saw mill for Sawing Boards. (Morris 1761:292)

Due to its fine harbour and a port home to many Captains, Liverpool early on became a haven for privateering (Sheppard 2001:xi). Privateers were vessels that received letters of marque from their governing authorities (in this case, Britain), which granted them the ability to arm their vessels and protect their home coastlines, as well as harass enemy shipping. Sylvanus Cobb, for example, a relatively famous early privateer, built a home in Liverpool (Sheppard 2001:xi). Following the American Revolution, the newly formed American privateers began raiding the coastline of Nova Scotia, pillaging communities, and capturing ships. In response to this, Liverpool commissioned a schooner, the *Enterprise*, to protect its all-important shipping lanes. The *Enterprise* was captained by one Joseph Barss (senior), and within its first 12 days on the sea, it returned having captured 12 enemy vessels (Sheppard 2001:xi). Liverpool became home to even more storied privateer vessels, such as the *Lord Nelson*, the *Lord Spencer*, the *Rover*, and the *Charles Mary Wentworth*. The crews of these vessels were made up largely of volunteer fishermen, who were paid based on a share system per vessels captured, rather than a steady wage (Mullins 1934:193-194). The success of these privateering ventures was often determined by the experience and skill of the fishermen, who were expected to be familiar with and use naval weapons.

Privateering would ramp up in Liverpool again with the resumption of hostilities between Britain and the United States with the War of 1812. During the war, Liverpool, at its peak, was home to up to 50 privateering vessels, all which represented privately owned warships. Mullins, writing in 1934, described the *Liverpool Packet*, captained by Joseph Barss (junior), as “the greatest privateer of all time”. By the time she was done, the *Liverpool Packet* revolutionized the way sea traffic was conducted along the Atlantic coasts, being “credited with [...] 100 to 200 captures, some of which were released, some lost, some recaptured by the Americans. Their value is variously estimated from \$262,000 to \$1,000,000.” (Mullins 1934:201). Mullins contends that the *Liverpool Packet*, and vessels like it, caused such excessive fear in American ports during this time that serious thought was put into constructing the Cape Cod Canal, the costs of which would have been covered by the “losses inflicted in two of her cruises alone” (Mullins 1934:202).

Following the end of the War of 1812, and with it the end of privateering, the fishing, lumbering, and ship building industries within Liverpool began to grow. Timber floated down the Mersey River from the inland forests of the Lake Rossignol watershed provided much of the timber for these burgeoning industries, and by 1853 shipbuilding within Liverpool began to be one of the town’s most important businesses (More 1873:87). Seventeen shipyards were in operation at various time within Liverpool, with

as many as seven or eight vessels being constructed at one time. These ship building activities continued into the early 20th century, and up until 1925, when wooden ship building generally ceased. Liverpool at this time was engaged in the illicit rum-running trade, shipping alcohol to the United States during the prohibition years.

Liverpool remains a vibrant community today, although it was disincorporated as a town and merged with the Municipality of the County of Queens to form the Region of Queens Municipality in 1996.

4.1.6 Results – Archaeological Potential Modelling

The results of the APM developed by Boreas Heritage suggests that coastal areas around Liverpool have high potential for encountering archaeological resources due to the proximity of Liverpool Bay and the mouth of the Mersey River. It is noted that potential is diminished on the southern coast of the bay due to significant slope in the area (*Figure 3*).

In addition to the terrestrial APM, Boreas Heritage created an approximate shoreline reconstruction map based on available and conceptual data regarding sea level rise during the Holocene and Late Holocene (*Figure 4*). The coastline has evolved significantly through time and the coastal orientation of precontact archaeological sites must be considered in light of the changing configuration. As mentioned above, the average position of the coastline was 10 kilometres seaward of its present location at 10,000 radiocarbon years BP, and by 5,000 years BP the shores were at 1.5 kilometres, which corresponds to the Mu Awsami Kejikawe'k L'nu'k period. At approximately 1,750 cal BP, sea level was approximately 1.3 metres lower than the present day, suggesting a stabilization of coastal submergence during Kejikawe'k L'nu'k.

4.1.7 Results – Archaeological Potential

Based on the results of the desk-based assessment, **two (2)** areas are considered to exhibit high potential for encountering submerged archaeological resources (HPA-01 & HPA-02). The remaining portions of the Assessment Area are considered to exhibit low potential for encountering archaeological resources.

Brooklyn Site

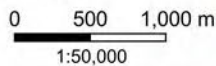
The proposed new Brooklyn aquaculture site is situated southwest of Eastern Head (*Figure 2*). The proposed lease has dimensions of approximately 405 metres x 1005 metres, comprising a total area of approximately 40.7 hectares. An analysis of bathymetric data, generated by Sweeney International Marine Corp., revealed the presence of a relatively level terrace in the western portion of the Assessment Area (*Plate 12*). This landform attribute is conducive to supporting past occupation and/or use of this location by Indigenous people. The potential for encountering submerged archaeological resources along this terrace, designated HPA-01, is considered to be high (*Figure 5*).

Figure 3 - Archaeological Potential Model
Cooke Aquaculture Sites
Archaeological Resource Impact Assessment
Queens County

- Mersey Location
- Brooklyn Location
- Liverpool Location
- Archaeological Site



Notes:
NAD 83 UTM Zone 20
Base Map: SNSMR



BOREAS
HERITAGE

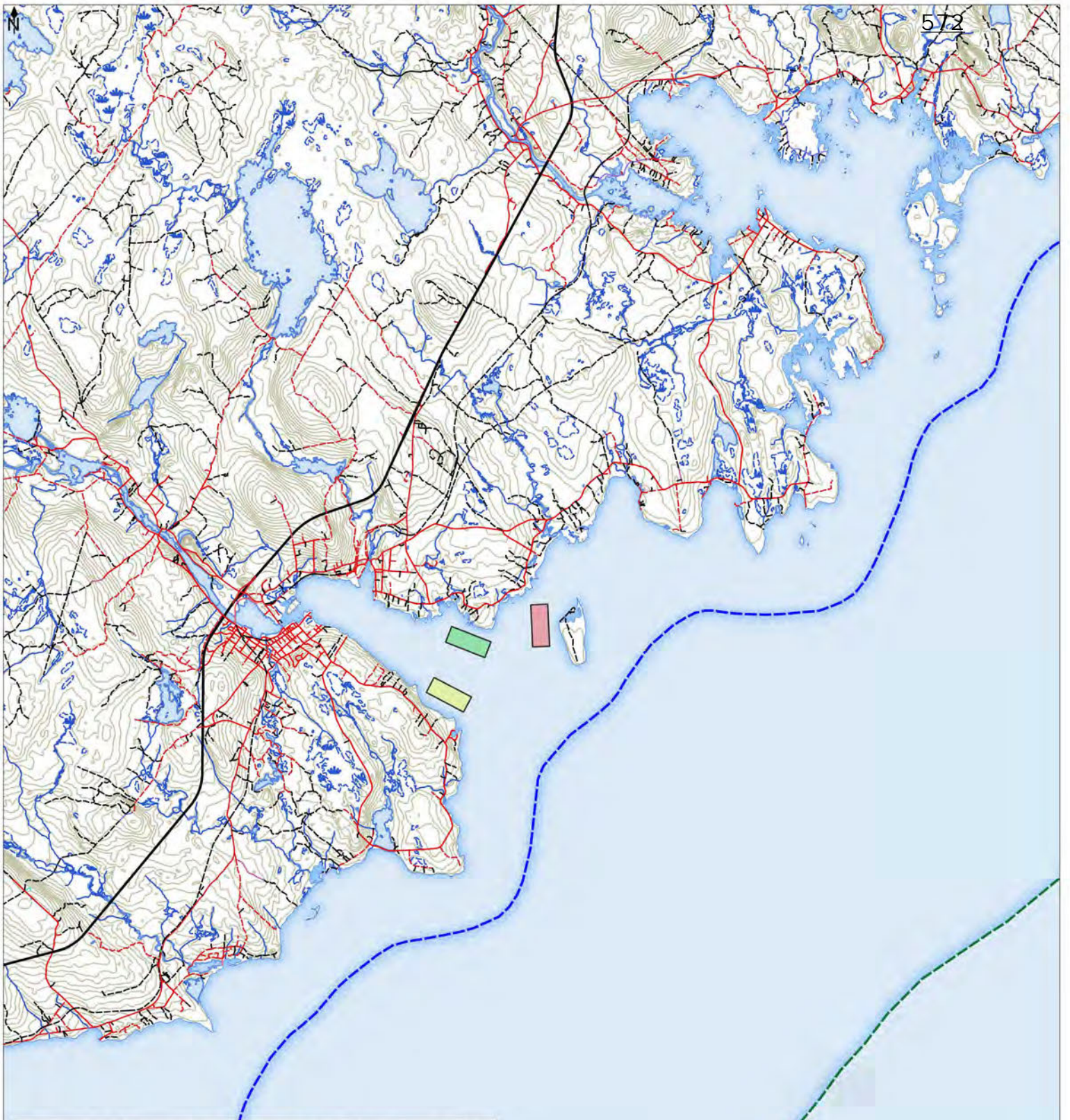


Figure 4 - Approximate Shoreline Reconstruction

Cooke Aquaculture Sites
 Archaeological Resource Impact Assessment
 Queens County

- Mersey Location
- Brooklyn Location
- Liverpool Location
- Shoreline @ 5,000 BP
- Shoreline @ 10,000 BP

Notes:
 NAD 83 UTM Zone 20
 Base Map: SNSMR

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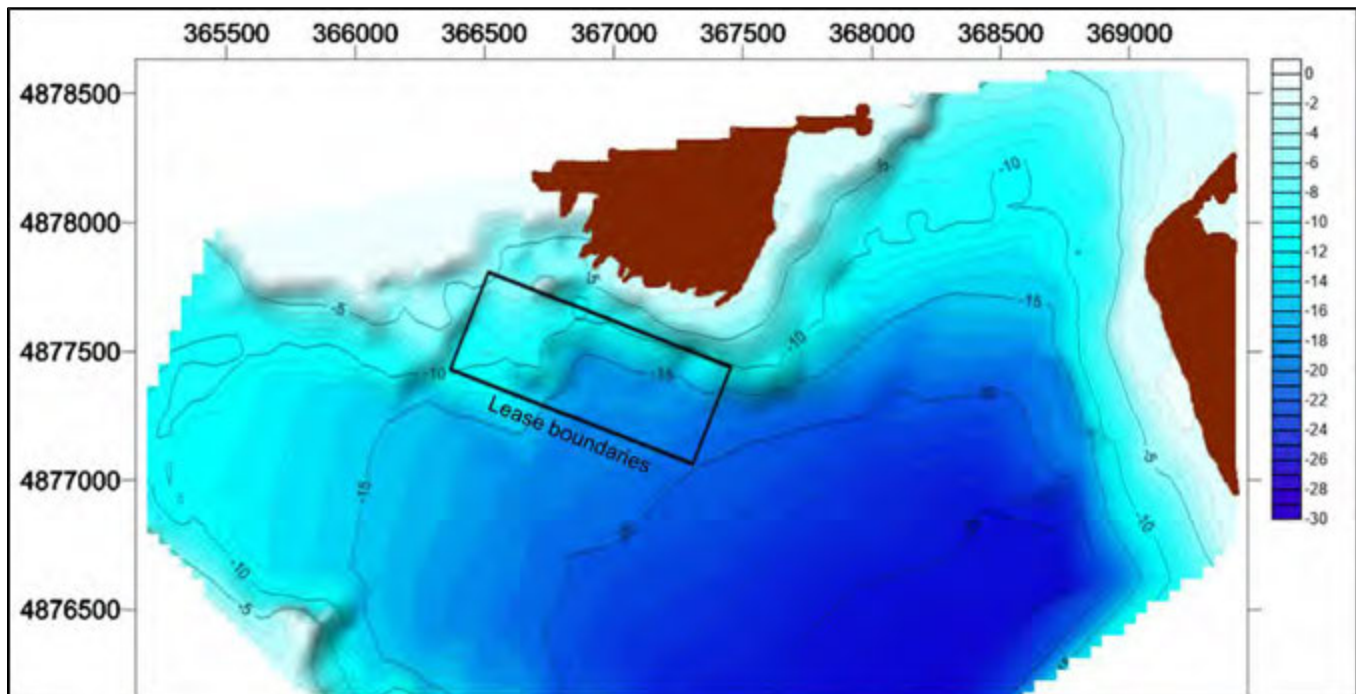


Plate 12: Interpolated 3-D surface map of proposed Brooklyn site [Baseline Assessment Report, Sweeney International Marine Corp.].

It is therefore recommended that HPA-01 be avoided during any proposed development and/or ground disturbance activities associated with the proposed Project. If HPA-01, or parts thereof, cannot be avoided, it is recommended these areas be subjected to subsurface archaeological sampling probes in order to confirm the presence or absence of archaeological resources. Any potential need for further archaeological assessment or mitigation will be based on the results of this subsurface investigation.

Liverpool Site

The Liverpool marine aquaculture site #1205 is situated on the western side of Coffin Island (**Figure 2**). The current lease has dimensions of approximately 200 metres x 200 metres, comprising a total area of approximately 4 hectares. The proposed boundary amendment extends the lease boundaries to add six additional cages south of the existing grid and to accommodate all below surface gear. An analysis of bathymetric data, generated by Sweeney International Marine Corp., revealed the presence of a relatively level terrace in the northern portion of the Assessment Area, extending along the eastern boundary (**Plate 13**). This landform attribute is conducive to supporting past occupation and/or use of this location by Indigenous people. The potential for encountering submerged archaeological resources along this terrace, designated HPA-02, is considered to be high (**Figure 5**).

It is therefore recommended that HPA-02 be avoided during any proposed development and/or ground disturbance activities associated with the proposed Project. If HPA-02, or parts thereof, cannot be avoided, it is recommended these areas be subjected to subsurface archaeological sampling probes in order to confirm the presence or absence of archaeological resources. Any potential need for further archaeological assessment or mitigation will be based on the results of this subsurface investigation.

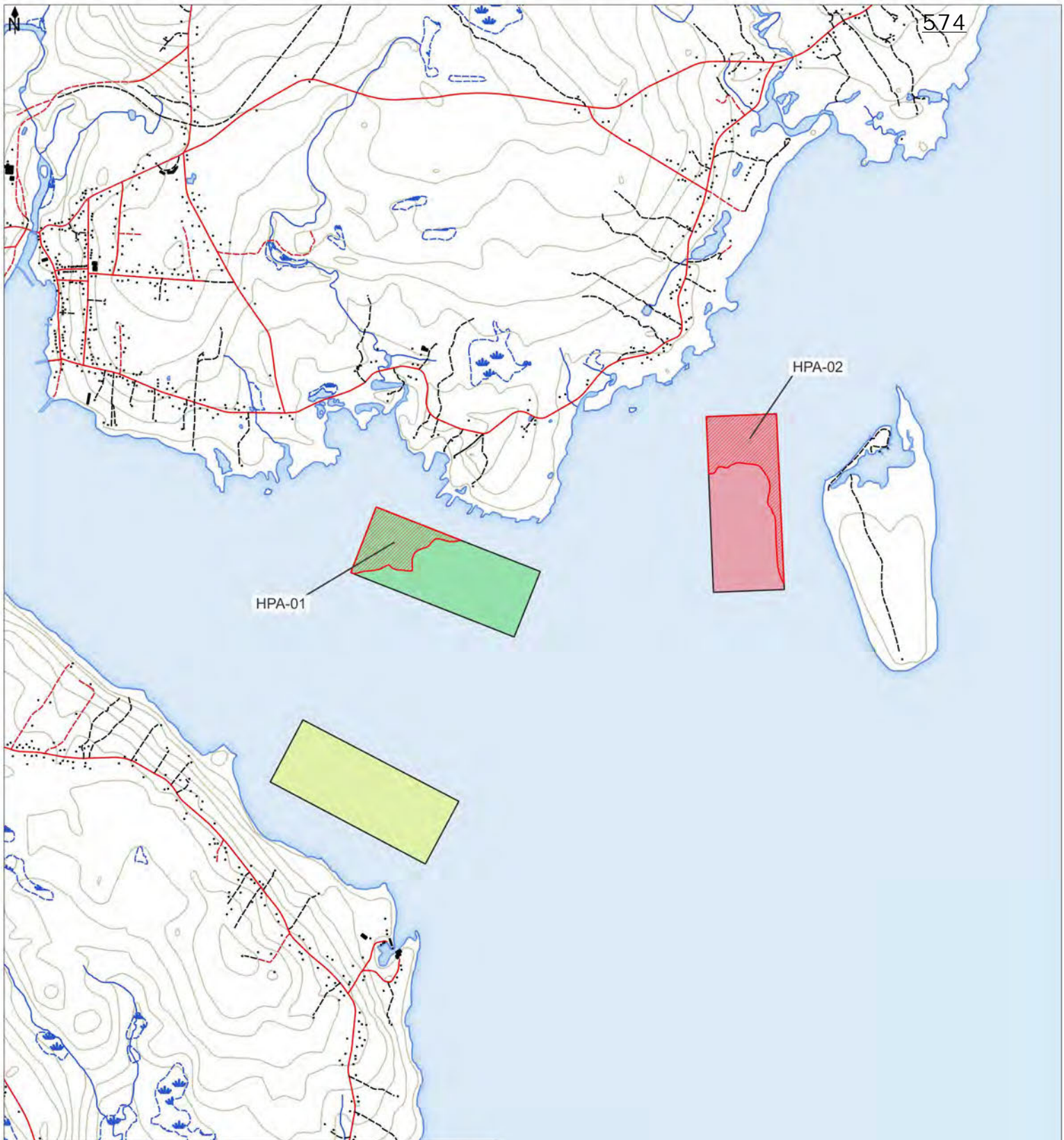


Figure 5 - High Potential Areas

Cooke Aquaculture Sites
Archaeological Resource Impact Assessment
Queens County

- Mersey Location
- Brooklyn Location
- Liverpool Location
- High Potential Area

Notes:
NAD 83 UTM Zone 20
Base Map: SNSMR

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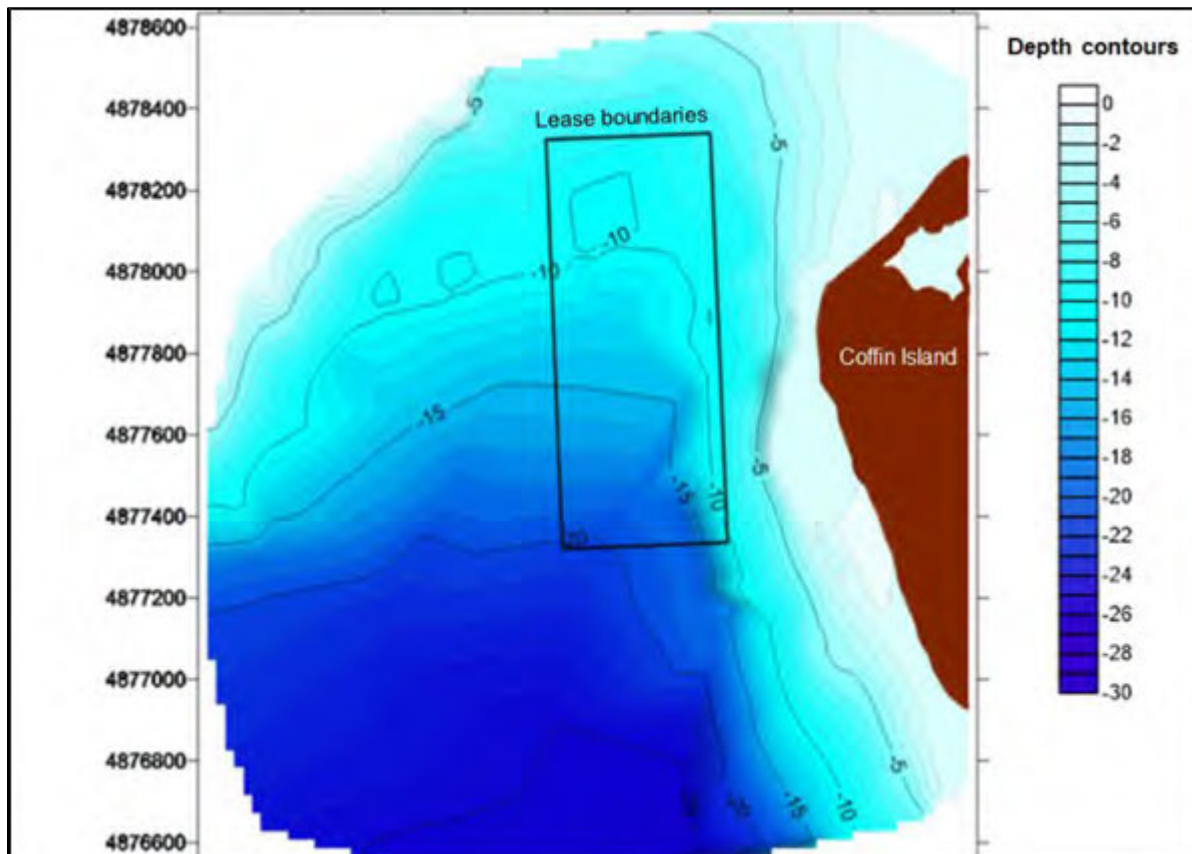


Plate 13: Interpolated 3-D surface map of Liverpool site [Baseline Assessment Report, Sweeney International Marine Corp.].

Mersey Point Site

The proposed new Mersey Point aquaculture site is situated between Black Point and Moose Harbour (**Figure 2**). The proposed lease has dimensions of approximately 405 metres x 1005 metres, comprising a total area of approximately 40.7 hectares. An analysis of bathymetric data, generated by Sweeney International Marine Corp., revealed the presence of steeply sloped terrain throughout the Assessment Area (**Plate 14**). This landform attribute is not conducive to supporting past occupation and/or use of this location by Indigenous people. The potential for encountering submerged archaeological resources within the Mersey Point Assessment Area is considered to be low (**Figure 5**).

The ARIA resulted in the identification of two areas considered to exhibit high potential for encountering submerged archaeological resources (HPA-01 & HPA-02). It is therefore recommended that the areas of high archaeological potential be avoided during any proposed development and/or ground disturbance activities associated with the proposed Project. If the areas of high archaeological potential, or parts thereof, cannot be avoided during development activities related to the proposed Project, it is recommended these areas be subjected to subsurface archaeological sampling probes in order to confirm the presence or absence of archaeological resources. Any potential need for further archaeological assessment or mitigation will be based on the results of this subsurface investigation.

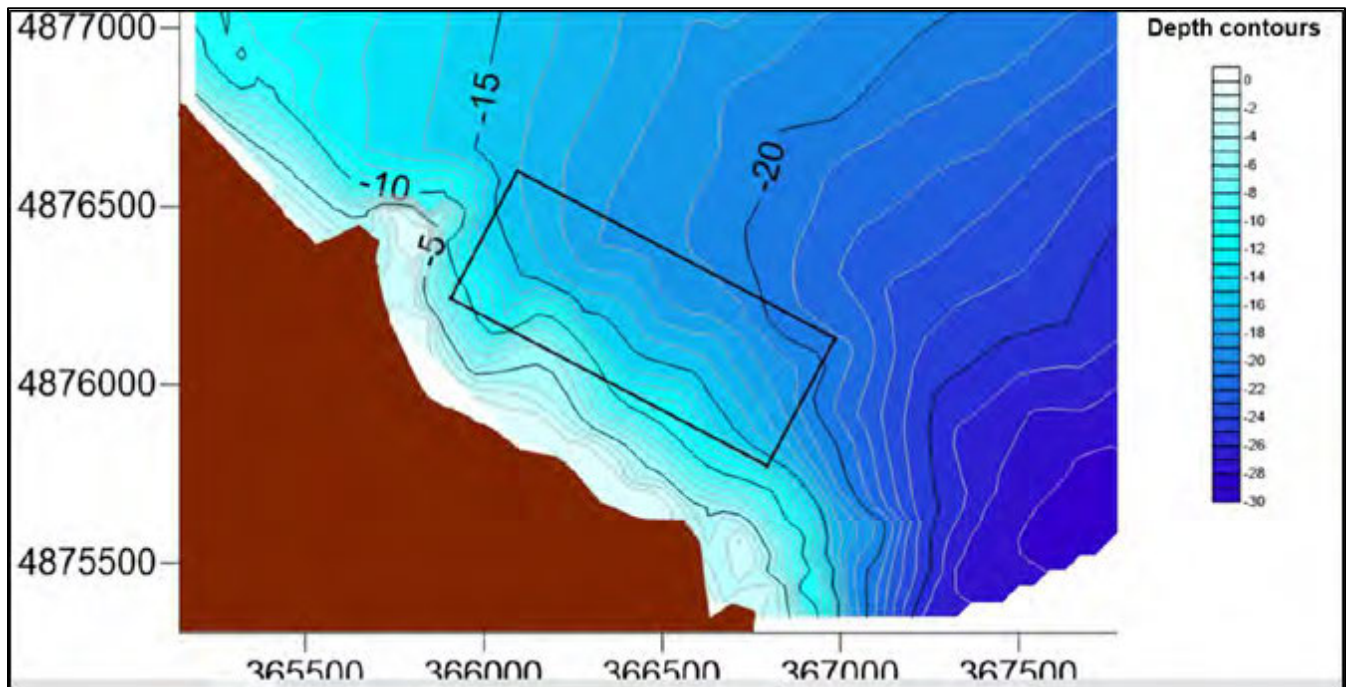


Plate 14: Interpolated 3-D surface map of Mersey Point site [Baseline Assessment Report, Sweeney International Marine Corp.].

5.0 CONCLUSIONS AND RECOMMENDATIONS

The 2022 ARIA for the Liverpool Bay Aquaculture project involved a desk-based assessment only, which examined the environmental context, the archaeological context, and the historical context of the Assessment Area. Based on the results of the ARIA, Boreas Heritage identified **two (2)** areas considered to exhibit high potential for encountering submerged archaeological resources (**HPA-01 & HPA-02**). The remaining portions of the Assessment Area are considered to exhibit low potential for encountering archaeological resources. As a result, Boreas Heritage offers the following archaeological resource management recommendations:

1. It is recommended that the two (2) areas of high archaeological potential (HPA-01 & HPA-02), as described in this report, be avoided during any proposed development and/or ground disturbance activities associated with the proposed Project, to prevent accidental impacts to areas ascribed high archaeological potential;
2. If areas of high archaeological potential, or parts thereof, cannot be avoided during development activities related to the proposed Project, it is recommended these areas be subjected to subsurface archaeological sampling probes in order to confirm the presence or absence of archaeological resources;
3. If any changes or deviations from the original plans relating to the proposed Project, as provided to Boreas Heritage for this Survey, are necessary, and are found to impact areas outside the Assessment Area described in this report, then additional archaeological resource impact assessment(s) may be warranted for these amended portions of the proposed Project;
4. It is recommended that the remainder of the Assessment Area, as described in the report, be cleared of any requirement for further archaeological investigation and that development within these areas may proceed as planned;
5. In the event archaeological resources and/or human remains are encountered, from disturbed or undisturbed contexts, during construction or disturbance activities associated with the proposed Project, works must immediately cease until contact is made with, and direction(s) on how to proceed has been received from the Coordinator of Special Places, Nova Scotia Department of Communities, Culture, Tourism and Heritage.

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APPENDIX A

Heritage Research Permit



Heritage Research Permit (Archaeology)

587

Special Places Protection Act 1989

(Original becomes Permit when approved by
Communities, Culture and Heritage)

Office Use Only
Permit Number:

A2022NS130

<i>Greyed out fields will be made publically available. Please choose your project name accordingly</i>	
Surname Beanlands	First Name Sara
Project Name Liverpool Bay Aquaculture	
Name of Organization Boreas Heritage Consulting Inc.	
Representing (if applicable)	
Permit Start Date August 5, 2022	Permit End Date December 31, 2022
General Location: The proposed Liverpool Bay Assessment Areas are located in Liverpool Bay, Queens County.	
Specific Location: <i>(cite Borden numbers and UTM designations where appropriate and as described separately in accordance with the attached Project Description. Please refer to the appropriate Archaeological Heritage Research Permit Guidelines for the appropriate Project Description format)</i>	
Permit Category: Please choose one <input type="checkbox"/> Category A – Archaeological Reconnaissance <input type="checkbox"/> Category B – Archaeological Research <input checked="" type="checkbox"/> Category C – Archaeological Resource Impact Assessment <input checked="" type="checkbox"/> I certify that I am familiar with the provisions of the <i>Special Places Protection Act</i> of Nova Scotia and that I have read, understand and will abide by the terms and conditions listed in the Heritage Research Permit Guidelines for the above noted category.	
Signature of applicant	Date 07/26/2022
Approved by Executive Director	Date

From: Watts, Melinda
Sent: November 29, 2022 11:38 AM
To: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: ARIA Report for Kelly Cove Salmon Liverpool Bay Adjudicative Applications

Hi Katie,

It is my understand that CCTH received and reviewed the ARIA report completed by Boreas Heritage Consulting Inc. for Kelly Cove Salmon, as requested during consultation with Acadia First Nation/the KMKNO?

As we are trying to finalize consultations and submit the application to the Aquaculture Review Board, we would like to confirm with your department that you are satisfied with the Report and can be considered a final version to be shared with Acadia/KMKNO?

Any questions, please let me know.

Cheers,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: December 12, 2022 9:30 AM
To: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: ARIA Report for Kelly Cove Salmon Liverpool Bay Adjudicative Applications

Hi Katie,

I'm just following up again regarding the review of the ARIA that was submitted, as indicated in my previous email below.

Thanks,
Melinda

From: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Sent: December 12, 2022 12:36 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>; Lewis, Beth J <Beth.Lewis@novascotia.ca>; Cormier, John Kenneth <John.Cormier@novascotia.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: ARIA Report for Kelly Cove Salmon Liverpool Bay Adjudicative Applications

Hi Melinda,

We have reviewed the ARIA report and communicated that review to the consulting archaeologist. We also recently approved a second permit for core sampling in two of the proposed aquaculture operation areas in Liverpool Bay. My colleague, John Cormier, cc'd here, sends out the reviewed and approved reports. John, please see the email below.

Yours,
Katie

From: Cormier, John Kenneth <John.Cormier@novascotia.ca>
Sent: December 12, 2022 2:10 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>; Lewis, Beth J <Beth.Lewis@novascotia.ca>; Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Subject: RE: ARIA Report for Kelly Cove Salmon Liverpool Bay Adjudicative Applications

Hi Melinda,

The final report for HRP A2022NS130 Liverpool Bay Aquaculture was reviewed by CCTH Staff and approved. The report letter confirming approval was emailed to Boreas Heritage Consulting Inc. December 9th.

Kind regards,
John

December 13, 2022

Sara Beanlands
Boreas Heritage Consulting Inc.
46 Arlington Avenue
Halifax, Nova Scotia
B3T 2A1

Dear Sara Beanlands:

**RE: Heritage Research Permit Report
A2022NS130 – Liverpool Bay Aquaculture, ARIA**

We have received and reviewed the final report on work conducted under the terms of Heritage Research Permit A2022NS130 for the Liverpool Bay Aquaculture, ARIA in Queens County, Nova Scotia.

Liverpool marine aquaculture site #1205 is located in Liverpool Bay, to the west of Coffin Island with current dimensions of 200 m x 200 m with a total area of 4 ha². The amendment to the boundary will allow the addition of six cages to the south of the existing grid and accommodate all below surface gear. Dimensions of the proposed lease, as well as the other two proposed leases, Mersey Point (situated between Black Point & Moose Harbour) and Brooklyn aquaculture (located southwest of Eastern Head), are 405 m x 1005 m, or 40.7 ha², with 2 x 10 cage grid configuration. This ARIA involved Mi'kmaq engagement, and background study only. As the footprints are situated underwater Phase I of the ARIA will be a desktop review, which will aid in the development of a field reconnaissance strategy.

Background study showed the surrounding area to have been occupied and utilized by Mi'kmaq for thousands of years prior to the arrival of Europeans. There are eighteen (18) registered precontact archaeological sites situated within 10 km of the development area. Permanent European settlement to the Liverpool area began in the mid-18th century, as it played an important role in the fur trade. Potential modeling identified two (2) areas considered to exhibit high potential for encountering submerged archaeological resources. The remaining portions of the proposed development areas are scribed low archaeological potential.

Based on the above, Boreas Heritage offered the following recommendations:

1. It is recommended that the two (2) areas of high archaeological potential (HPA-01 & HPA-02), as described in this report, be avoided during any proposed development and/or ground disturbance activities associated with the proposed Project, to prevent accidental impacts to areas ascribed high archaeological potential.
2. If areas of high archaeological potential, or parts thereof, cannot be avoided during development activities related to the proposed Project, it is recommended these areas be subjected to subsurface archaeological sampling probes in order to confirm the presence or absence of archaeological resources.
3. If any changes or deviations from the original plans relating to the proposed Project, as provided to Boreas Heritage for this Survey, are necessary, and are found to impact areas outside the Assessment Area described in this report, then additional archaeological resource impact assessment(s) may be warranted for these amended portions of the proposed Project.

S. Beanlands
December 13, 2022
Page 2

4. It is recommended that the remainder of the Assessment Area, as described in the report, be cleared of any requirement for further archaeological investigation and that development within these areas may proceed as planned.

5. In the event archaeological resources and/or human remains are encountered, from disturbed or undisturbed contexts, during construction or disturbance activities associated with the proposed Project, works must immediately cease until contact is made with, and direction(s) on how to proceed has been received from the Coordinator of Special Places, Nova Scotia Department of Communities, Culture, Tourism and Heritage.

CCH Staff have reviewed the report and find it acceptable as submitted. Please do not hesitate to contact me with any questions or concerns.

Sincerely,



John Cormier
Coordinator, Special Places

A handwritten signature in blue ink, appearing to read "John Cormier", written over the typed name and title.

From: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Sent: Wednesday, March 15, 2023 10:02 AM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Jeff Nickerson <jnickerson@cookeaqua.com>
Subject: Aria Report

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Melinda/Lynn

Attached is the Aria report we received this morning from Boreas Heritage.

The report has yet to be reviewed by CCTH and the recommendations have not yet been accepted our consultant is submitting it to CCTH today.

I will follow up when they accept the recommendations.

Regards Jennifer

Jennifer Hewitt

Kelly Cove Salmon Ltd.

Division of Cooke Aquaculture INC

Compliance Manager, NS

Cell (902) 521-8604

134 North Street

Bridgewater, NS

B4V 2V6



A2023NS016_Cooke
Aquaculture Core Sa

LIVERPOOL BAY AQUACULTURE
ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT
CORE SAMPLING
QUEENS COUNTY



Submitted to:
Cooke Aquaculture
and the
Special Places Program

Submitted by:
Boreas Heritage Consulting Inc.

Heritage Research Permit:
A2023NS016

March 2023

PROJECT PERSONNEL

PRINCIPAL INVESTIGATOR: Sara J. Beanlands, M.A.

PROJECT MANAGEMENT: Sara J. Beanlands, M.A.

DESKTOP COMPONENT: Sara J. Beanlands, M.A.

REPORT PREPARATION: Sara J. Beanlands, M.A.

GIS / FIGURE DRAFTING: Stephen G. Garcin, M.A.

EXECUTIVE SUMMARY

Kelly Cove Salmon Ltd., the Canadian salmon farming division of Cooke Aquaculture Inc., has applied for two new aquaculture sites (Mersey & Brooklyn) and the expansion of an existing site (Liverpool) in Liverpool Bay, located within the greater Mi'kmaw territory of Kespukwitk, Queens County, Nova Scotia. In order to evaluate the potential for impacting archaeological resources during this work, Cooke Aquaculture retained Boreas Heritage Consulting Inc. (Boreas Heritage) to conduct an Archaeological Resource Impact Assessment (ARIA) of the proposed Project development areas (A2022NS130). The purpose of the Survey was to highlight areas of potential archaeological sensitivity associated with the proposed Project. As the proposed development footprints are currently submerged, the first phase of the ARIA involved a desk-based assessment only, so that an appropriate field component strategy could be devised.

Based on the results of the desk-based assessment, which examined the environmental context, the archaeological context, and the historical context of the Assessment Area, Boreas Heritage identified **two (2)** areas (Brooklyn & Liverpool) considered to exhibit high potential for encountering submerged archaeological resources (HPA-01 & HPA-02). Boreas Heritage subsequently recommended the **two (2)** areas of high archaeological potential be avoided during any proposed development and/or ground disturbance activities associated with the proposed Project. If areas of high archaeological potential, or parts thereof, could not be avoided, it was recommended these areas be subjected to subsurface archaeological sampling probes in order to confirm the presence or absence of archaeological resources.

As development plans progressed, Kelly Cove Salmon Ltd. determined that HPA-1 & HPA-2 may be impacted by the proposed development and subsequently retained Boreas Heritage to oversee and analyse the recommended core sampling programme. The objective is to collect sediment core samples at 18 anchor positions for site #1432 (Brooklyn) and 21 anchor positions for site #1205 (Liverpool) to confirm the presence or absence of archaeological resources. The archaeological assessment was conducted in accordance with the terms of Heritage Research Permit A2023NS016, issued by the Nova Scotia Department of Communities, Culture, Tourism, and Heritage (CCTH) – Special Places Program (SPP), and was directed by Sara Beanlands. The archaeological core sampling programme was carried out in January and February of 2023.

A total of 39 core samples was extracted from proposed anchor locations across the high potential areas. No core samples were recorded as positive for cultural material. Based on the results of the archaeological core sampling programme, Boreas Heritage recommends the Assessment Area be cleared of any requirement for further archaeological investigation and that development within these areas may proceed as planned. Furthermore, if any changes or deviations from the original plans relating to the proposed Project, as provided to Boreas Heritage, are necessary, and are found to impact areas outside the Assessment Area described in this report, then additional archaeological resource impact assessment(s) may be warranted for amended portions of the proposed Project.

TABLE OF CONTENTS

PROJECT PERSONNEL	i
EXECUTIVE SUMMARY	ii
TABLE OF CONTENTS.....	iii
LIST OF FIGURES	iii
LIST OF PLATES	iii
LIST OF TABLES.....	iv
1.0 INTRODUCTION	1
2.0 ASSESSMENT AREA.....	2
3.0 METHODS.....	5
3.1 Sample Collection – Methods	5
3.2 Sediment Analysis – Methods.....	5
4.0 RESULTS.....	6
4.1 Core Sampling Programme	6
4.2 Archaeological Potential	16
5.0 CONCLUSIONS and RECOMMENDATIONS	17
APPENDIX A.....	18
Heritage Research Permit.....	19

LIST OF FIGURES

Figure 1: <i>Assessment Area</i>	3
Figure 2: <i>High Potential Areas</i>	4
Figure 3: <i>Brooklyn Core Locations</i>	7
Figure 4: <i>Liverpool Core Locations</i>	12

LIST OF PLATES

Plate 1: <i>View southeast of existing Liverpool aquaculture site</i>	2
Plate 2: <i>Core Sample 28</i>	9
Plate 3: <i>Core Sample 28 under microscope</i>	9
Plate 4: <i>Core Sample 32</i>	9
Plate 5: <i>Core Sample 32 under microscope</i>	9

Plate 6: <i>Core Sample 36</i>	10
Plate 7: <i>Core Sample 36 under microscope</i>	10
Plate 8: <i>Core Sample B6</i>	10
Plate 9: <i>Core Sample B6 under microscope</i>	10
Plate 10: <i>Core Sample 1</i>	14
Plate 11: <i>Core Sample 1 under microscope</i>	14
Plate 12: <i>Core Sample 27</i>	14
Plate 13: <i>Core Sample 27 under microscope</i>	14
Plate 14: <i>Core Sample 36</i>	15
Plate 15: <i>Core Sample 36 under microscope</i>	15
Plate 16: <i>Core Sample B6</i>	15
Plate 17: <i>Core Sample B6 under microscope</i>	15

LIST OF TABLES

Table 1: <i>Target coordinates of sample locations for #1432</i>	6
Table 2: <i>Sample Observations for #1432</i>	8
Table 3: <i>Target coordinates of sample locations for #1205</i>	11
Table 4: <i>Sample observations for #1205</i>	13

1.0 INTRODUCTION

Kelly Cove Salmon Ltd., the Canadian salmon farming division of Cooke Aquaculture Inc., has applied for two new aquaculture sites (Mersey & Brooklyn) and the expansion of an existing site (Liverpool) in Liverpool Bay, located within the greater Mi'kmaw territory of Kespukwitk, Queens County, Nova Scotia. In order to evaluate the potential for impacting archaeological resources during this work, Cooke Aquaculture retained Boreas Heritage Consulting Inc. (Boreas Heritage) to conduct an Archaeological Resource Impact Assessment (ARIA) of the proposed Project development areas (A2022NS130). The purpose of the Survey was to highlight areas of potential archaeological sensitivity associated with the proposed Project. As the proposed development footprints are currently submerged, the first phase of the ARIA involved a desk-based assessment only, so that an appropriate field component strategy could be devised.

Based on the results of the desk-based assessment, which examined the environmental context, the archaeological context, and the historical context of the Assessment Area, Boreas Heritage identified two (2) areas (Brooklyn & Liverpool) considered to exhibit high potential for encountering submerged archaeological resources (HPA-01 & HPA-02). Boreas Heritage subsequently recommended the two (2) areas of high archaeological potential be avoided during any proposed development and/or ground disturbance activities associated with the proposed Project. If areas of high archaeological potential, or parts thereof, could not be avoided, it was recommended these areas be subjected to subsurface archaeological sampling probes in order to confirm the presence or absence of archaeological resources.

As development plans progressed, Kelly Cove Salmon Ltd. determined that HPA-1 & HPA-2 may be impacted by the proposed development and subsequently retained Boreas Heritage to oversee and analyse the recommended core sampling programme. The objective is to collect sediment core samples at 18 anchor positions for site #1432 (Brooklyn) and 21 anchor positions for site #1205 (Liverpool) to confirm the presence or absence of archaeological resources. The archaeological assessment was conducted in accordance with the terms of Heritage Research Permit A2023NS016 (*Appendix A*), issued by the Nova Scotia Department of Communities, Culture, Tourism, and Heritage (CCTH) – Special Places Program (SPP), and was directed by Sara Beanlands. The archaeological core sampling programme was carried out in January and February of 2023.

This report includes an overview of the methods applied during the archaeological core sampling programme, a summary of the results of the Survey, and archaeological resource management recommendations for the proposed Project.

2.0 ASSESSMENT AREA

The Assessment Area includes two previously identified high potential areas: HPA-1, located within the proposed Brooklyn aquaculture site (#1432), and HPA-2, located within the proposed expansion of the Liverpool aquaculture site (#1205), both of which are situated in Liverpool Bay, within the greater Mi'kmaw territory of Kespukwitk (*Figures 1 & 2*). Landform attributes associated with the high potential areas are conducive to supporting past occupation and/or use of these locations by Indigenous peoples and the proposed development activities may generate subsurface disturbances associated with the anchoring system for the cage-culture grids.

The proposed new Brooklyn aquaculture site #1432 is situated in Liverpool Bay, southwest of Eastern Head. The proposed lease has dimensions of approximately 405 metres x 1005 metres, comprising a total area of approximately 40.7 hectares. If approved, the proposed lease would have a 2 x 10 cage grid configuration. The Liverpool marine aquaculture site #1205 is situated in Liverpool Bay, on the western side of Coffin Island. The current lease has dimensions of approximately 200 metres x 200 metres, comprising a total area of approximately 4 hectares (*Plate 1*). The proposed boundary amendment extends the lease boundaries to add six additional cages south of the existing grid and to accommodate all below surface gear. The dimensions of the proposed lease are approximately 405 metres x 1005 metres, comprising a total area of approximately 40.7 hectares.



Plate 1: *View southeast of existing Liverpool aquaculture site.*

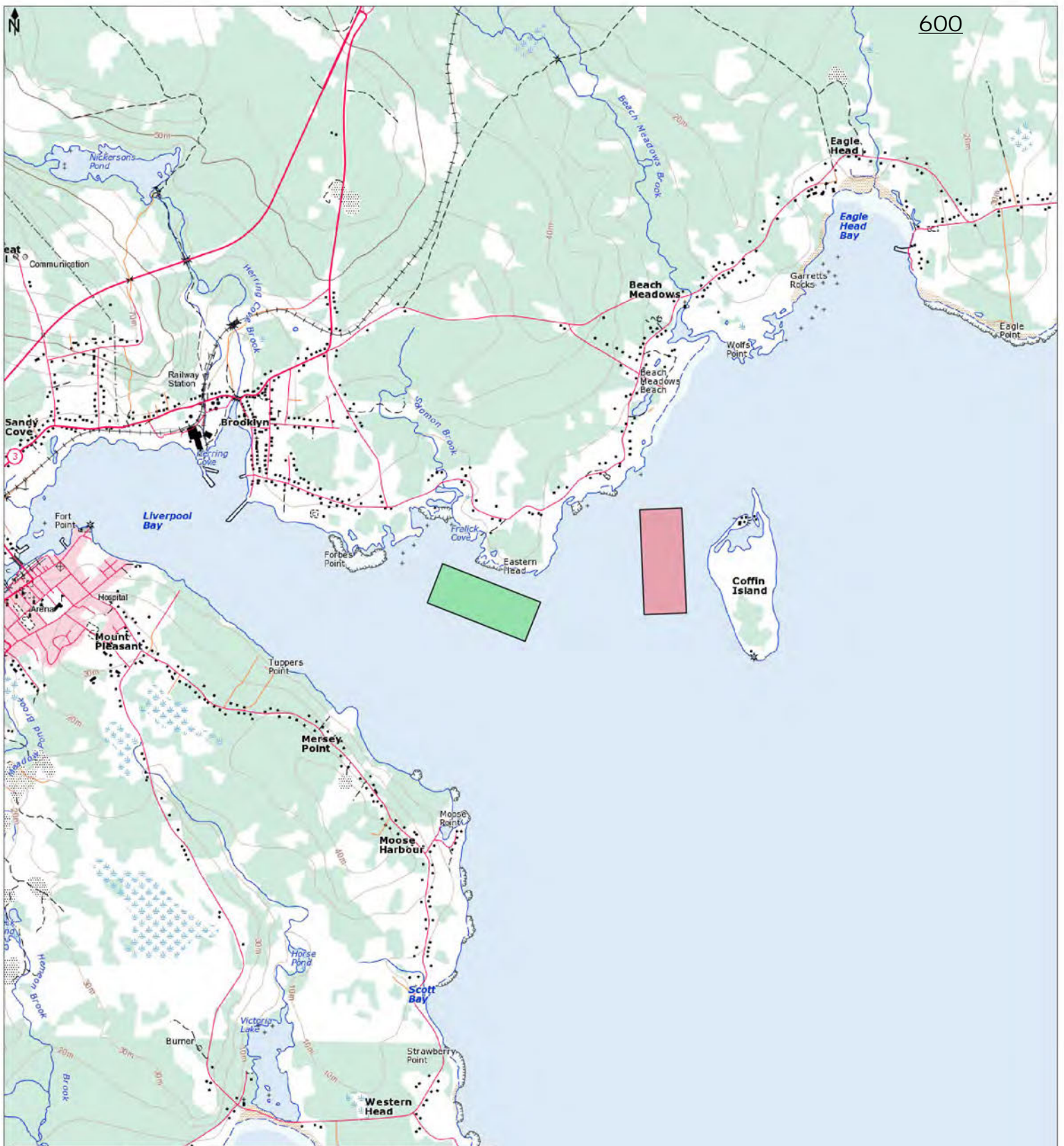


Figure 1 - Assessment Area

Cooke Aquaculture Sites
Archaeological Core Sampling Programme
Queens County

 Brooklyn Location	 Liverpool Location
--	---

Notes:
NAD 83 UTM Zone 20
Base Map: NRCAN

0 500 1,000 m
1:50,000

BOREAS
HERITAGE

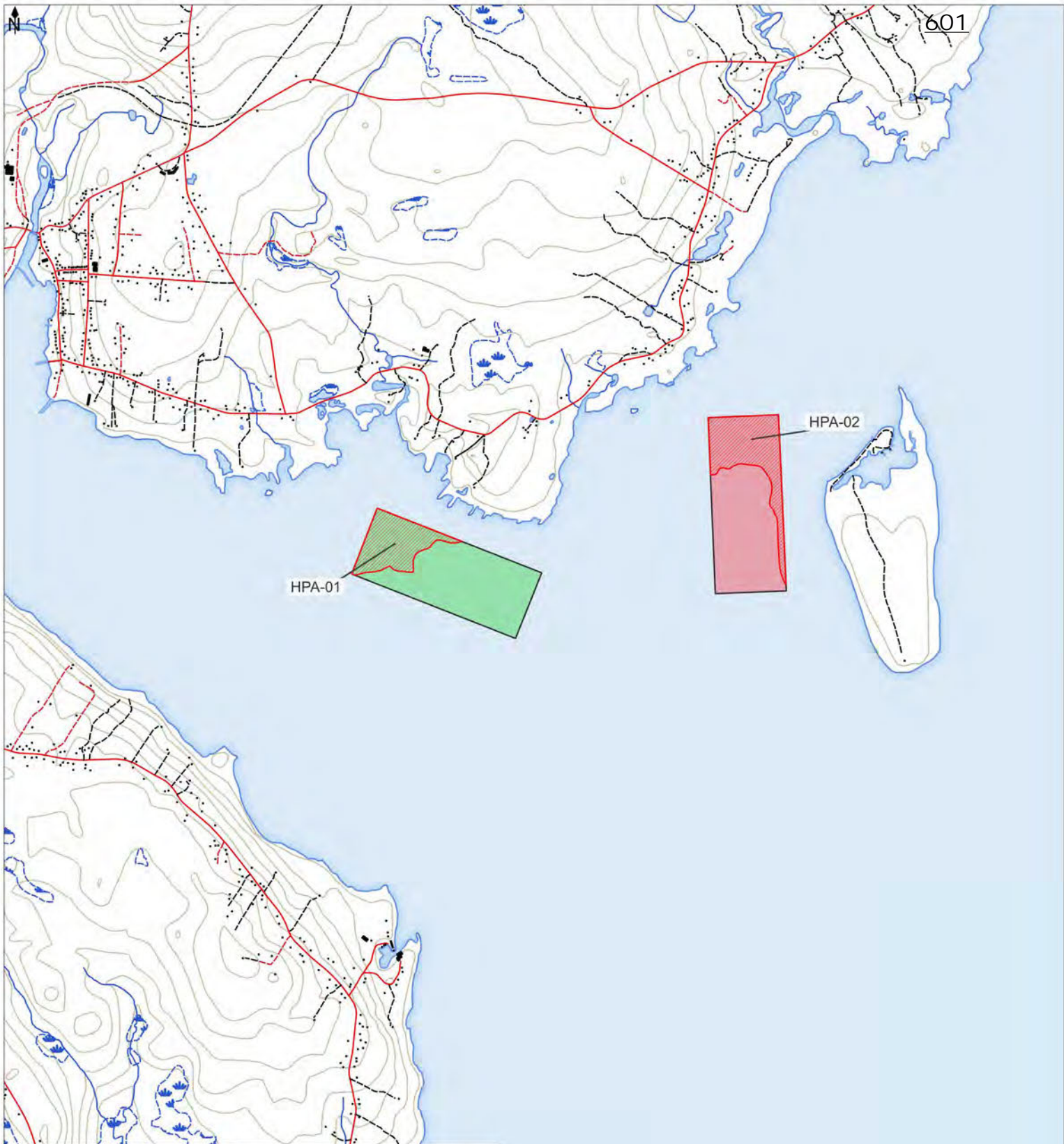


Figure 2 - High Potential Areas

Cooke Aquaculture Sites
Archaeological Core Sampling Programme
Queens County

- Brooklyn Location
- Liverpool Location
- High Potential Area

Notes:
NAD 83 UTM Zone 20
Base Map: SNSMR

0 300 600 m
1:30,000

BOREAS
HERITAGE

3.0 METHODS

The objectives of the Survey are to collect sediment core samples at 18 anchor positions for site #1432 (Brooklyn) and 21 anchor positions for site #1205 (Liverpool) to confirm the presence or absence of archaeological resources and to offer comprehensive recommendations so that appropriate archaeological resource management strategies can be devised. It is also noted that, as per Heritage Research Permit requirements, the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO) was advised of the proposed Project.

3.1 Sample Collection – Methods

The collection of sediment cores for archaeological analysis was undertaken by Sweeney International Marine Corp (SIMCorp). Samples were collected by SCUBA diver, and efforts were made to remain within 1 m² of the target coordinates. The position of the sampling location was marked from the surface with a drop line, with an anchor at one end and a float at the other. Coordinates of the anchor drop were recorded in the field book. Sediment samples were collected with Wildco hand-corer liners and caps. Each 20-inch liner was composed of clear cellulose acetate butyrate and took a sediment core 2 inches in diameter. Cores were inserted into the sediment at an angle as close to vertical as possible. Due to the hardness of the seafloor, some cores were inserted on a slight angle in order to achieve penetration. A depth of at least 15 centimetres was targeted. Before removing the sample from the sea floor, the divers dug around the core to access the bottom end and fitted the bottom cap in place. Upon reaching the vessel, the upper end of the core was capped, and the sediment samples photographed and visually inspected for level of disturbance, sediment depth, and other qualitative observations. For very coarse sediment samples, the upper cap was fitted before removing the core from the sediment, to prevent sample loss.

Video footage was recorded using a GoPro Hero 5 or Hero 3. Illumination was provided by Hydra 2500 (Lumens) V2 lights by Kraken Sports. Video recording of each sampling station started at the surface with the viewing of a whiteboard showing collection location information, and then the underwater footage followed. During sampling, the divers presented each core tube to the camera to show which sample was being collected. The recording continued uninterrupted for the duration of the underwater surveillance and was concluded only after the camera was returned to the vessel at the surface. Visibility during the sampling was poor, which is reflected in the video quality. Video files are available upon request.

3.2 Sediment Analysis – Methods

All core sediment samples recovered from the test locations are sifted through 3-millimetre wire mesh and analysed for the presence of micro-debitage or other material culture. Each sample is recorded, photographed, and analysed at close range (up to 200x) using a Dino-Lite Premier AM4113ZT handheld digital microscope with adjustable polarization.

4.0 RESULTS

4.1 Core Sampling Programme and Analysis

A total of 39 core samples was extracted from the proposed anchor locations across the high potential areas, including 18 anchor positions for site #1432 and 21 anchor positions for site #1205. Each site is discussed separately below.

Brooklyn Site #1432

The proposed new Brooklyn aquaculture site #1432 is situated southwest of Eastern Head (*Figure 1*). The proposed lease has dimensions of approximately 405 metres x 1005 metres, comprising a total area of approximately 40.7 hectares. An analysis of bathymetric data, generated by SIM Corp., revealed the presence of a relatively level terrace in the western portion of the Assessment Area. This landform attribute is conducive to supporting past occupation and/or use of this location by Indigenous people and was designated HPA-01 (*Figure 2*). A total of 18 sediment samples was collected from HPA-01 (*Table 1; Figure 3*). The typical core sample contained coarse-grained sand with inclusions of shell debris and gravel (*Table 2; Plates 2-9*). No core samples were recorded as positive for cultural material.

Table 1: Target coordinates of sample locations for #1432

Anchor ID	Latitude	Longitude
28	44° 2.3612'	64° 39.6791'
29	44° 2.3727'	64° 39.7224'
30	44° 2.3837'	64° 39.7645'
31	44° 2.3951'	64° 39.8077'
32	44° 2.3938'	64° 39.8460'
33	44° 2.3737'	64° 39.8714'
34	44° 2.3429'	64° 39.8870'
35	44° 2.3365'	64° 39.8894'
36	44° 2.3121'	64° 39.9028'
37	44° 2.2846'	64° 39.9010'
B1	44° 2.3124'	64° 39.8813'
B2	44° 2.3332'	64° 39.8452'
B3	44° 2.3456'	64° 39.8372'
B4	44° 2.3611'	64° 39.8326'
B5	44° 2.4140'	64° 39.9351'
B6	44° 2.3943'	64° 39.9717'
B7	44° 2.3740'	64° 39.9839'
B8	44° 2.3414'	64° 39.9785'

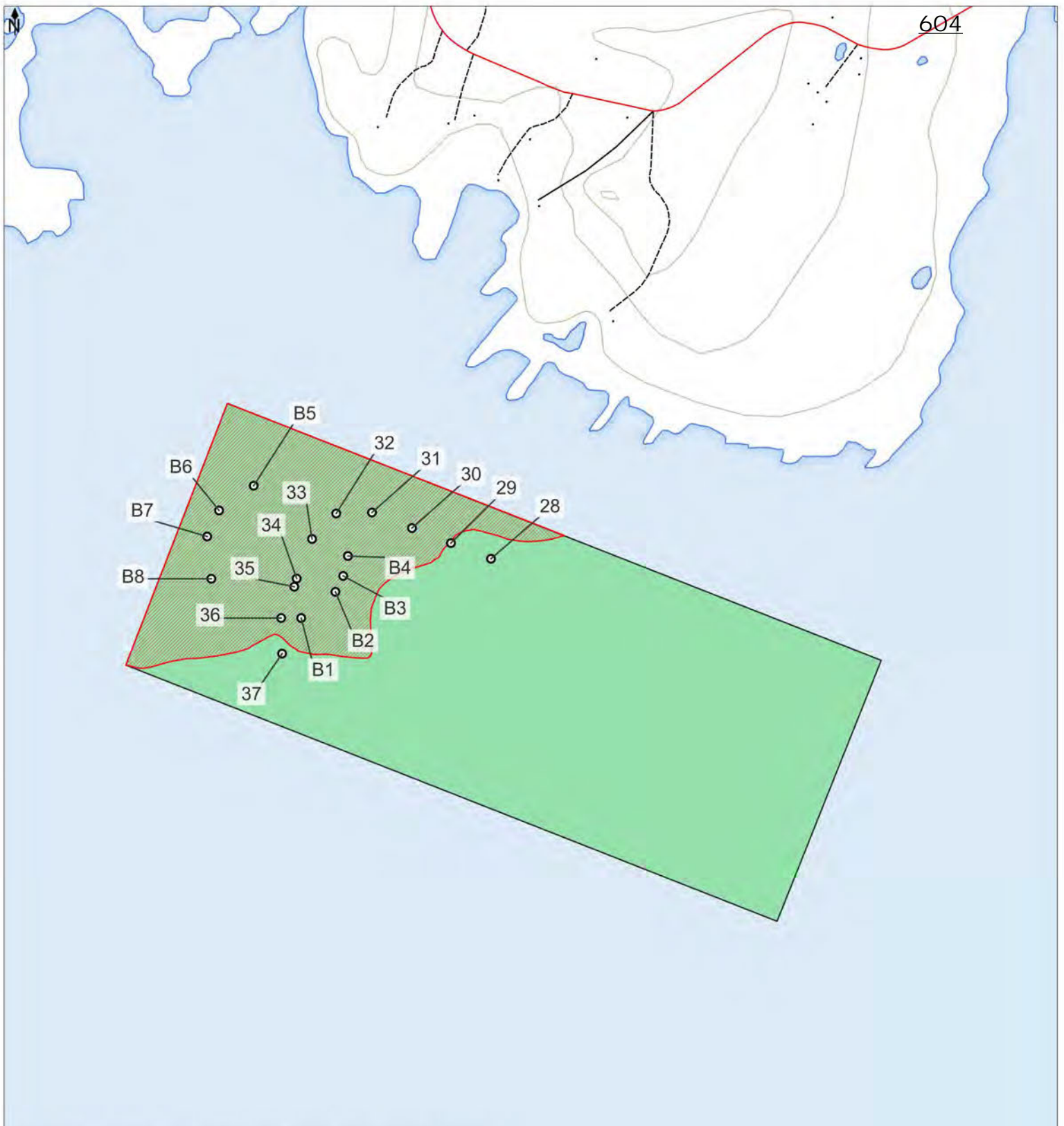
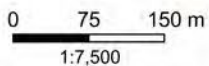


Figure 3 - Brooklyn Core Locations
 Cooke Aquaculture Sites
 Archaeological Core Sampling Programme
 Queens County

- Brooklyn Location
- Core Location
- High Potential Area

Notes:
 NAD 83 UTM Zone 20
 Base Map: SNSMR



BOREAS
 HERITAGE

Table 2: Sample Observations for #1432

ID #	Attempt	Colour	Soil/Sediment Description	Inclusions	Compaction	Depth(cm)
28	1	Brown - Black	Coarse sand, shell debris, gravel	Small pebbles, shell debris	Hard	18
30	1	Brown	Sand, crushed shell debris	Shell debris	Hard	11
31	3		Shell debris	Shell debris	Hard	6
32	1	Grey	Medium grained silty sand	Micro shell debris	Hard	23
33	1	Dark grey - Black	Medium-grained sand, shell debris	Shell debris	Hard	27
34		Grey	Fine-medium grained silty sand	Micro shell debris	Hard	28
35	1	Dark grey - Black	Medium-grained silty sand	Shell debris	Hard	18
36	1	Brown	Sand, crushed shell debris, gravel	Crushed shell debris, gravel	Hard	18
37	1	Brown	Coarse sand, shell debris, gravel	Shell debris, gravel	Hard	19
B1	1		Crushed shell debris, gravel	Shell debris, gravel	Hard	17
B2	3		Water-worn black pebbles		Hard	3
B3	1		Sand, gravel, shell debris	Water-worn black pebbles, crushed shell debris	Hard	6
B4	1		Ledge – only traces of sediment			0
B5	1	Dark brown - black	Ledge – only traces of coarse-grained sand	Shell debris		1
B6	1	Brown	Coarse-grained sand, shell debris, gravel	Gravel, shell debris	Hard	15
B8	1	Brown	Coarse sand, micro-shell debris, gravel	Shell debris, gravel	Hard	13

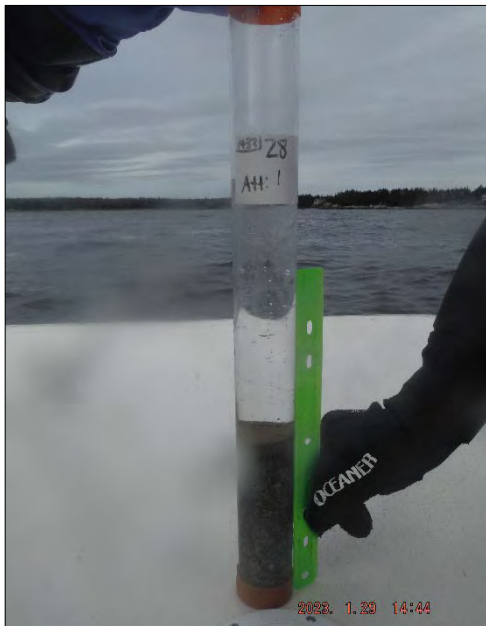


Plate 2: Core Sample 28.



Plate 3: Core Sample 28 under microscope.

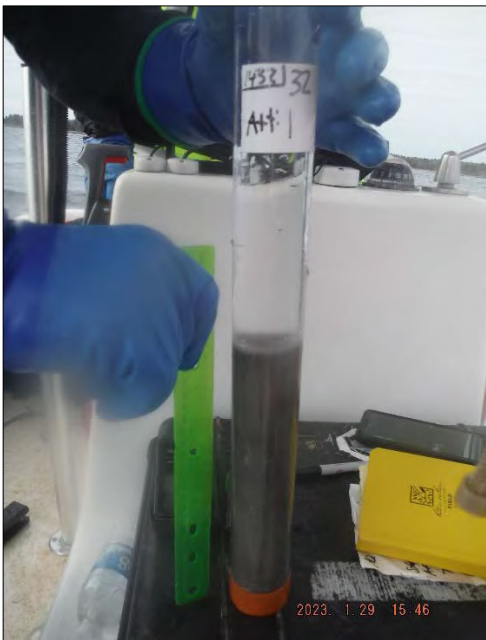


Plate 4: Core Sample 32.



Plate 5: Core Sample 32 under microscope.



Plate 6: Core Sample 36.



Plate 7: Core Sample 36 under microscope.

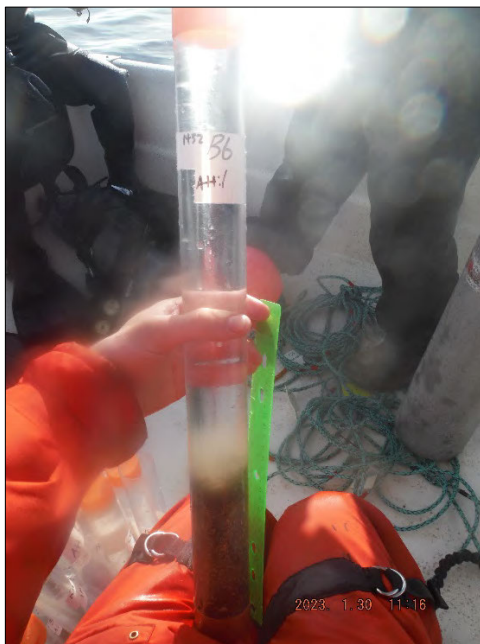


Plate 8: Core Sample B6.



Plate 9: Core Sample B6 under microscope.

Liverpool Site

The Liverpool marine aquaculture site #1205 is situated on the western side of Coffin Island (*Figure 1*). The current lease has dimensions of approximately 200 metres x 200 metres, comprising a total area of approximately 4 hectares. The proposed boundary amendment extends the lease boundaries to add six additional cages south of the existing grid and to accommodate all below surface gear. An analysis of bathymetric data, generated by SIM Corp., revealed the presence of a relatively level terrace in the northern portion of the Assessment Area, extending along the eastern boundary. This landform attribute is conducive to supporting past occupation and/or use of this location by Indigenous people and was designated HPA-02 (*Figure 2*). A total of 21 sediment samples was collected from HPA-02 (*Table 3; Figure 4*). The typical core sample contained sand with inclusions of shell debris (*Table 4; Plates 11-17*). No core samples were recorded as positive for cultural material.

Table 3: Target coordinates of sample locations for #1205

Anchor ID	Latitude	Longitude
1	44° 2.6497'	64° 38.5050'
2	44° 2.6168'	64° 38.5050'
27	44° 2.5254'	64° 38.2934'
28	44° 2.5582'	64° 38.2958'
29	44° 2.5911'	64° 38.2983'
30	44° 2.6241'	64° 38.3007'
31	44° 2.6569'	64° 38.3032'
32	44° 2.6817'	64° 38.3194'
33	44° 2.6910'	64° 38.3558'
34	44° 2.6891'	64° 38.3930'
35	44° 2.6883'	64° 38.4103'
36	44° 2.6875'	64° 38.4470'
37	44° 2.6756'	64° 38.4811'
B1	44° 2.6570'	64° 38.4189'
B2	44° 2.6630'	64° 38.4397'
B3	44° 2.7464'	64° 38.4582'
B4	44° 2.7638'	64° 38.4196'
B5	44° 2.7645'	64° 38.3888'
B6	44° 2.7491'	64° 38.3484'
B7	44° 2.6655'	64° 38.3578'
B8	44° 2.6574'	64° 38.3824'

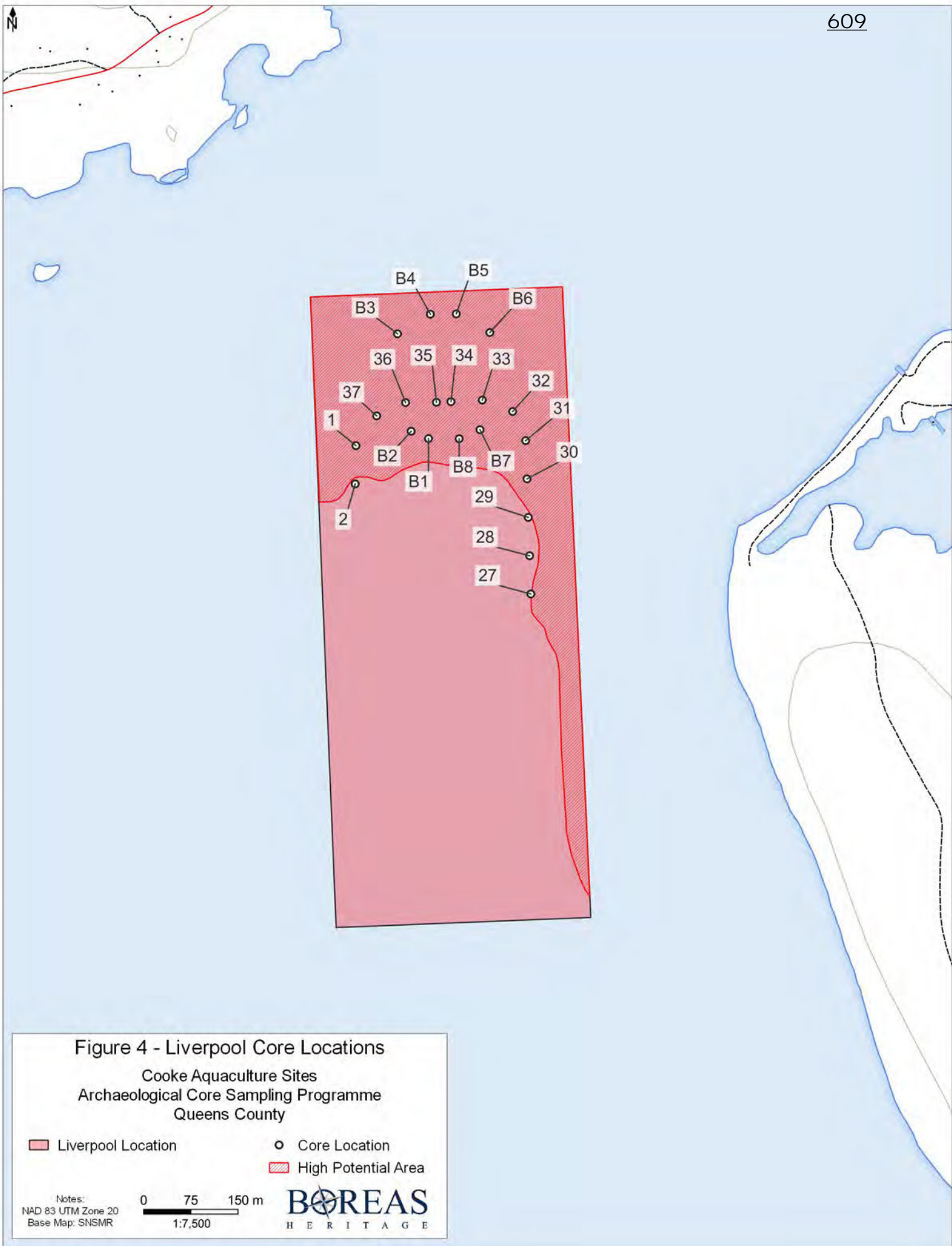


Table 4: Sample Observations for #1205

ID #	Attempt	Colour	Soil/Sediment Description	Inclusions	Compaction	Depth(cm)
1	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	30
2	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	29
27	2	Brown	Sand, shell debris	Shell debris	Hard	21
28	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	30
29	1	Brown	Sand, shell debris	Shell debris	Hard	29
30	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	30
31	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	24
32	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	32
33	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	32
34	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	29
35	1	Grey/Brown	Silty sand, shell debris	Shell debris	Hard	32
36	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	26
37	1	Grey/Brown	Silty sand, shell debris	Shell debris	Hard	30
B1	1	Grey/Brown	Silty sand, shell debris	Shell debris	Hard	30
B2	1	Grey/Brown	Silty sand, shell debris	Shell debris	Hard	30
B3	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	26
B4	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	21
B5	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	27

B6	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	33
B7	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	30
B8	1	Grey/Brown	Sand, shell debris	Shell debris	Hard	29



Plate 10: Core Sample 1.



Plate 11: Core Sample 1 under microscope.



Plate 12: Core Sample 27.



Plate 13: Core Sample 27 under microscope.



Plate 14: Core Sample 36.



Plate 15: Core Sample 36 under microscope.



Plate 16: Core Sample B6.



Plate 17: Core Sample B6 under microscope.

4.2 Archaeological Potential

A total of 39 core samples was extracted from proposed anchor locations across the high potential areas (HPA-01 & HPA-02). All sediment samples were sifted and analysed. No core samples were recorded as positive for cultural material. Based on the results of the archaeological core sampling programme, Boreas Heritage recommends the Assessment Area be cleared of any requirement for further archaeological investigation and that development within these areas may proceed as planned. Furthermore, if any changes or deviations from the original plans relating to the proposed Project, as provided to Boreas Heritage, are necessary, and are found to impact areas outside the Assessment Area described in this report, then additional archaeological resource impact assessment(s) may be warranted for amended portions of the proposed Project.

5.0 CONCLUSIONS AND RECOMMENDATIONS

A total of 39 core samples was extracted from proposed anchor locations across the high potential areas (HPA-01 & HPA-02). All sediment samples were sifted and analysed. No core samples were recorded as positive for cultural material. Based on the results of the core sampling programme, Boreas Heritage offers the following archaeological resource management recommendations:

1. It is recommended the Assessment Area (HPA-01 & HPA-02), as described in the report, be cleared of any requirement for further archaeological investigation and that development within these areas may proceed as planned;
2. If any changes or deviations from the original plans relating to the proposed Project, as provided to Boreas Heritage for this Survey, are necessary, and are found to impact areas outside the Assessment Area described in this report, then additional archaeological resource impact assessment(s) may be warranted for these amended portions of the proposed Project;
3. In the event archaeological resources and/or human remains are encountered, from disturbed or undisturbed contexts, during construction or disturbance activities associated with the proposed Project, works must immediately cease until contact is made with, and direction(s) on how to proceed has been received from the Coordinator of Special Places, Nova Scotia Department of Communities, Culture, Tourism and Heritage.

APPENDIX A

Heritage Research Permit

Special Places Protection Act 1989

(Original becomes Permit when approved by
Communities, Culture and Heritage)

Office Use Only
Permit Number:

A2023NS016

<i>Greyed out fields will be made publically available. Please choose your project name accordingly</i>	
Surname Beanlands	First Name Sara
Project Name Liverpool Bay Aquaculture	
Name of Organization Boreas Heritage Consulting Inc.	
Representing (if applicable)	
Permit Start Date August 5, 2022	Permit End Date December 31, 2022
General Location: The proposed Liverpool Bay Assessment Areas are located in Liverpool Bay, Queens County.	
Specific Location: <i>(cite Borden numbers and UTM designations where appropriate and as described separately in accordance with the attached Project Description. Please refer to the appropriate Archaeological Heritage Research Permit Guidelines for the appropriate Project Description format)</i>	
Permit Category: Please choose one <input type="checkbox"/> Category A – Archaeological Reconnaissance <input type="checkbox"/> Category B – Archaeological Research <input checked="" type="checkbox"/> Category C – Archaeological Resource Impact Assessment <input checked="" type="checkbox"/> I certify that I am familiar with the provisions of the <i>Special Places Protection Act</i> of Nova Scotia and that I have read, understand and will abide by the terms and conditions listed in the Heritage Research Permit Guidelines for the above noted category.	
Signature of applicant	Date 07/26/2022
Approved by Executive Director	Date 1/16/23

From: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Sent: Thursday, March 30, 2023 3:26 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Buchan, Carla M <Carla.Buchan@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; Jeff Nickerson <jnickerson@cookeaqua.com>
Subject: FW: A2023NS016 – Liverpool Bay Aquaculture – Core Sampling

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

Exercice caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Melinda,

Please see attached final letter from Communities, Culture & Heritage regarding Liverpool Bay archeology assessment.

Best regards,

Jennifer

Jennifer Hewitt

Kelly Cove Salmon Ltd.

Division of Cooke Aquaculture INC

Compliance Manager, NS

Cell (902) 521-8604

134 North Street

Bridgewater, NS

B4V 2V6



A2023NS016 Report
Letter.pdf

March 22, 2023

Sara Beanlands
46 Arlington Ave,
Halifax, Nova Scotia
B3T 2A1

Dear Sara Beanlands:

**RE: Heritage Research Permit Report
A2023NS016 – Liverpool Bay Aquaculture – Core Sampling**

We have received and reviewed the report on work conducted under the terms of Heritage Research Permit A2023NS016 – Liverpool Bay Aquaculture – Core Sampling project in Queens County, Nova Scotia.

Kelly Cove Salmon Ltd., the Canadian salmon farming division of Cooke Aquaculture Inc., plans to create two new aquaculture sites (Mersey & Brooklyn) and to expand the existing aquaculture site in Liverpool Bay in Queens County, Kespukwitk Territory, Nova Scotia. Boreas Heritage Consulting Inc. (Boreas Heritage) was contracted to conduct an archaeological resource impact assessment (ARIA) - desktop only - for the proposed development areas in 2022, under HRP A2022NS130. Two areas were identified as having high potential for encountering archaeological resources. Avoidance or core sampling were recommended, and Kelly Cove Salmon Ltd. determined that HPA-1 & HPA-2 may be impacted by proposed development activities. Boreas Heritage was again retained to oversee and analyse the recommended core sampling program.

Thirty-nine (39) core samples were extracted from proposed anchor locations within high potential areas HPA-01 & HPA-02. All core samples were negative for cultural materials.

Based on the above, Boreas Heritage offered the following recommendations:

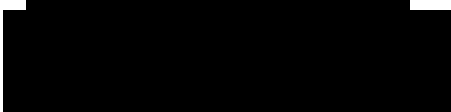
1. It is recommended the Assessment Area (HPA-01 & HPA-02), as described in the report, be cleared of any requirement for further archaeological investigation and that development within these areas may proceed as planned.
2. If any changes or deviations from the original plans relating to the proposed Project, as provided to Boreas Heritage for this Survey, are necessary, and are found to impact areas outside the Assessment Area described in this report, then additional archaeological resource impact assessment(s) may be warranted for these amended portions of the proposed Project.
3. In the event archaeological resources and/or human remains are encountered, from disturbed or undisturbed contexts, during construction or disturbance activities associated with the proposed Project, works must immediately cease until contact is made with, and direction(s) on how to proceed has been

S. Beanlands
March 30, 2023
Page 2

received from the Coordinator of Special Places, Nova Scotia Department of Communities, Culture, Tourism and Heritage.

CCH Staff have reviewed the report and find it acceptable as submitted. Please do not hesitate to contact me with any questions or concerns.

Sincerely,



John Cormier
John Cormier
Coordinator, Special Places

From: Watts, Melinda
Sent: Tuesday, April 18, 2023 3:00 PM
To: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Cc: Cormier, John Kenneth <John.Cormier@novascotia.ca>
Subject: Liverpool Bay Aquaculture Applications - ARIA Phase II Approval

Good afternoon Katie,

Our Department received the attached letter from Kelly Cove Salmon Ltd. following the core sampling event in Liverpool Bay. As this letter was not submitted directly to our department, we require confirmation that Communities, Culture, Tourism and Heritage is satisfied with the results and recommendations provided by the consultant following their ARIA Phase II investigations. The attached letter will be incorporated into the application package that will be submitted to Aquaculture Review Board for their decision on the Liverpool Bay Aquaculture applications.

Thank you so much,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

NOTE: REFERRING TO THE PREVIOUS LETTER SUBMITTED BY CCTH.

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: Monday, April 24, 2023 11:23 AM
To: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Cc: Cormier, John Kenneth <John.Cormier@novascotia.ca>
Subject: RE: Liverpool Bay Aquaculture Applications - ARIA Phase II Approval

Good morning Katie,

I just wanted to follow up on my previous email but also confirm if CCTH is alright with the ARIA reports being included in the application packages to the Aquaculture Review Board? These packages will be posted on the Board's website so we wish to confirm there is nothing cited within the ARIA reports that should not be released?

Thank you,
Melinda

From: Cormier, John Kenneth <John.Cormier@novascotia.ca>
Sent: Monday, April 24, 2023 11:34 AM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>; Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Cc: Cosgrove, Mary <Mary.Cosgrove@novascotia.ca>; Lewis, Beth J <Beth.Lewis@novascotia.ca>
Subject: RE: Liverpool Bay Aquaculture Applications - ARIA Phase II Approval

Hi Melinda,

As a rule, we do not share archaeology reports with the general public. Can I assume this website will be publicly accessible? We have shared some reports publicly in the past, but those reports were heavily redacted of any locational information pertaining to archaeological sites, Mi'kmaq cultural areas and access to areas such as these. What we generally recommend for an EA's – which are posted on NSECC's website for public access – is that a paragraph or two is written explaining that archaeological work was conducted, when, by whom and under which Heritage Research Permit, and the conclusions and recommendations of the arch work – again, with any information about the locations of archaeological sites, Mi'kmaq cultural and sensitive areas and access information to these areas removed from the text.

If you have any further questions, please feel free to contact me and I will help you however I can.

Kind regards,
John

John Cormier
Coordinator, Special Places
Department of Communities, Culture, Tourism & Heritage
Government of Nova Scotia
Phone: (902) 229-3159
E-mail: John.Cormier@novascotia.ca

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: Monday, April 24, 2023 11:52 AM
To: Cormier, John Kenneth <John.Cormier@novascotia.ca>; Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Cc: Cosgrove, Mary <Mary.Cosgrove@novascotia.ca>; Lewis, Beth J <Beth.Lewis@novascotia.ca>
Subject: RE: Liverpool Bay Aquaculture Applications - ARIA Phase II Approval

Thank you John for confirming.

Yes, the Board's website is accessible by the general public so we will look at incorporating a statement, as you suggested in the summary section of the application package.

To follow up, is the letter that was submitted by CCTH (attached) appropriate for inclusion and posting to the website? Also, we do require confirmation that this is CCTH's final comments for these applications as this was not directed to DFA rather than the consultant (see my original request to Katie).

Cheers,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

From: Cormier, John Kenneth <John.Cormier@novascotia.ca>
Sent: Monday, April 24, 2023 12:59 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>; Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Cc: Cosgrove, Mary <Mary.Cosgrove@novascotia.ca>; Lewis, Beth J <Beth.Lewis@novascotia.ca>
Subject: RE: Liverpool Bay Aquaculture Applications - ARIA Phase II Approval

Hi Melinda,

This is our final comment on this project, as Staff at CCTH have reviewed this report and granted approval. We always send the letter to the Permit Holder; in this case, Sara Beanlands. As she has provided you with a copy of the letter, and that letter contains no locational or sensitive information, I do not have any concerns with posting the report letter on the website. Katie, thoughts?

Technically, the letter was issued to Ms. Beanlands of Boreas Heritage, and I cannot speak to whether she has any concerns with it being published online.

Have a wonderful day, and do not hesitate to contact me with any other questions you may have.

John

John Cormier
Coordinator, Special Places
Department of Communities, Culture, Tourism & Heritage
Government of Nova Scotia
Phone: (902) 229-3159
E-mail: John.Cormier@novascotia.ca

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: Monday, April 24, 2023 1:51 PM
To: Cormier, John Kenneth <John.Cormier@novascotia.ca>; Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Cc: Cosgrove, Mary <Mary.Cosgrove@novascotia.ca>; Lewis, Beth J <Beth.Lewis@novascotia.ca>
Subject: RE: Liverpool Bay Aquaculture Applications - ARIA Phase II Approval

Thank you again John for this insight and confirmation.

Katie, if you have any objections please let me know.

Otherwise, I will share with our group and we will proceed as advised.

Cheers,
Melinda

From: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>
Sent: Monday, April 24, 2023 2:52 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>; Cormier, John Kenneth <John.Cormier@novascotia.ca>
Cc: Cosgrove, Mary <Mary.Cosgrove@novascotia.ca>; Lewis, Beth J <Beth.Lewis@novascotia.ca>
Subject: RE: Liverpool Bay Aquaculture Applications - ARIA Phase II Approval

No objections folks. katie

APPENDIX K – NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTRY
(NOW DEPARTMENT OF NATURAL RESOURCES AND RENEWABLES)

From: Winfield, Lynn
Sent: June 27, 2019 10:05 AM
To: shane.hood@inspection.gc.ca; david.macarthur@ec.gc.ca; rachel.gautreau@ec.gc.ca; Birch, Angela <Angela.Birch@novascotia.ca>; Miller, L (Dawn) <Dawn.Miller2@novascotia.ca>; 'Cottreau-Robins, Catherine M' <cottrecm@gov.ns.ca>; Murrant, Darryl D <Darryl.Murrant@novascotia.ca>; Blackburn, Lori M <Lori.Blackburn@novascotia.ca>; Angela.Smith@canada.ca
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Attn: Network Review Agencies:

Attached please find the Boundary Amendment application and information for Kelly Cove Salmon AQ#1205 in Liverpool Bay, Queens County.

Please respond with your feedback by August 27, 2019.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
 Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
 Shelburne, NS B0T 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429

Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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***Please refer to Application Package, Section 2.0 - Applicant's Aquaculture Development Plan, for documents sent to and reviewed by Department of Natural Resources and Renewables.**

NOTE: THIS EMAIL WAS DUPLICATED FOR AQ#1432 AND AQ#1433 AND SENT TO THE SAME RECIPIENTS.

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: August 30, 2019 11:49 AM
To: Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>; Boudreau, Louise O <Louise.Boudreau@novascotia.ca>
Cc: Blackburn, Lori M <Lori.Blackburn@novascotia.ca>
Subject: FW: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Good Morning,
Please be reminded that our office has not received comments from your Department for the proposed aquaculture site in Liverpool Bay AQ1205. Your comments are due on or before **September 6, 2019**.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture**

NOTE: THIS EMAIL WAS DUPLICATED FOR AQ#1432 AND AQ#1433 AND SENT TO THE SAME RECIPIENTS.

From: Boudreau, Louise O <Louise.Boudreau@novascotia.ca>
Sent: September 3, 2019 1:56 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Blackburn, Lori M <Lori.Blackburn@novascotia.ca>; O'Brien-Latham, Lesley <Lesley.O'Brien-Latham@novascotia.ca>; Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Hi Lynn,

Thank you for the opportunity to comment on the Aquaculture Application. I did not receive the original request and two of our reviewers are out of office until Sept. 9. I would like to ask for an extension to respond by Monday Sept. 23. If I can respond earlier I will.

Warm Regards,
Louise

Louise Boudreau
Policy Analyst
Department of Lands and Forestry
Founders Square | 1701 Hollis Street, 3rd Floor | Halifax, NS B3J 2T9 |
424-3530

NOTE: THIS RESPOSNE FROM LOUISE BOUDREAU TO DFA WAS DUPLICATED FOR AQ#1432 AND AQ#1433.

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: September 4, 2019 8:35 AM
To: Boudreau, Louise O <Louise.Boudreau@novascotia.ca>
Cc: Blackburn, Lori M <Lori.Blackburn@novascotia.ca>; O'Brien-Latham, Lesley <Lesley.O'Brien-Latham@novascotia.ca>; Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Good Morning Louise,
Yes, I can approve the extension to September 23, 2019 for your response on the Kelly Cove Salmon – AQ1205, AQ1432 and AQ1433.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture**

From: Boudreau, Louise O <Louise.Boudreau@novascotia.ca>
Sent: September 4, 2019 10:10 AM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Cc: Blackburn, Lori M <Lori.Blackburn@novascotia.ca>; O'Brien-Latham, Lesley <Lesley.O'Brien-Latham@novascotia.ca>; Ceschiutti, Robert <Robert.Ceschiutti@novascotia.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Thanks very much Lynn. I've sent messages to our subject matter experts yesterday. It will be helpful for them to have time to review the application.

Warm Regards,
Louise

Louise Boudreau
Policy Analyst
Department of Lands and Forestry
Founders Square | 1701 Hollis Street, 3rd Floor | Halifax, NS B3J 2T9 |
424-3530

From: Boudreau, Louise O <Louise.Boudreau@novascotia.ca>

Sent: September 19, 2019 4:13 PM

To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>

Cc: O'Brien-Latham, Lesley <Lesley.O'Brien-Latham@novascotia.ca>; Blackburn, Lori M <Lori.Blackburn@novascotia.ca>

Subject: Lands and Forestry Comments Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Hi Lynn,

Attached is the Department of Lands and Forestry submission for AQ 1205, 1432, and 1433. If you have questions please feel free to contact me.

Warm Regards,

Louise

Louise Boudreau

Policy Analyst

Department of Lands and Forestry

Founders Square | 1701 Hollis Street, 3rd Floor | Halifax, NS B3J 2T9 |
424-3530

Network Agency Review of an Aquaculture Application

Agency	Department of Lands and Forestry
Division (if applicable)	Louise Boudreau (policy) on behalf of the Department of Lands and Forestry
Date	September 23, 2019
File No.	#1205, #1432. #1433
Type of application	Kelly Cover Salmon Ltd.
Information Provided	Recommendations

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

1. This proposal is adjacent to Coffin Island. An important area for herons, terns, and ducks. This area is also an important area for the Harlequin duck, an endangered species in Nova Scotia.

This site is already in operation. The Department of Lands and Forestry recommends that before the operation is expanded, a study be conducted on the number of bird interactions with the existing site. If this study has already been completed the Department would like to see the study and review the survey and/or monitoring protocols.

2. According to the records on file at the Crown Land Information Management Centre, any land lying below the original ordinary high water mark of Liverpool Bay, at the three locations provided, is considered ungranted Crown land with no encumbrances.

It should be noted that the scope of this research only includes information on file at this office relating to Nova Scotia Lands and Forestry ownership and anything affecting that interest.

Public Notice and Disclosure

As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

Privacy Statement

The network review information collected as part of an aquaculture application will only be used or disclosed by Fisheries and Aquaculture for the purpose of deciding on the application.

All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: February 8, 2022 3:02 PM
To: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: FW: Network Comments for Liverpool Bay Applications (Brooklyn, Mersey Point, Liverpool Boundary Amendment)

Hi again Jen,

Here again is that request from Lands and Forestry regarding bird interactions.

As discussed, if you could provide a response indicating that although you do not conduct bird studies, you do keep records for interactions and include any records that you have for 1205. Hopefully this will satisfy their request.

Cheers,
 Melinda

NS Lands and Forestry	The Department of Lands and Forestry recommends that before the operation is expanded, a study be conducted on the number of bird interactions with the existing site. If this study has already been completed the Department would like to see the study and review the survey and/or monitoring protocols. See next column for further comments from Lands and Forestry.	<ol style="list-style-type: none"> 1. This proposal is adjacent to Coffin Island. An important area for herons, terns, and ducks. This area is also an important area for the Harlequin duck, an endangered species in Nova Scotia. 2. According to the records on file at the Crown Land Information Management Centre, any land lying below the original ordinary high water mark of Liverpool Bay, at the three locations provided, is considered ungranted Crown land with no encumbrances.
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Network Comments
 Re. KCS Liverpool Ba

NOTE: ATTACHED TO THE EMAIL WAS THE NETWORK COMMENTS CAPTURED IN THE EXCEL SPREADSHEET THAT WAS ORIGINALLY SENT TO THE APPLICANT ON APRIL 13, 2021.

From: Jennifer Hewitt <Jennifer.Hewitt@cookeaqua.com>
Sent: April 6, 2022 4:12 PM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: Updated WIP

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

Exercice caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Hi Melinda,
This document has been updated, more emphasis on the birds especially in Liverpool if you want to send that to the Bird groups,
Jen

Jennifer Hewitt

Kelly Cove Salmon Ltd.

Division of Cooke Aquaculture INC

Compliance Manager, NS

Cell (902) 521-8604

134 North Street

Bridgewater, NS

B4V 2V6



WIP Wildlife
Interaction Plan 22.C

Wildlife Interaction Plan

for Marine Salmonid Farms on the
East Coast of North America

Version 22.04-07



Table of Contents

SECTION 1 - Local Laws and Regulations for Wildlife Management and Protection	3
1.1 Canadian Federal Legislation	3
1.2 Canadian Provincial Legislation	3
1.2.1 New Brunswick	3
1.2.2 Nova Scotia	4
1.2.3 Newfoundland	4
1.3 United States Federal Legislation	4
1.4 US State Legislation	4
1.4.1 Maine	4
SECTION 2 - Operating Permit Considerations for Wildlife Management and Protection	5
2.1 Maine	5
2.1.1 DMR Lease	5
2.1.2 ACOE Permit	5
2.1.3 DEP MEPDES Permit	5
2.2 New Brunswick	5
2.2.1 Commercial Aquaculture Licence	5
2.2.2 Approval to Operate	5
2.3 Newfoundland	5
2.3.1 Lease for Aquaculture	5
2.3.2 Aquaculture Licence	6
2.3.3 Marine Aquaculture Water Use Licence	6
2.4 Nova Scotia	6
2.4.1 Lease	6
2.4.2 Licence	6
SECTION 3 - Ecologically and Biologically Sensitive and Significant Areas	7
3.1 Atlantic Canada EBSAs	7
3.1.1 National Wildlife Areas and Migratory Bird Sanctuaries	12
3.1.2 Marine Protected Areas	15
3.2 Maine Natural Areas Program	17
SECTION 4 - Risk Assessment	18
4.1 Atlantic Canada Aquaculture Sites and the Species at Risk Act (SARA)	18
4.1.1 Important Birds and Biodiversity Areas (IBA)	18
4.2 Maine Aquaculture Sites and the Endangered Species Act (ESA)	19
SECTION 5 - Local Endangered or Threatened Species	20
5.1 Atlantic Canada	20
5.1.1 New Brunswick	22
5.1.2 Newfoundland	22
5.2 Maine	22
SECTION 6 - Control Measures	24
6.1 Passive Control Measures	24
6.2 Active Control Measures	24
6.3 Lethal Control Measures	25
6.4 Daily Inspections	25

SECTION 7 - Special Requirements	26
7.1 Newfoundland Species at Risk; Bald Eagles and Miawpukek First Nation	26
7.2 Maine Coastal Islands National Wildlife Refuge Complex	26
7.3 National (US) Bald Eagle Management Guidelines	26
7.4 Coffin Island, Nova Scotia	27
SECTION 8 - Reporting and Training	29
8.1 General Predator Interactions	29
8.2 General Wildlife Interactions	29
8.2.1 Entanglement, Entrapment	29
8.2.2 Oiled Birds	30
8.3 Canadian Wildlife Service Permit	30
8.4 SARA Reporting	31
8.5 Endangered Species – Federal and State	31

Appendices

Agrilaser® Handheld User Manual

CAF Safe Operation Agreement: Bird Control Group Agrilaser® Handheld 200/500

Maine

USFWS: Maine Coastal Islands National Wildlife Refuge Complex

New Brunswick

NB Protected Wildlife ID Chart

Newfoundland

NL Protected Wildlife ID Chart

Nova Scotia

NS Protected Wildlife ID Chart

SECTION 1 - Local Laws and Regulations for Wildlife Management and Protection

1.1 Canadian Federal Legislation

- **Aquaculture Activities Regulations (AAR), 2015** - Fisheries and Oceans Canada has developed the Aquaculture Activities Regulations, to clarify conditions under which aquaculture operators may treat their fish and deposit organic matter, while ensuring the protection of fish and fish habitat and sector sustainability.
- **Canadian Environmental Assessment Act, 2012** - CEAA is an environmental assessment focused on potential adverse environmental effects that are within federal jurisdiction, including: fish and fish habitat; other aquatic species; migratory birds; federal lands; effects that cross provincial or international boundaries; effects that impact on Aboriginal peoples, such as their use of lands and resources for traditional purposes; changes to the environment that are directly linked to or necessarily incidental to any federal decisions about a project. If there is a Provincial requirement for an environmental assessment or review, the applicant has an exemption from the CEAA.
- **Canadian Environmental Protection Act, 1999** - an Act respecting pollution prevention and the protection of the environment and human health to contribute to sustainable development.
- **Fisheries Act, 1985** - established to manage and protect Canada's fisheries resources. It applies to all fishing zones, territorial seas and inland waters of Canada and is binding to federal, provincial, and territorial governments.
- **Marine Mammal Regulations, 1993** - regulations that govern the fishing and hunting and in effect treatment of marine mammals in Canada¹.
- **Migratory Birds Convention Act, 1994** - protecting and conserving migratory birds.
- **Oceans Act, 1997** - Canada made a legal commitment to conserve, protect, and develop the oceans in a sustainable manner.
- **Species at Risk Act (SARA), 2002** - the purposes of this Act are to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered, or threatened because of human activity and to manage species of special concern to prevent them from becoming endangered or threatened.

1.2 Canadian Provincial Legislation

1.2.1 New Brunswick

- **Fish and Wildlife Act, 1980** - *policies and programs created under this Act help to maintain diversity of wildlife species in New Brunswick. Among other things, it enables the provincial government to create wildlife refuges and wildlife management areas, it regulates hunting, fishing, possession, and sale of wildlife in the province, and it establishes the provincial Wildlife Fund.*
- **Species at Risk Act (SARA), 2012** - *the purposes of this Act are to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered, or threatened as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened.*

¹ Previously, Nuisance Seal Licences (NSL) were issued by the Department of Fisheries and Oceans (DFO) to aquaculture sites which allowed farmers to intentionally kill a nuisance seal. In March 2019, the Minister of Fisheries, Oceans, and the Coast Guard issued a statement that the DFO has ceased the issuance of the licence in efforts to meet the requirements of the US Marine Mammal Protection Act, Import Provisions scheduled to come into force on January 1, 2022. The Minister also stated that the "DFO will undertake regulatory amendments to the Marine Mammal Regulations (MMR) to either amend or repeal provisions respecting the issuance of NSLs for aquaculture purposes. <https://www.dfo-mpo.gc.ca/fisheries-peches/consultation/mmr-par-rmm-rap-eng.html>

1.2.2 Nova Scotia

- **Fisheries and Coastal Resources Act, 1996** - *this Act revises the outstanding fisheries law and promotes programs to encourage the development of a sustainable fishery. It sets standards for aquaculture, harvesting, and fish processing, and expands the recreational fishery. It also outlines the requirements for administration, and enforcement.*
- **Endangered Species Act, 1998** - *the purpose of this Act is to provide for the protection, designation, recovery, and other relevant aspects of conservation of species at risk in the province, including habitat protection.*

1.2.3 Newfoundland

- **Endangered Species Act, 2001** - *provides special protection for plant and animal species considered to be endangered, threatened, or vulnerable in the province.*
- **Wilderness and Ecological Reserves Act, 1990** - *an act to provide for the natural areas in the province to be set aside for the benefit, education, and enjoyment of the people of the province.*

1.3 United States Federal Legislation

- **Endangered Species Act of 1973** (16 U.S.C 1531 et seq.) - requires federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS) and/or the U.S National Oceanic and Atmosphere Administration (NOAA) Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species.
- **Clean Water Act of 1972 (Formerly the Federal Water Pollution Control Act of 1948)** (33 U.S.C 1251 et seq.) - under this Act, it is unlawful for any person to discharge any pollutant from a point of source into navigable waters, unless a permit is obtained under its provisions.
- **Migratory Bird Treaty Act of 1918** (16 U.S.C 703-712) - protecting and conserving migratory birds, or the parts, nests, or eggs of such birds.
- **Marine Mammal Protection Act of 1972** - prohibits the hunt, harassment, capture or killing of any marine mammal or attempts to do so. Also prohibits the import and export of marine mammals, in whole or parts. Three federal entities share responsibility for implementation of the Act: NOAA, USFWS and the Marine Mammal Commission.

1.4 US State Legislation

1.4.1 Maine

- **Maine Endangered Species Act, 1975** – *the Department of Inland Fisheries and Wildlife administers the Act (MESA) and is responsible for monitoring resident inland fish and wildlife (including invertebrates). The Department, through scientific studies, determines whether a species should be listed as endangered or threatened.*
- **Maine Marine Endangered Species Act, 2003** – *enacted to separate marine species from the inland species, the Act (MMESA) is administered by the Maine department of Marine resources.*
- **Maine Coastal Management Program, 1978** - *led by the Maine Department of Agriculture, Conservation, and Forestry. The coastal management program consists of a network of 19 state laws with four state agencies working in cooperation with local governments, nonprofit organizations, private businesses, and the public to improve management of coastal resources. Maine’s coastal zone extends to the inland boundary of all towns bordering tidal waters and includes all coastal islands.*

SECTION 2 - Operating Permit Considerations for Wildlife Management and Protection

2.1 *Maine*

2.1.1 DMR Lease

The Department of Marine Resources (DMR) Rule Chapter 2.37; Area Resources (Essential Habitats/Endangered Species) – under the Maine Endangered Species Act a state agency or municipal government shall not permit, license, fund or carry out projects occurring partly or wholly within the Essential Habitat, without the approval of the Commissioner of Maine Department of Inland Fisheries and Wildlife (MDIFW). Applicants are required to provide a signed statement to confirm the proposed lease either does not fall within the boundary of an Essential Habitat or that the applicant has contacted MDIFW, and preliminary review will grant approval for the Maine DMR to issue an aquaculture lease within part or the entire boundary of a designated Essential Habitat. No nuisance shall be permitted to exist on the leased premises. Lessee shall not operate in a manner as to be detrimental to public health, personal property or marine resources, or as to create a serious threat to the marine environment.

2.1.2 ACOE Permit

Appendix C: Special Conditions which are intended to minimize potential impact to Atlantic salmon, Atlantic salmon critical habitat, other fisheries, benthic habitat, and local water quality.

2.1.3 DEP MEPDES Permit

Refer to the Atlantic Salmon Aquaculture General Permit PART II, Section I. Protection of Atlantic Salmon. In summary, only salmon of North American strain are permitted, and fish must be marked to identify their origin.

2.2 *New Brunswick*

2.2.1 Commercial Aquaculture Licence

Schedule A – Operating Terms and Conditions; this licence may be suspended or revoked should the licensee fail to acquire or comply with any approvals, permits or licences which may be required under the *Clean Water Act*, the *Clean Environment Act*, the *Canadian Navigable Waters Act*, the *Federal Fisheries Act* or the *Crown Lands and Forests Act*, the *Public Health Act*, the *Seafood Processing Act*, the *Fish and Wildlife Act*, or any other applicable law.

2.2.2 Approval to Operate

Schedule A – Terms and Conditions (E); the Approval Holder operate the Facility in accordance with the most recent version of the *Environmental Management Program for the Marine Finfish Cage Aquaculture Industry in New Brunswick*, issued by the Department of Environment and Local Government. The Approval Holder shall ensure that all chemicals are stored in a manner such that any spill is contained and not released to the environment.

2.3 *Newfoundland*

2.3.1 Lease for Aquaculture

Schedule C; the use of the demised premises will, for its intended purpose, be subject to and in accordance with all provincial acts and regulations respecting the promotion of efficient aquaculture and environmental control. The Lessee agrees that upon cancellation or non-renewal of this Lease, the demised premises shall be restored to a condition satisfactory to the Minister, which restoration shall include the removal of all buoys, mooring lines, anchors, floating structures, and any other items placed or installed in or on the demised premises.

2.3.2 Aquaculture Licence

Licence Conditions: Licensees must ensure that all required plans are approved by the department. These plans include but are not limited to: Environmental and Waste Management Plan; Integrated Pest Management Plan; Biosecurity Plan; and Fish Health Management Plan.

2.3.3 Marine Aquaculture Water Use Licence

Appendix A – Terms and Conditions: The Licensee/Holder shall not impair, pollute, or cause to be polluted the quality of water. In the event that the site is no longer being used during the term created by this Licence, the Licensee/Holder shall remove the aquaculture gear and other work(s)/system(s) associated with and restore all areas affected by this facility to a state that resembles local natural conditions.

2.4 *Nova Scotia*

2.4.1 Lease

The Lessee must adhere to the Farm Management Plan, as it is in effect for this lease from time to time, and any failure to adhere to the Farm Management Plan is a breach of the lease. The Lessee agrees to comply with any permits, protocols, approvals, licences, or permissions (the “licencing requirements”) which may be required under the laws of the relevant municipality, the Province or Canada. The Lessee is responsible for confirming any licencing requirements and ensuring compliance with them.

2.4.2 Licence

The Licensee must adhere to the Farm Management Plan, as it is in effect for this licence from time to time, and any failure to adhere to the Farm Management Plan is a breach of the licence. The Licensee agrees to comply with any permits, protocols, approvals, licences, or permissions (the “licencing requirements”) which may be required under the laws of the relevant municipality, the Province or Canada. The Lessee is responsible for confirming any licencing requirements and ensuring compliance with them.

SECTION 3 - Ecologically and Biologically Sensitive and Significant Areas

An Ecologically and Biologically Sensitive Area (EBSA or EBSAs) is an area that has been determined to be of high ecological or biological significance and as such, should receive a higher level of risk aversion when activities are occurring to avoid disruption of the overall ecosystem and structure. It is important that employees are aware of areas that are in proximity to their farm and avoid impacting these areas intentionally and follow company protocols regarding garbage containment, proper fuel and chemical storage, equipment maintenance, among others to reduce the risk of unintentional damage.

3.1 *Atlantic Canada EBSAs*

Both the DFO and the Convention on Biological Diversity (CBD) have criteria for evaluating areas. These criteria consider biological functions, physical oceanography, structural habitat features and biodiversity. Criteria established by DFO to rank an area are uniqueness; aggregation; fitness consequences, plus 2 additional modifying criteria: resilience and naturalness. Criteria established by the CBD are uniqueness or rarity; special importance for life history stages of species; importance for threatened, endangered or declining species and/or habitats; vulnerability, fragility, sensitivity, or slow recovery; biological diversity and naturalness. Both the DFO and CBD criteria were used to establish the EBSAs.

There are three sub-regions within the DFO Maritimes Region in which EBSAs were identified: the Bay of Fundy, the Atlantic coast of Nova Scotia and the offshore Scotian Shelf.

The Bay of Fundy forms a significant part of the Gulf of Maine. A total of 16 areas (**Fig.1**) were identified (DFO²) as EBSAs with the Bay of Fundy, Gulf of Maine. There is no formal list of Ecologically Sensitive Species (ESS) in the Bay of Fundy yet, but there is the presence of potential ESS and the reason that some areas have been established as an EBSA.

In the Atlantic coast sub-region, Cape St. Mary's to Cape North, a total of 38 areas (**Fig. 2**) were identified (DFO³) as EBSAs.

² 2014. DFO CSAS Research Document 2013/065. Identification and Review of Ecologically and Biologically Significant Areas in the Bay of Fundy.

³ 2014. DFO Canadian Technical Report of Fisheries and Aquatic Sciences 3107. Ecologically and Biologically Significant Areas in the Atlantic Coastal Region of Nova Scotia.

Figure 1. Location of identified Bay of Fundy EBSAs – boundaries represent a best approximation of where a significant feature or features exist.

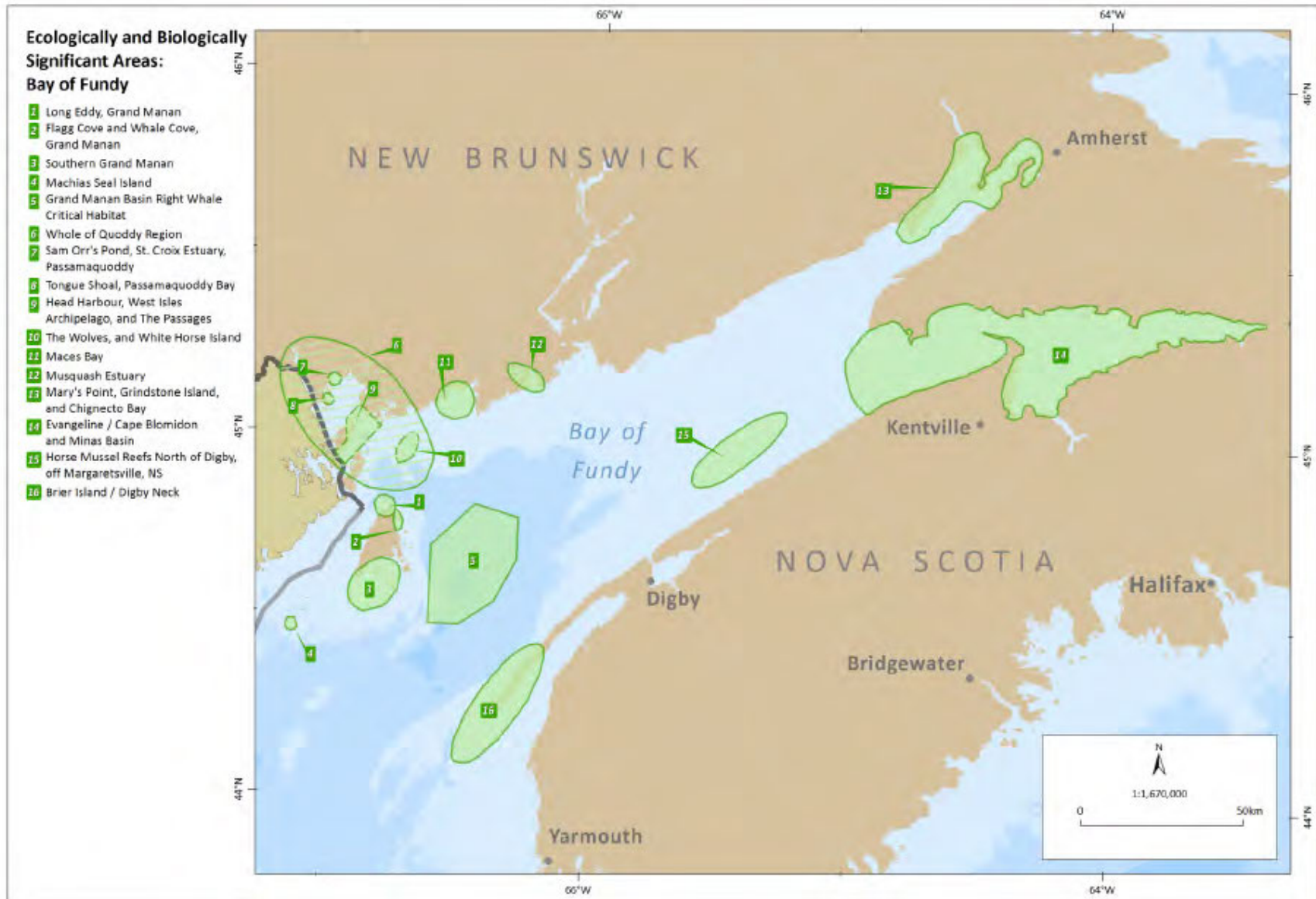
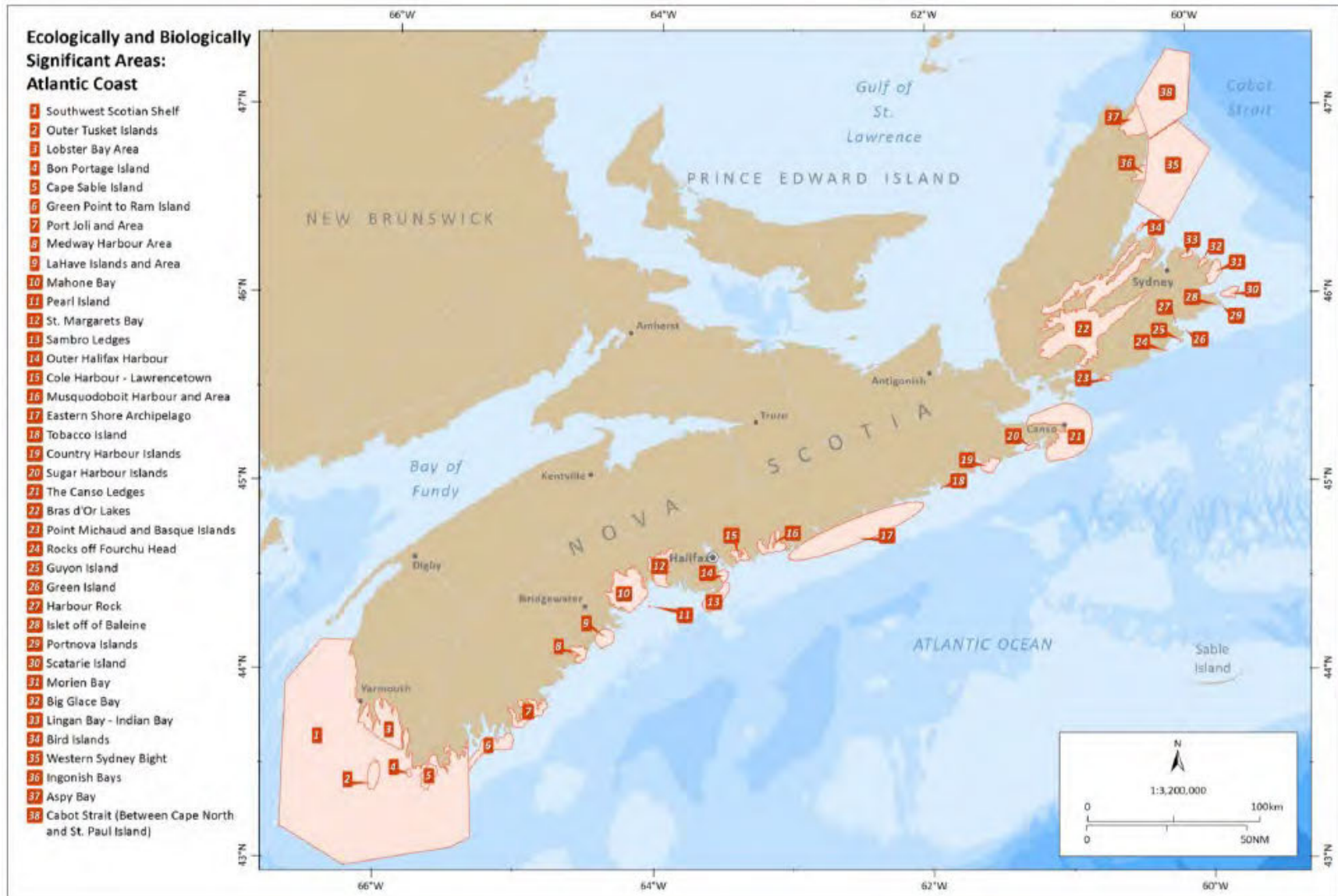
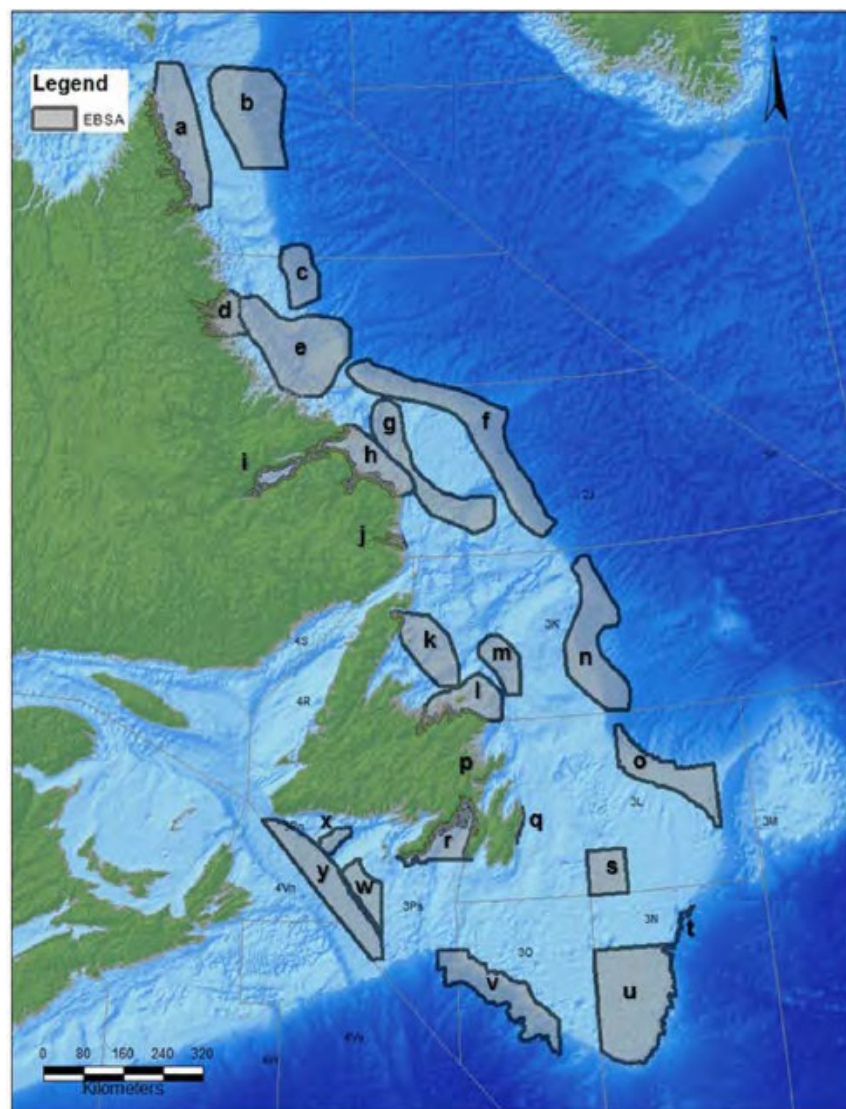


Figure 2. Location of identified Atlantic coast sub-region EBSAs – boundaries represent a best approximation of where a significant feature or features exist.



Within the DFO Newfoundland and Labrador Region 26 EBSAs have been identified in the Newfoundland and Labrador Shelves Bioregion since 2007 (**Fig. 3**)⁴. One of the 26 EBSAs is a transitory EBSA that encompasses the southern extent of pack ice. Unlike other EBSAs, the location of the southern pack ice is transitory and varies both within and among years, as it is influenced by winds and currents. However, it is usually located south of Hamilton Inlet, as far south as Notre Dame Bay. Although it cannot be defined by rigid boundaries, the southern pack ice is an area that is highly productive and ecologically important within the Newfoundland shelf ecosystem and the North Atlantic.

Figure 3. EBSAs in the Newfoundland and Labrador Bioregion: a) Northern Labrador, b) Outer Shelf Saglek Bank, c) Outer Shelf Nain Bank, d) Nain Area, e) Hopedale Saddle, f) Labrador Slope, g) Labrador Marginal Trough, h) Hamilton Inlet, i) Lake Melville, j) Gilbert Bay, k) Grey Islands, l) Fogo Shelf m) Notre Dame Channel, n) Orphan Spur, o) Northeast Shelf and Slope, p) Smith Sound, q) Eastern Avalon, r) Placentia Bay Extension, s) Virgin Rocks, t) Lilly Canyon-Carson Canyon, u) Southeast Shoal and Tail of the Banks, v) Southwest Shelf Edge and Slope, w) St. Pierre Bank, x) Burgeo Bank, and y) Laurentian Channel.



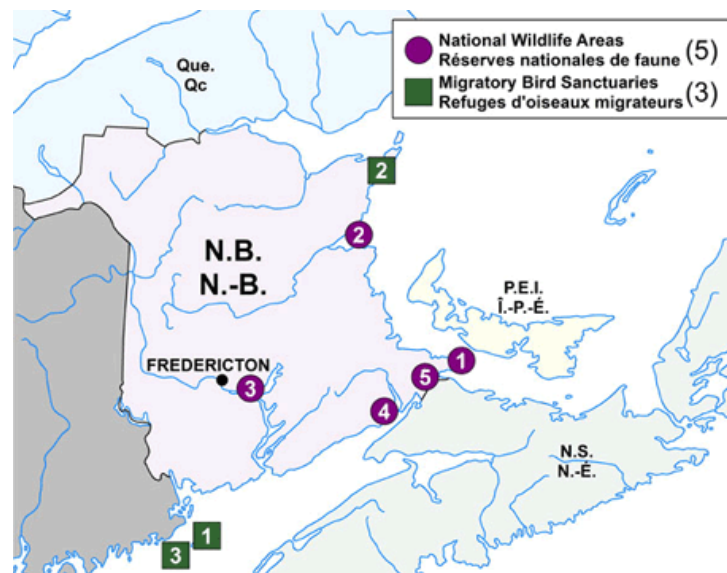
⁴ DFO. 2016. Refinement of Information Relating to Ecologically and Biologically Significant Areas (EBSAs) Identified in the Newfoundland and Labrador (NL) Bioregion. DFO Can. Sci. Advis. Sec. Sci. Resp. 2016/032.

3.1.1 National Wildlife Areas and Migratory Bird Sanctuaries

According to the Canada Wildlife Act, National Wildlife Areas are created and managed for the purposes of wildlife conservation, research, and interpretation. There are currently 55 National Wildlife Areas across Canada containing nationally significant habitats for animals or plants. The National Wildlife Areas managed by Environment and Climate Change Canada (ECCC) protect over 2.1 million hectares of habitat with over 75% of that area protecting marine habitat⁵.

Migratory Bird Sanctuaries (MBS) are listed under the Schedule in the Migratory Bird Sanctuary Regulations, which prescribe rules and prohibitions regarding the taking, injuring, destruction or molestation of migratory birds or their nests or eggs in the sanctuaries. Hunting of listed species under the Act is not permitted in any Migratory Bird Sanctuary. At present, there are 92 MBS across Canada, comprising almost 11.5 million hectares of migratory bird habitat that provides safe refuge for migratory birds in the terrestrial and marine environment. The Canadian Wildlife Service of Environment Canada is the agency responsible for MBS, although the sanctuaries can be located on federal, provincial, or private land⁶.

Figure 4. National Wildlife Areas and Migratory Bird Sanctuaries in New Brunswick.



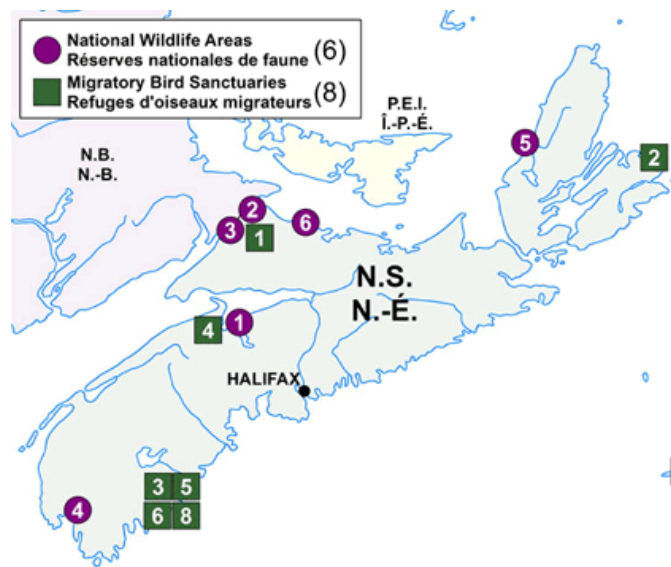
National Wildlife Areas			
No.	Name	Year Established	Size in Hectares
1	Cape Jourimain	1980	654
2	Portage Island	1979	349
3	Portobello Creek	1995	3,011
4	Shepody	1980	1,062
5	Tintamarre	1977	1,970

Migratory Bird Sanctuaries			
No.	Name	Year Established	Size in Hectares
1	Grand Manan MBS	1931	433
2	Inkerman MBS	1998	16
3	Machias Seal Island MBS	1944	1,046

⁵ <https://www.canada.ca/en/environment-climate-change/services/national-wildlife-areas/locations.html>

⁶ <https://www.canada.ca/en/environment-climate-change/services/migratory-bird-sanctuaries/locations.html>

Figure 5. National Wildlife Areas and Migratory Bird Sanctuaries in Nova Scotia.



National Wildlife Areas			
No.	Name	Year Established	Size in Hectares
1	Boot Island	1979	107
2	Chignecto	1982	409
3	John Lusby Marsh	1978	552
4	Sand Pond	1977	531
5	Sea Wolf Island	1982	76
6	Wallace Bay	1980	701
#	Isle Haute	In Progress	80

Migratory Bird Sanctuaries			
No.	Name	Year Established	Size in Hectares
1	Amherst Point	1947	433
2	Big Glace Bay Lake	1939	393
3	Port Herbert	1941	346
4	Kentville	1939	506
5	Port Joli	1941	397
6	Sable River	1941	313
7	Sable Island	1977	3,100
8	Haley Lake	1980	95

There are no designated National Wildlife Areas in Newfoundland and Labrador, however, there are 3 designated Migratory Bird Sanctuaries. The first two are located near Belle Isle, off the northeast coast of Newfoundland, the third is in the Bonavista Bay region of northeastern Newfoundland, adjacent to Terra Nova Provincial Park.

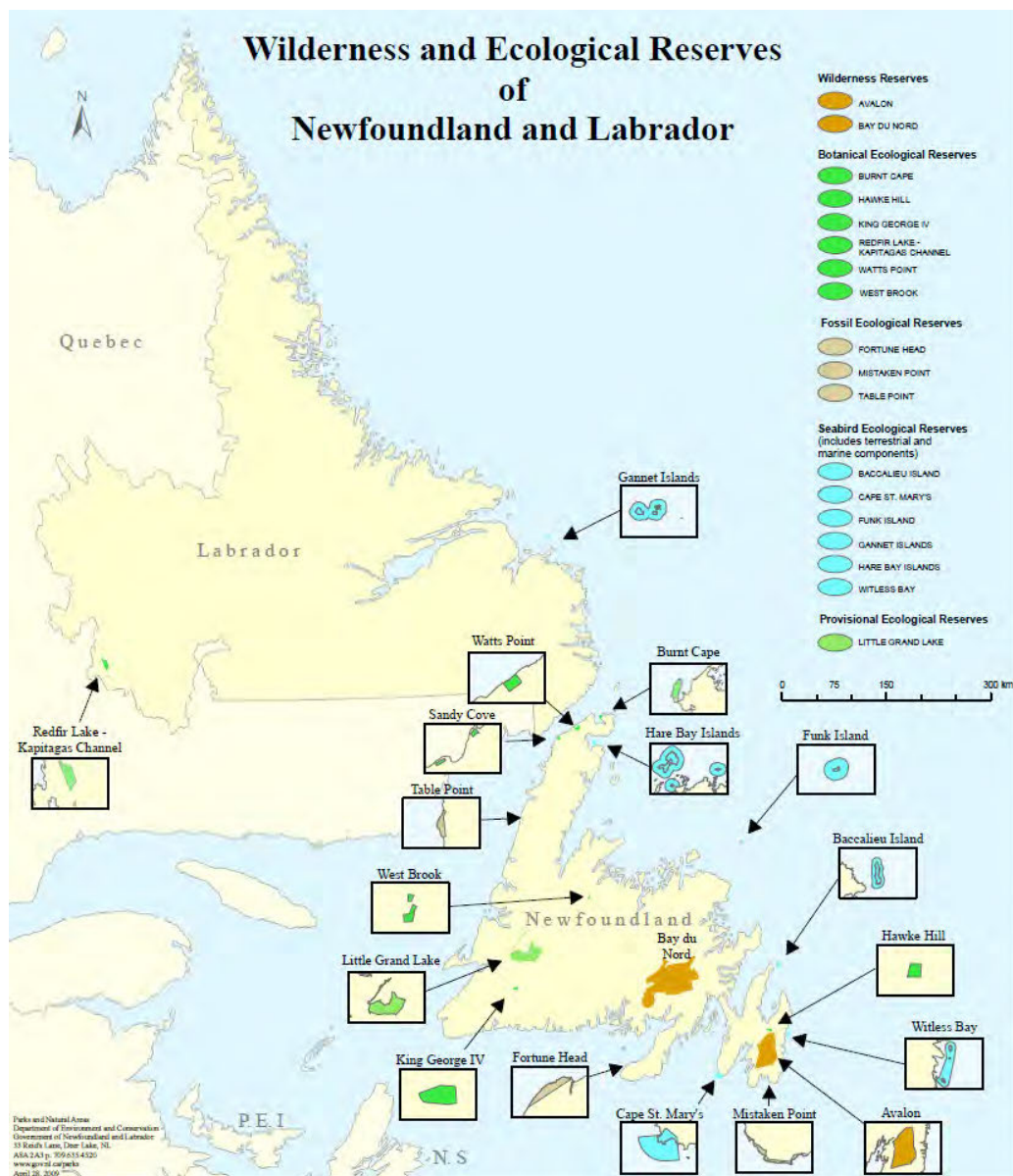
Table 1. Migratory Bird Sanctuaries in Newfoundland and Labrador.

Migratory Bird Sanctuaries			
No.	Name	Year Established	Size in Hectares
1	Shepherd Island	1991	18
2	Ile aux Canes	1991	162
3	Terra Nova	1967	1,178

The government of Newfoundland and Labrador has designated 18 wilderness and ecological reserves (**Fig. 6**)⁷ which protect wide-ranging caribou herds, diverse seabird colonies, globally important fossil sites, and habitat for endangered or threatened plants and animals. Several protected areas are representative examples of the province's natural regions. Wilderness reserves are large, protected areas (greater than 1,000 km²) that are designed to protect significant natural features and landscapes. There are two wilderness reserves in Newfoundland - the Avalon and the Bay du Nord and none in Labrador which were created primarily to protect the habitat and range of a caribou herd. Ecological reserves are protected areas (less than 1,000 km²) that were created for two main purposes: a) to protect representative examples of ecosystems or ecoregions, or b) to protect unique, rare, or endangered plants, animals, or other elements of our natural heritage.

Most of the reserves in the second category are divided into three general types-botanical, fossil, and seabird ecological reserves.

Figure 6. Wilderness and Ecological Reserves of Newfoundland and Labrador.



⁷ Department of Environment and Conservation. 2006. A Guide to our Wilderness and Ecological Reserves – Newfoundland and Labrador.

3.1.2 Marine Protected Areas

Marine Protected Areas (MPAs) are defined geographic areas dedicated to and managed for the long-term conservation of nature. The Department of Fisheries and Oceans (DFO) Canada establishes and manages MPAs under the Oceans Act in order to conserve numerous aspects which include, but are not limited to, commercial and non-commercial fishery resources, endangered or threatened marine species, unique habitats and other marine resources, or habitats necessary to fulfill the DFOs mandate of scientific research.

As of February 2022, there are 14 MPAs designated across Canada⁸, **8 of these are in the Atlantic Ocean.**

- **Anguniaqvia niqiqyuam** – located in the Northwest Territories, within the Inuvialuit Settlement Region, as defined by the Western Arctic Claim – Inuvialuit Final Agreement, Western Arctic Bioregion.
 - To maintain the integrity of the marine environment offshore of the Cape Parry Migratory Bird Sanctuary so that it is productive and allows for higher trophic level feeding.
 - To maintain the habitat to support populations of key species (such as beluga whales, Arctic char, and ringed and bearded seals).
- **Banc-des-Américains** – located off the eastern tip of the Gaspé Peninsula, Estuary, and the Gulf of St. Lawrence bioregion.
 - Conserve and protect benthic (seabed) habitats.
 - Conserve and protect pelagic (water column) habitats and forage species (prey).
 - Promote the recovery of at-risk whales and wolffish.
- **Basin Head** – located off the eastern tip of Prince Edward Island, Estuary and Gulf of St. Lawrence Bioregion.
 - Maintain the quality of the marine environment and the physical structures of the ecosystem supporting the *Chondrus crispus* variety of Irish Moss.
 - Maintain the health (biomass and coverage) of the Basin Head *Chondrus crispus*.
 - Maintain the overall ecological integrity of the Basin Head lagoon and inner channel, including avoidance of excessive Ulva growth, maintenance of adequate oxygen levels, and diversity of indigenous flora and fauna.
- **Eastport** – located off the northeast coast of Newfoundland; Newfoundland-Labrador Shelves Bioregion.
 - Maintain a viable population of American lobster through the conservation, protection, and sustainable use of resources and habitats within the Eastport Peninsula Lobster Management Area (EPLMA); and
 - Ensure the conservation and protection of threatened or endangered species.
- **Endeavour Hydrothermal Vents** – located on the Juan de Fuca Ridge, British Columbia, Offshore Pacific Bioregion.
 - Conserve the biological diversity, productivity, structural habitat, and ecosystem function of the hydrothermal vents.
- **Gilbert Bay** – located off the southeast coast of Labrador; Newfoundland-Labrador Shelves Bioregion.
 - Conservation and protection of the Gilbert Bay cod and its habitats.
 - Conservation and protection of the Gilbert Bay ecosystem.
 - Facilitation of scientific research opportunities in the Gilbert Bay ecosystem.
 - Promotion of public awareness, education, and support of the Gilbert Bay MPA.
- **The Gully** – located east of Nova Scotia’s Sable Island, Scotian Shelf Bioregion.
 - Minimize harmful impacts from human activities on cetacean populations and their habitats.
 - Minimize the disturbance of seafloor habitat and associated benthic communities caused by human activities.
 - Maintain and monitor the quality of water and sediments of the Gully; and
- Manage human activities to minimize impacts on other commercial and non-commercial living resources.
- **Hecate Strait/Queen Charlotte Sound Glass Sponge Reefs** – located north and south of the entrance to Douglas Channel, British Columbia, Northern Shelf Bioregion.
 - Conserve the biological diversity, structural habitat, and ecosystem function of the glass sponge reefs.

⁸ <http://www.dfo-mpo.gc.ca/oceans/mpa-zpm/index-eng.html>

- **Laurentian Channel** – located off the southwest coast of Newfoundland and Labrador, Newfoundland, and Labrador Shelves Bioregion.
 - Protect corals, particularly significant concentrations of sea pens, from harm due to human activities (e.g., fishing, oil and gas exploratory drilling, submarine cable installation and anchoring) in the Laurentian Channel.
 - Protect Black Dogfish from human induced mortality (e.g., bycatch in the commercial fishery) in the Laurentian Channel.
 - Protect Smooth Skate from human induced mortality (e.g., bycatch in the commercial fishery) in the Laurentian Channel.
 - Protect Porbeagle sharks from human induced mortality (e.g., bycatch in the commercial fishery, seismic activities) in the Laurentian Channel.
 - Promote the survival and recovery of Northern Wolffish by minimizing risk of harm from human activities (e.g., bycatch in the commercial fishery) in the Laurentian Channel.
 - Promote the survival and recovery of Leatherback Sea Turtles by minimizing risk of harm from human activities (e.g., entanglement in commercial fishing gear, seismic activities) in the Laurentian Channel.
- **Musquash Estuary** – Bay of Fundy, New Brunswick; Scotian Shelf Bioregion.
 - Maintain productivity of harvested species.
 - Maintain biodiversity of individual species, communities, and populations within the different ecotypes.
 - Safeguard habitat, including the physical and chemical properties of the ecosystem, by maintaining water and sediment quality.
- **SGaan Kinghlas-Bowie Seamount** - located 180 kilometers offshore and to the west of Haida Gwaii (formerly known as Queen Charlotte Islands) in the northeast Pacific, off the coast of British Columbia. The seamount rises from a depth of 3,000 meters to within 24 meters of the surface.
 - Conserve and protect the unique biodiversity and biological productivity of the area's marine ecosystem, which includes the SGaan Kinghlas-Bowie, Hodgkins and Davidson seamounts and the surrounding waters, seabed, and subsoil.
- **St. Anns Bank** – located east of Cape Breton Island, Nova Scotia, Scotian Shelf Bioregion.
 - Conserve and protect all major benthic, demersal (i.e., close to the sea floor) and pelagic (i.e., in the water column) habitats within the MPA, along with their associated physical, chemical, geological, and biological properties and processes.
 - Conserve and protect marine areas of high biodiversity at the community, species, population, and genetic levels within the MPA.
 - Conserve and protect biological productivity across all trophic levels so that they can fulfill their ecological role in the ecosystems of the MPA.
- **Tarium Nirjutait** – located in the Mackenzie River Delta and estuary in the Beaufort Sea, Western Arctic Bioregion.
 - To conserve and protect beluga whales and other marine species (anadromous fish, waterfowl, and seabirds), their habitats and their supporting ecosystem.
- **Tuvaijuittuq** – located off the northwest coast of Ellesmere Island, Nunavut in the Arctic Ocean, encompasses areas within the Arctic Basin and Arctic Archipelago Bioregions.
 - To contribute to the conservation, protection and understanding the natural diversity, productivity, and dynamism of the High Arctic Sea ice ecosystem.
 - Tuvaijuittuq is the first MPA to be designated for interim protection by ministerial order under the *Oceans Act*, limiting human activities in the area for up to five years.

3.2 *Maine Natural Areas Program*

Ecological Reserves are lands specifically set aside to protect and monitor the State of Maine's natural ecosystems. These lands are managed by the Bureau of Parks and Public Lands, and the Maine Natural Areas Program oversees the long-term ecological monitoring plan. As of 2013, Maine has designated more than 90,000 acres of Ecological Reserves on 17 public land units. The purposes of the Reserves are:

1. To maintain one or more natural community types or native ecosystem types in a natural condition and range of variation and contribute to the protection of Maine's biological diversity,
2. To act as a benchmark against which biological and environmental change may be measured, as a site for ongoing scientific research, long-term environmental monitoring, and education, and
3. To protect sufficient habitat for those species whose habitat needs are unlikely to be met on lands managed for other purposes.

Reserves were designated following a multi-year inventory and assessment project coordinated by the Maine Forest Biodiversity Project, with staff assistance from The Nature Conservancy, the Maine Natural Areas Program, and the Bureau of Parks and Public Lands. In total, there are 17 Maine Ecological Reserves as of July 2018 - ranging in size from 775 acres at Wassataquoik Stream to over 11,000 acres at Nahmakanta.

Factsheets on each of the reserves are available through the Maine Department of Agriculture, Conservation and Forestry website⁹.

- [Big Spencer Mountain](#)
- [Bigelow Preserve](#)
- [Chamberlain Lake/Lock Dam](#)
- [Cutler Preserve](#)
- [Deboullie](#)
- [Duck Lake](#)
- [Gero Island](#)
- [Great Heath](#)
- [Mahoosucs Unit](#)
- [Mt. Abraham](#)
- [Nahmakanta](#)
- [Number Five Bog](#)
- [Rocky Lake](#)
- [Salmon Brook Lake](#)
- [St. John Ponds](#)
- [Tunk Lake Area, including Donnell Pond and Spring River Lake](#)
- [Wassataquoik Stream](#)

⁹ <https://www.maine.gov/dacf/mnap/reservesys/index.htm>

SECTION 4 - Risk Assessment

4.1 Atlantic Canada Aquaculture Sites and the Species at Risk Act (SARA)

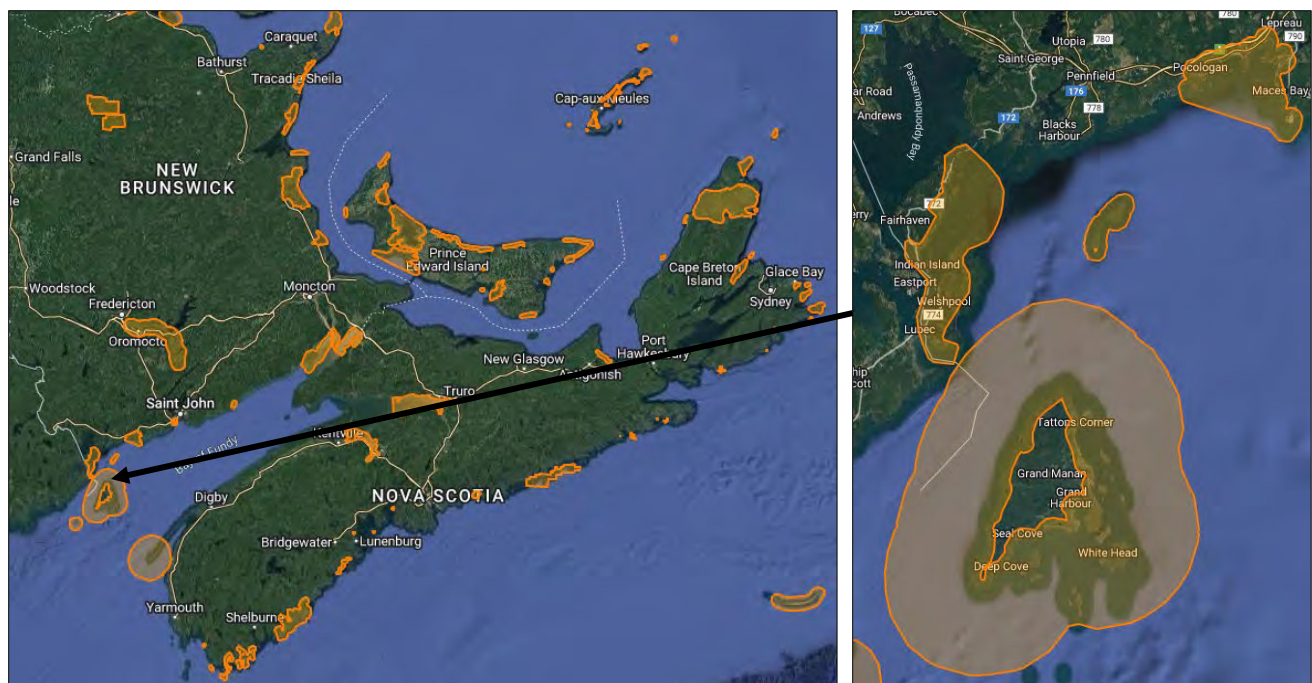
The SARA is a key federal government commitment “to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened”. SARA provides for the legal protection of wildlife species and the conservation of their biological diversity.

When scoping new sites or proposing boundary amendments for pre-existing farms, endangered, at risk and threatened species that have been or may be found within the proposed area must be identified. Species identified that are listed under the SARA designation must be protected and considered within the proposal. Applicants must provide mitigation plans for those species regarding how the operation will strive to not impede or otherwise cause harm. Applicants must also consider those species identified by regional conservation strategies, including Provincial Species at Risk Acts or Endangered Species Acts.

4.1.1 Important Birds and Biodiversity Areas (IBA)

Important Bird Areas (IBAs)¹⁰ are discrete sites that support specific groups of birds: threatened birds, large groups of birds, and birds restricted by range or by habitat. When bird species occur at a site in sufficient numbers during one or more seasons (winter; migration; breeding), they become known as trigger species, and the site at which they are found is designated as an IBA. IBAs range in size from very tiny patches of habitat to large tracts of land or water. They may encompass private or public land, and they may or may not overlap partially or entirely with legally protected sites, such as EBSAs, National Wildlife Areas, Migratory Bird Sanctuaries and Wilderness and Ecological Reserves mentioned previously. While there are no IBAs located near our marine farms in Newfoundland, there are several identified within New Brunswick and Nova Scotia (**Fig. 7**).

Figure 7. IBAs in the Maritimes Region, with focus of Grand Manan Island, Passamaquoddy Bay and Maces Bay, NB.



¹⁰ <https://www.ibacanada.org/index.jsp?lang=en>

4.2 Maine Aquaculture Sites and the Endangered Species Act (ESA)

The ESA aims to conserve, protect, and recover imperiled species and the ecosystems upon which they depend. The National Oceanic and Atmospheric Administration (NOAA) Fisheries is responsible for the protection, conservation, and recovery of endangered and threatened marine and anadromous species under the ESA.

Generally, NOAA Fisheries manages the marine and anadromous species including whales, corals, sea turtles, and salmon. The US Fish and Wildlife Service (USFWS) manages terrestrial and freshwater species such as polar bears, sea otters, and manatees.

The Maine Endangered Species Act (MESA) provides the Maine Department of Inland Fisheries and Wildlife (MDIFW) with a mandate to conserve all the species of fish and wildlife found in the State, as well as the ecosystems upon which they depend. Under the MESA, as stated in Maine aquaculture site Department of Marine Resources (DMR) Leases, a state agency or municipal government shall not permit, licence, fund or carry out projects occurring partly or wholly within the essential habitat, without the approval of the Commissioner of MDIFW.

Applicants are required to provide a signed statement to confirm the proposed lease either does not fall within the boundary of an essential habitat or that the applicant has contacted MDIFW, and preliminary review will grant approval for the Maine Department of Marine Resources (MDMR) to issue an aquaculture lease within part or all the boundary of a designated Essential Habitat.

SECTION 5 - Local Endangered or Threatened Species

5.1 Atlantic Canada

The following species are listed as endangered or threatened in Atlantic Canada¹¹ (excluding Prince Edward Island as well as terrestrial plants and animals) either under the Federal Species at Risk Act (SARA) and/or the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and may be seen in the vicinity of our marine farms:

E = Endangered under the SARA and listed by the COSEWIC
T = Threatened under the SARA and listed by the COSEWIC
s = Special Concern under the SARA and listed by the COSEWIC
c = COSEWIC Designation, no SARA Status

Birds

- 1 Bank Swallow (*Riparia riparia*) **T**
- 2 Barn Swallow (*Hirundo rustica*) **T**
- 3 Barrow's Goldeneye (*Bucephala islandica*) **s**
- 4 Bicknell's Thrush (*Catharus bicknelli*) **T**
- 5 Bobolink (*Dolichonyx oryzivorus*) **T**
- 6 Canada Warbler (*Wilsonig anadensis*) **T**
- 7 Chimney Swift (*Chaetura pelagica*) **T**
- 8 Common Nighthawk (*Chordeiles minor*) **T**
- 9 Eastern Meadowlark (*Sturnella magna*) **T**
- 10 Eastern Whip-poor-will (*Antrastomus vociferus*) **T**
- 11 Eastern Wood Pewee (*Contopus virens*) **c**
- 12 Eskimo Curlew (*Numenius borealis*) **E – LIKELY EXTINCT**
- 13 Evening Grosbeak (*Coccothraustes vespertinus*) **s**
- 14 Harlequin Duck (*Histrionicus histrionicus*) **s**
- 15 Horned Grebe – Western population (*Podiceps auratus*) **s**¹²
- 16 Hudsonian Godwit (*Limosa haemastica*) **c**
- 17 Ipswich Sparrow (*Passerculus sandwichensis princeps*) **s**
- 18 Ivory Gull (*Pagophila eburnean*) **E**
- 19 Leach's Storm-Petrel (*Oceanodroma leucorhoa*) **c**
- 20 Least Bittern (*Ixobrychus exilis*) **T**
- 21 Lesser Yellowlegs (*Tringa flavipes*) **c**
- 22 Olive-sided Flycatcher (*Contopus cooperi*) **T**
- 23 Peregrine Falcon – Anatum Subspecies (*Falco peregrinus anatum*) **s**
- 24 Piping Plover (*Charadrius melodus*) **E**
- 25 Red Crossbill percna (*Loxia curvirostra percna*) **T**
- 26 Red Knot Rufa (*Calidris canutus rufa*) **E**
- 27 Red-necked Phalarope (*Phalaropus lobatus*) **s**
- 28 Roseate Tern (*Sterna dougallii*) **E**
- 29 Ross's Gull (*Rhodostethia rosea*) **T**
- 30 Rusty Blackbird (*Euphagus carolinus*) **s**
- 31 Savannah Sparrow princeps (*Passerculus sandwichensis princeps*) **s**
- 32 Short-eared Owl (*Asio flammeus*) **s**
- 33 Wood Thrush (*Hylocichla mustelina*) **T**
- 34 Yellow Rail (*Coturnicops noveboracensis*) **s**

¹¹ <https://species-registry.canada.ca/index-en.html#/species?ranges=15,9,7,8&taxonomyId=4,5,2&sortBy=commonNameSort&sortDirection=asc&pageSize=10> (Filtered by NB, NL, NS, Atlantic Ocean; Birds, Fishes (Marine), Mammals)

¹² The Western population is recognized by the Province of New Brunswick under the provincial Species at Risk Act, though the SARA Registry does not consider New Brunswick as a range of the species. Due to its listing on the provincial list, it is included here.

Fish

- 1 Acadian Redfish (*Sebastes fasciatus*) **c**
- 2 American Eel (*Anguilla rostrata*) **T**
- 3 American Plaice (*Hippoglossoides platessoides*) **c**
- 4 Atlantic Bluefin Tuna (*Thunnus thynnus*) **c**
- 5 Atlantic Cod – Newfoundland and Labrador, Laurentian North and South, Southern populations (*Gadus morhua*) **c**
- 6 Atlantic Salmon – Eastern Cape Breton, Gaspé-Southern Gulf of St. Lawrence, Outer Bay of Fundy, Nova Scotia Southern Upland, South Newfoundland populations (*Salmo salar*) **c**
- 7 Atlantic Salmon – Inner Bay of Fundy (*Salmo salar*) **E**
- 8 Atlantic Sturgeon – Maritime population (*Acipenser oxyrinchus*) **c**
- 9 Atlantic Whitefish (*Coregonus huntsman*) **E**
- 10 Atlantic Wolffish (*Anarhichas lupus*) **s**
- 11 Basking Shark (*Cetorhinus maximus*) **c**
- 12 Cusk (*Brosme brosme*) **c**
- 13 Lumpfish (*Cyclopterus lumpus*) **c**
- 14 Northern Wolffish (*Anarhichas denticulatus*) **T**
- 15 Porbeagle (*Lamna nasus*) **c**
- 16 Shortfin Mako – Atlantic population (*Isurus oxyrinchus*) **c**
- 17 Shortnose Sturgeon (*Acipenser brevirostrum*) **s**
- 18 Smooth Skate – Lauranian-Scotian population (*Malacoraja senta*) **c**
- 19 Spiny Dogfish (*Squalus acanthias*) **c**
- 20 Spotted Wolffish (*Anarhichas minor*) **T**
- 21 Striped Bass – Bay of Fundy, Southern Gulf of St. Lawrence Population (*Morone saxatilis*) **c**
- 22 Thorny Skate (*Amblyraja radiata*) **c**
- 23 White Shark (*Carcharodon Carcharias*) **E**
- 24 White Hake (*Urophycis tenuis*) **c**
- 25 Winter Skate – Georges Bank, Western Scotian Shelf, Bay of Fundy populations (*Leucoraja ocellate*) **c**

Mammals

- 26 Beluga Whale (*Delphinapterus leucas*) **c**
- 27 Blue Whale (*Balaenoptera musculus*) **E**
- 28 Fin Whale (*Balaenoptera physalus*) **s**
- 29 Harbour Porpoise - Northwest Atlantic Population (*Phocoena phocoena*) **c**
- 30 Killer Whale – Northwest Atlantic population (*Orcinus orca*) **c**
- 31 North Atlantic Right Whale (*Eubalaena glacialis*) **E**
- 32 Northern Bottlenose Whale – Scotian Shelf population (*Hyperoodon ampullatus*) **E**
- 33 Polar Bear (*Ursus maritimus*) **s**
- 34 Ringed Seal (*Pusa hispida*) **c**
- 35 Sowerby's Beaked Whale (*Mesoplodon bidens*) **s**

Turtles

- 36 Leatherback Sea Turtle – Atlantic population (*Dermochelys coriacea*) **E**
- 29 Loggerhead Sea Turtle (*Caretta caretta*) **E**

5.1.1. New Brunswick

In addition to the Federal SARA Registry, the following species are listed under Schedule A of the New Brunswick *List of Species at Risk Regulations - Species at Risk Act*¹³ and may be seen within the vicinity of our marine farms:

E = Endangered Species

T = Threatened Species

S = Species of Special Concern

Birds

- 1 Bald Eagle (*Haliaeetus leucocephalus*) **E**

Fish

- 2 Blue Shark – Atlantic population (*Prionace glauca*) **S**
- 3 Rainbow Smelt – Lake Utopia Large-Bodied, Small-Bodied populations (*Osmerus mordax*) **T**
- 4 Winter Skate – Southern Gulf of St. Lawrence population (*Leucoraja ocellata*) **E**

5.1.2 Newfoundland

Newfoundland and Labrador's Endangered Species Act provides special protection for plant and animal species considered to be endangered, threatened, or vulnerable in the province. The Act considers species and populations that are native to the province but does not include marine fish. The following species are additional species relevant to those listed under the Federal SARA Registry and are listed under the Newfoundland and Labrador Endangered Species Act¹⁴:

E = Endangered

T = Threatened

V = Vulnerable

Birds

- 1 Newfoundland Gray-cheeked Thrush (*Catharus minimus minimus*) **T**

5.2 Maine

Endangered and threatened marine species in the state of Maine are listed under the Marine Endangered Species Act¹⁵. Endangered and threatened inland fish and wildlife species in Maine are listed either under Maine's Endangered Species Act¹⁶, the US Endangered Species Act¹⁷, or both. The following species are listed as endangered or threatened in Maine and may be seen in the vicinity of our marine farms:

F = Federally Endangered under the U.S. Endangered Species Act

f = Federally Threatened under the U.S. Endangered Species Act

S = State Endangered under the Maine Endangered Species Act

s = State Threatened under the Maine Endangered Species Act

M = State Endangered under the Maine Marine Endangered Species Act

m = State Threatened under the Maine Marine Endangered Species Act

¹³ <https://laws.gnb.ca/en/showdoc/cr/2013-38>

¹⁴ <https://www.gov.nl.ca/ffa/wildlife/endangeredspecies/>

¹⁵ <http://www.mainelegislature.org/legis/statutes/12/title12sec6975.html>

¹⁶ <https://www.maine.gov/ifw/fish-wildlife/wildlife/endangered-threatened-species/listed-species.html>

¹⁷ https://www.fisheries.noaa.gov/species-directory/threatened-endangered?title=&species_category=any&species_status=any®ions=1000001111&items_per_page=25&sort=#

Birds

- 1 American Pipit (*Anthus rubescens*) (Breeding population only) **S**
- 2 Arctic Tern (*Sterna paradisaea*) **s**
- 3 Atlantic Puffin (*Fratercula arctica*) **s**
- 4 Barrow's Goldeneye (*Bucephala islandica*) **s**
- 5 Black-crowned Night Heron (*Nycticorax nycticorax*) **S**
- 6 Black Tern (*Chlidonias niger*) **S**
- 7 Common Gallinule (*Gallinula chloropus*) **s**
- 8 Giant Manta Ray (*Manta birostris*) **f**
- 9 Golden Eagle (*Aquila chrysaetos*) **S**
- 10 Grasshopper Sparrow (*Ammodramus savannarum*) **S**
- 11 Great Cormorant – Breeding population (*Phalacrocorax carbo*) **s**
- 12 Harlequin Duck (*Histrionicus histrionicus*) **s**
- 13 Least Bittern (*Lxobrychus exilis*) **S**
- 14 Least Tern (*Sterna antillarum*) **S**
- 15 Peregrine Falcon – Breeding population (*Falco peregrinus*) **S**
- 16 Piping Plover (*Charadrius melodus*) **S f**
- 17 Razorbill (*Alca torda*) **s**
- 18 Red Knot (*Calidris canutus rufa*) **f**
- 19 Roseate Tern (*Sterna dougallii*) **S F**
- 20 Sedge Wren (*Cistothorus platensis*) **S**
- 21 Short-eared Owl (*Asio flammeus*) (Breeding population only) **s**
- 22 Upland Sandpiper (*Bartramia longicauda*) **s**

Fish

- 23 Atlantic Salmon (*Salmo salar*) **F**
- 24 Atlantic Sturgeon (*Acipenser oxyrinchus*) **f**
- 25 Shortnose Sturgeon (*Acipenser brevirostrum*) **F M**
- 26 Oceanic Whitetip Shark (*Carcharhinus longimanus*) **f**

Mammals

- 27 Blue Whale (*Balaenoptera musculus*) **F**
- 28 Fin Whale (*Balaenoptera physalus*) **F M**
- 29 Humpback Whale (*Megaptera novaeangliae*) **M**
- 30 North Atlantic Right Whale (*Eubalaena glacialis*) **F M**
- 31 Sei Whale (*Balaenoptera borealis*) **F M**
- 32 Sperm Whale (*Physeter catodon*) **F M**

Turtles

- 33 Atlantic (Kemp's) Ridley Turtle (*Lepidochelys kempii*) **F M**
- 34 Green Turtle (*Chelonia mydas*) **f**
- 35 Leatherback (*Dermochelys coriacea*) **F M**
- 36 Loggerhead (*Caretta caretta*) **f m**

SECTION 6 - Control Measures

From the careful selection of farm sites and investment in the best technology in everything from cage and net construction to feeding systems, to regular monitoring and sampling of sediment under cage sites, we ensure that all the necessary steps to safeguard the health of our salmon and of the surrounding areas are taken. Any measures taken to protect fish from predators are always carried out in a manner that considers predator welfare and does not endanger the predator population; however, if a predator cannot be deterred and is threatening human safety or the security of the containment, it may be dispatched with Saltwater Management consent AND in accordance with Provincial, State or Federal Regulations.

6.1 *Passive Control Measures*

The primary containment net will be protected from predators using a predator net as needed. The predator net mesh size will be consistent with that utilized in the area for controlling access by predators. Bird nets shall be present over top of each containment net when fish are present and only pulled back to allow access to the cage. During daily inspections, bird nets are checked for damage and pulled tight. 150m cages may require additional support lines to reduce sagging. In winter months, bird nets should be simmed to main nets.

6.2 *Active Control Measures*

Non-lethal, visual, or audible surface deterrent devices may be used on sites to discourage birds from landing on the cages. Use of audible deterrents must take into effect proximity to other users and abide by noise regulations in the respective area and as described in the operational licences and permits.

Visual active controls include the use of handheld lasers, specifically the Agrilaser® Handheld 200/500 developed by Bird Control Group. The beam produced is classified as a 3B Laser with an effective range of 2,500m. Birds see the laser beam differently than humans and see the beam as a physical danger. The goal is that after consistent use, the birds will perceive the farm as unsafe and will not return. Range of the laser is highly dependent upon weather conditions, with the longest range seen on dark or cloudy days. Sites designated to use this deterrent require specific training and must completed a Safe Use Agreement prior to being assigned a laser.

For predatory marine mammals, Acoustic Deterrent Devices (ADDs) may deployed underneath the water to deter the animals away from our cages. The use of ADDs has drastically reduced in recent years largely due in part to the advances in passive control systems, such as the use of the steel-core nets, redesign of our grid systems and other technologies. ADDs may only be used if:

- The use of an ADD has been first communicated with and approved by the respective Area and/or Production Manager to ensure that all other preventative measures have been taken.
- Other factors such as the legality to use such devices or the requirements of certification programs need to be referred to prior to deployment and your Compliance Manager (or similar) and/or Production Manager are your best resources to answer these questions.
- To ensure that non-target species are not negatively impacted, the use of any ADDs is limited during periods of high population densities. As such, the use of ADDs will NOT BE PERMITTED during the months of June through September – any ADDs must be physically removed from the water during this time.

For smaller marine predators, such as the mink, active measures to control or remove these predators is the use of traps. Traps are only permitted to be used under permit, such as the Nuisance Animal Control Permit in New Brunswick or through those who hold a valid licence, such as the Nuisance Wildlife Control Operator Licence or utilizing the services of local Wildlife Control Officers.

6.3 *Lethal Control Measures*

Lethal control measures for predators are prohibited unless there is a permit in place and actions are carried out according to said permit under the instructions and guidance of Senior Management. In most instances, marine mammals, primarily seals, found inside cages can be removed by lowering the net to allow the animal to remove themselves. Birds should never require the use of lethal control measures and only require intervention if entangled, entrapped or to aid, refer to *General Predator Interactions*.

6.4 *Daily Inspections*

Each day crews are to inspect the farm to check water quality, inspect cages and netting and to make general observations of the fish and fish activity from the surface. Any debris that could cause harm to the fish and/or damage netting should be removed from around or in the cages including garbage, large sticks, and excessive amounts of kelp or rockweed. Any garbage shall be removed from the water and placed in site garbage to be disposed properly.

Inspections on the cages and netting should include infrastructure inspections, such as:

- Checking for waterlines or handrail ties that are untied, missing, broken, or chaffed. Any lines that are untied must be retied; all others shall be replaced as soon as possible.
- Inspecting netting and the water surface inside of the cage for any entangled or entrapped wildlife. When possible, to do so without handling the wildlife, all attempts shall be made to release the wildlife without additional harm. Any species found deceased should be removed from the structure.
- Inspecting netting and cage for any damage. For larger repairs, such as broken, chaffed, or missing bridals, weight ring ropes or camera lines should be reported to the Site Manager as these types of repairs may require the use of divers, maintenance vessels, or plastic welders. Any holes discovered in the netting should immediately be repaired, if able, or reported to the Site Manager so that divers can be called in to assess and check for signs of fish escapement.

SECTION 7 - Special Requirements

7.1 *Newfoundland Species at Risk; Bald Eagles and Miawpukek First Nation*

Interactions between wildlife and aquaculture facilities are bound to occur from time to time. Therefore, our activities should be conducted with respect and care for the local wildlife, ensuring that harmful encounters are minimized. In cases where we do encounter entangled birds, other wildlife, and marine mammals on our sites, whether alive or dead, we are obligated to contact the following authorities for their information and action.

- Report any sightings of species listed on the Newfoundland and Labrador Species at Risk to the Department of Environment and Conservation – Endangered Species and Biodiversity, Wildlife Division at (709) 637-2026.
- Birds and other wildlife: notify the local Conservation Officer, Department of Environment and Conservation (in the Bay D’Espoir area the phone number is (709) 882-2200). If the animal in question is an eagle, we will also contact the Miawpukek First Nation Council, located in Conne River, at (709) 882-2470.
- Marine mammals and fish (tuna, etc.): contact the local Department of Fisheries and Oceans Canada Conservation and Protection Officer in your community.

In the case of wild animals that are alive, the province’s Department of Environment and Conservation has a “Wildlife Care and Rehabilitation Program” at Salmonier Nature Park. The local Conservation Officer will be able to determine if the animal in question should be sent to the Salmonier Park.

If a dead animal is encountered, it should be retrieved where possible, treated respectfully, and turned over to the appropriate authority when directed to do so. In the case of deceased bald eagles, the Conservations Officer will make properly permitted arrangements to turn them over to the Miawpukek First Nation Council for respectful burial at Conne River.

7.2 *Maine Coastal Islands National Wildlife Refuge Complex*

Established between 1972 and 1980, the US Fish and Wildlife Service (USFWS) oversees the Maine Coastal Islands National Wildlife Refuge Complex, which were established for the protection of migratory birds, principally colonial nesting seabirds, The Complex, containing more than 73 offshore islands and 4 coastal parcels, is comprised of five individual refuges which span the coast of Maine and support an incredible diversity of habitats including coastal islands, forested headlands, estuaries, and freshwater wetlands. **Refer to APPENDIX USFWS: Maine Coastal Islands National Wildlife Refuge Complex¹⁸**

The Cross Island marine farm (MACH C12), located just inside Northwest Harbour off Cross Island in Machias Bay, is positioned near the Cross Island National Wildlife Refuge. A “line of impasse” is described within the Army Corp of Engineers Permit for MACH C12 (1989) in which the permit states that no aquaculture gear can be placed south of this line.

7.3 *National (US) Bald Eagle Management Guidelines*

Bald Eagles were removed from the US endangered species list in August 2007 due to sufficient population recovery, however both bald eagles and golden eagles are still protected by the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act. The National Bald Eagle Management Guidelines¹⁹ were developed by the USFWS to advise individuals who share public and private lands with bald eagles about when and under what circumstances the protective provisions of the Eagle Act may apply to their activities.

The Guidelines are intended to help people minimize such impacts to bald eagles, particularly where they may constitute "disturbance" which is prohibited by the Eagle Act.

¹⁸ [fws.gov/refuge/maine-coastal-islands-complex](https://www.fws.gov/refuge/maine-coastal-islands-complex)

¹⁹ <https://www.fws.gov/media/national-bald-eagle-management-guidelines-0>

Due to the farms proximity to Stone Island, the Stone Island marine farm (MACH ST), located in Machias Bay, must comply with the Guidelines to minimize disturbance of nesting eagles on Stone Island. Such guidelines include sensitive periods (**Table 1**) within various ranges across the US, such as the Northern US which includes Maine.

Table 1. Chronology of typical reproductive activities of Bald Eagles for the Northern U.S., including Maine.

Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.
			Nest Building - I								
				Egg Laying/Incubation - II, III							
						Hatching/Rearing Young - IV					
									Fledging Young - V		

Table 2. Nesting Bald Eagle sensitivity to human activities.

Phase	Activity	Sensitivity to Human Activity	Comments
I	Courtship and Nest Building	Most Sensitive	Most critical time period. Disturbance is manifested in nest abandonment. Bald eagles in newly established territories are more prone to abandon nest sites.
II	Egg Laying	Very Sensitive	Human activity of even limited duration may cause nest desertion and abandonment of territory for the breeding season.
III	Incubation and Early Nestling Period (up to 4 weeks)	Very Sensitive	Adults are less likely to abandon the nest near and after hatching. However, flushed adults leave eggs and young unattended; eggs are susceptible to cooling, loss of moisture, overheating, and predation; young are vulnerable to elements.
IV	Nestling period, 4 to 8 weeks	Moderately Sensitive	Likelihood of nest abandonment and vulnerability of the nestlings to elements somewhat decreases. However, nestlings may miss feedings, affecting their survival.
V	Nestlings 8 weeks through fledging	Very Sensitive	Gaining flight capacity, nestlings 8 weeks and older may flush from the nest prematurely due to disruption and die.

7.4 Coffin Island, Nova Scotia

Coffin Island is used for nesting by colonial birds, including the Roseate Tern, which are particularly vulnerable to the effects of human disturbance. The period spent at the colony prior to egg-laying is very important for seabirds, disturbance prior to egg-laying may cause birds to abandon historical colony locations. Meanwhile, disturbances during the breeding season can cause these birds to abandon their nests or young, or to use valuable energy reserves for defense, instead of incubating eggs and feeding their young. The presence of humans in close proximity to nests may prevent parent birds from returning to protect and feed their young, and expose eggs or chicks to predation, and to the lethal effects of heat, cold and rain.

The Liverpool marine farm (NS-1205) is located in close proximity to Coffin Island, which is pending designation as a 50-hectare Nature Reserve in Nova Scotia²⁰. Although not officially designated under the IBAs program, the surrounding beaches and flats at East Berlin, West Berlin, Eagle Head, Beach Meadows, and Western Head all host

²⁰ <https://novascotia.ca/parksandprotectedareas/plan/interactive-map/>

small populations of migrant shorebirds as well in late summer and early fall. Given the distance from the marine farm to the surrounding beaches and flats, there is no anticipated interaction with these areas.

There is concern for potential negative interactions with sensitive species, therefore it is important that mitigation measures, such as the following, be implemented to avoid/minimize adverse effects on migratory birds in the vicinity of Coffin Island:

- Marine travel should take place at steady speeds, moving parallel to the shore, rather than approaching Coffin Island directly.
- Vessels and equipment should be well muffled, and should avoid any sharp or loud noises, should not blow horns or whistles, and should maintain constant engine noise levels.
- Radio communications should be the primary source of communication, as opposed to whistle blasts and horns.
- Marine vessels should not pursue seabirds/waterbirds swimming on the water surface and avoid concentrations of birds on the water.
- There should be no access to Coffin Island, including the intertidal zone, by employees and/or equipment. Beaches and wetlands are sensitive habitats, and these habitats shall not be used for construction, operational or decommissioning activities, with the exception of beach clean-up activities, which should be timed to not coincide with sensitive periods for breeding birds.
- Beach clean-ups should be conducted in outer Liverpool Bay (Western Head to West Berlin) but avoid the mid-March to September 30th period.
- Should equipment wash up at these sites during the courtship, nesting, and/or chick rearing seasons of colonial nesters (spring and summer), the Canadian Wildlife Service will be contacted prior to retrieval of equipment.

Farms are expected to comply with the requirements as included in the Materials, Storage Handling and Waste Disposal Plan regarding fuel and chemical storage, household, and hazardous waste as well as feed storage that may affect wildlife through contamination or through the artificial enhanced presence of avian and mammalian predators.

SECTION 8 - Reporting and Training

Farm staff have available to them a copy of this plan. All site staff, as well as management, are responsible for both implementation and compliance of this plan.

Annually all marine farm employees participate in CREW Training which is an in-house developed and delivered session that discusses the day-to-day practices and responsibilities of all employees. Topics covered include Fish Health, Waste Management, Wildlife Interactions, Spill Prevention and Reporting, Escape Prevention and Reporting. Farm staff will be trained in recognizing endangered, threatened, and protected species they may see from their farm and a system for recording and reporting such observations to farm management. A Standard Operating Procedure for Predator Interaction is also included in the Fish Health Management Plan available on each site.

An IMS Incident Record is part of the Cooke Aquaculture Integrated Management System and is to be used to report various incident types, including wildlife interactions. The form is available electronically through Pronto Forms and is also available on SharePoint and hard copy if necessary.

All records of training are recorded in Intalex.

8.1 General Predator Interactions

Due to the environment in which we operate, wildlife interactions will be unavoidable – both neutral and negative. Neutral interactions are those where no wildlife is harmed but may be sighted by employees and been seen as a positive or rewarding experience. Though there is no direct contact, some species may require management notification if the species is listed on a Species at Risk list or other similar list. Negative interactions can be further divided into two subcategories – those that affect the marine farm populations (predators) and those where the wildlife has been impacted (entangled, entrapped, death). Based on historical knowledge, negative interactions will generally identify instances of predator activity and should be noted to determine if there is an increase or decrease in activity. If a predator is persistent or there is the potential for endangerment of employees, deterrence methods may be required. Any negative interaction, including those involving non-predatory species whether intentional or accidental, in addition to those neutral interactions with at risk species, must be reported.

8.2 General Wildlife Interactions

Marine birds and mammals have the greatest likelihood for interactions with marine farms given that they share the same waters and migrate through areas where farms are located. Wildlife may become entangled, entrapped, contaminated, or oiled from gear or chemicals on an aquaculture site. The first step to preventing such emergencies is prevention. Proper installed containment and predator exclusion netting, continually checking nets for integrity and avoiding oil, gas and chemical spills is important.

8.2.1 Entanglement, Entrapment

Birds, mainly gulls, will stand atop the bird stands and bird netting, both as a form of rest and in an attempt to access feed. Occasionally other birds such as crows, herons, among other may be seen but this is generally limited to smolt entry when the fish are small. Birds interested in fish generally lose interest once the fish are larger and as long as the bird nets remain taught. Other birds may be seen as they are passing through to other destinations.

Birds may become entrapped under the bird netting if there are holes in the net or if it is not properly secured. Should a bird become entrapped, employees must roll back the bird net and allow the bird to exit. The bird net must be gathered in a manner that prevents entanglement by neither the bird nor fish while it is pulled back. Once released, the bird net must be repaired, if applicable, and/or properly secured.

Marine mammals and large fishes may enter or entangle themselves within netting or anchor lines, either through forceful entry or accidental entanglement. Should a marine mammal such as a seal enter a cage, the seal should be immediately released by lowering the net to the height of the float pipe to allow the seal to swim out. The seal should be encouraged to leave the cage from the opposite side of the cage from where the net has been dropped. Once removed, the net is to be retied and divers should immediately be contacted to perform a net inspection.

These types of interactions require the submission of a Wildlife Interaction on the IMS Incident Record.

8.2.2 Oiled Birds

If a fuel, chemical or oil spill does occur or is discovered, immediately contact the Coast Guard, and activate the Spill Prevention and Response Plan (Canada) or Spill Prevention, Control and Countermeasure Plan (Maine). If wildlife is not initially affected, efforts should be made to keep wildlife out of the affected area, if possible.

Birds that have come into contact with oil may have exhibit obvious indicators of being oiled, such as oil coating, discolored feathers, or feathers having a wet or ragged appearance. Heavily oiled birds or individuals oiled below the waterline may also appear as though they are sitting low on the water, perhaps struggling to maintain above water. As such, oiled birds are also likely to be intently focused on preening in an attempt to remove the oil, so much so that they may not exhibit a strong flight reaction upon approach. They may also stand or rest on wharves, barges, or vessels with a more solid structure than those that might usually rest on the cages or netting.

DO NOT attempt to capture the bird without first seeking advice as their handling may require the issuance of permits, depending on species. Injured and oiled birds, especially those washed ashore are extremely weak, dehydrated, and often near death. The added stress of attempted capture could cause more harm than good, perhaps even fatality. Should an oiled bird be found, alive or deceased, contact the regional Compliance Manager, or designate and complete an IMS Incident Record. If further actions are required, the regional Compliance Manager or designate will communicate any advice or recommendations provided by the appropriate authorities.

8.3 Canadian Wildlife Service Permit

Migratory birds are protected under the Migratory Birds Convention Act and some species are also protected under the Species at Risk Act (SARA); this protection can extend to the point where even handling these species is not allowed without a Canadian Wildlife Service Permit.

Common sense must prevail in all circumstances and caution must be exercised when dealing with birds. In stressful situations, birds may react with more force to protect themselves. As well, birds can carry diseases and parasites which may be transmitted to humans. If a bird can be easily released from entrapment without handling, this may be attempted by site workers. Employees should not touch birds, regardless of the situation. If an incident cannot be resolved, employees must contact the Compliance Manager or designate and provide information regarding the incident such as the cause of the incident (entanglement, oil spill, etc.), wildlife involved and the location of the incident - good directions and/or coordinates are essential to help experts arrive in time. Canadian Wildlife Services should be contacted, (506)-364-5068 or ec.scfatlpermis-cwsatlpermits.ec@canada.ca, for further direction. A permit may become necessary to handle and transport the bird to a rehabilitation facility. If a bird must be handled, clean work gloves must be worn, and the bird handled with care.

An exception to paragraph 6(b) of the Migratory Birds Regulations is currently in place and the variance will remain in effect until August 20, 2022²¹. Normally a person is not allowed to have in their possession any migratory birds, even if found dead. Under this temporary variance, a person may possess such birds if (and only if) they are in the process of delivering them to authorities for testing. This exception was granted to allow CWS to

²¹ <https://www.canada.ca/en/environment-climate-change/services/migratory-birds-legal-protection/public-notice-allowing-temporary-possession.html>

monitor bird viruses. Once captured, keep the bird in a dark, quiet, warm location and transport to designated location as per the Regulator. DO NOT attempt to feed or clean the bird.

If crews find a dead migratory bird, the Site Manager must be informed and the Compliance Manager or designate contacted. The Compliance Manager or designate will contact the [Canadian Wildlife Health Cooperative](#) at 1-800-567-2033.

8.4 SARA Reporting

Species identified on the Provincial Protected Wildlife factsheets are protected under SARA (Species at Risk Act) and COSEWIC (Committee on the status of Endangered Wildlife in Canada) and have been or could be found in the area of aquaculture sites in Atlantic Canada.

Should you observe wildlife around aquaculture facilities identified under SARA/COSEWIC, special care should be taken to not disturb or harm the species. If able, collect a photograph and submit the details of the sighting on the IMS Incident Record, including location of the sighting. The Compliance Manager or designate will report sighting of these listed species to the species at risk hotline at 1-866-727-3467 or emailed to sightings@speciesatrisk.ca. Should the animal be found in distress, the Compliance Manager or designate will contact the Canadian Coast Guard at 1-800-565-1633.

The IMS Incident Record can be used to report both neutral and negative interactions.

8.5 Endangered Species – Federal and State

If you see a sick, injured, stranded, or dead marine mammal or sea turtle, immediately contact Northeast Marine Mammal and Sea Turtle Stranding and Entanglement Hotline at 1-866-755-NOAA (866-755-6622), or the Maine Marine Animal Reporting Hotline at 1-800-532-9551. A stranded animal is one that is dead on the beach or in the water, one that is alive on land and unable to return to the water and/or in need of medical attention, or a live animal in the water that is unable to return to its natural habitat under its own power or without assistance.

For Federally listed species, the National Oceanic and Atmospheric Administration (NOAA) – National Marine Fisheries Service (NMFS) should be contacted through David Bean, Consultation Biologist/Atlantic Salmon Team via email david.bean@noaa.gov and/or phone 1-207-866-4172.

Allied Whale is authorized by NOAA Fisheries to respond to marine mammal emergencies and strandings, covering the area from Rockland, Maine north to the Canadian border.²² To report a marine mammal stranding contact Allied Whale at 1-207-288-5644 (office) or 1-207-266-1326 (cell).

Endangered and threatened marine species are listed under Maine's Marine Endangered Species Act or ESA. The Maine Department of Marine Resources (MDMR) has responsibility for these species. For State listed species, the MDMR, Aquaculture Division should be contacted through Marcy Nelson, Aquaculture Program Director via phone (207) 441-4681.

²² <https://www.coa.edu/allied-whale/marine-mammal-strandings/>

APPENDICES

All Included in Master or Online Version Only
Applicable Regional Documents are Included in Site Reference Binders

Agrilaser® Handheld User Manual
CAF Safe Operation Agreement: Bird Control Group Agrilaser® Handheld 200/500

Maine

USFWS: Maine Coastal Islands National Wildlife Refuge Complex

New Brunswick

NB Protected Wildlife ID Chart

Newfoundland

NL Protected Wildlife ID Chart

Nova Scotia

NS Protected Wildlife ID Chart

END OF DOCUMENT



Agrilaser® Handheld

User manual EN

Mode d'emploi FR

Benutzerhandbuch DE

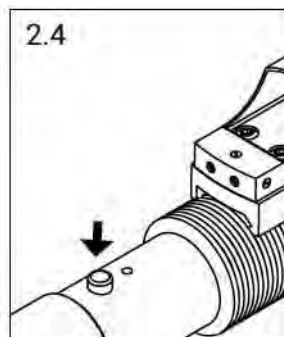
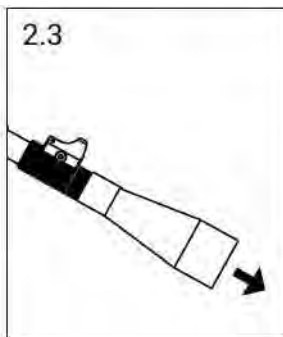
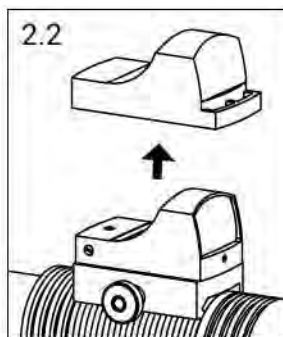
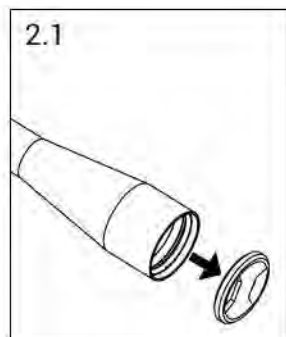
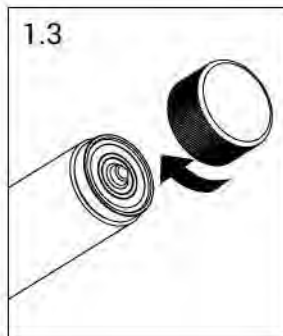
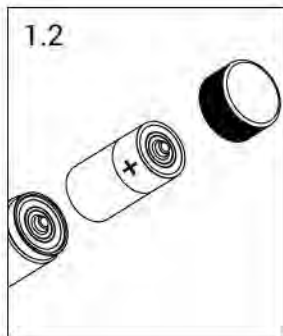
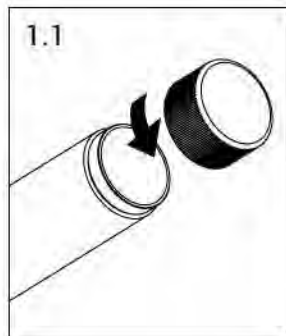
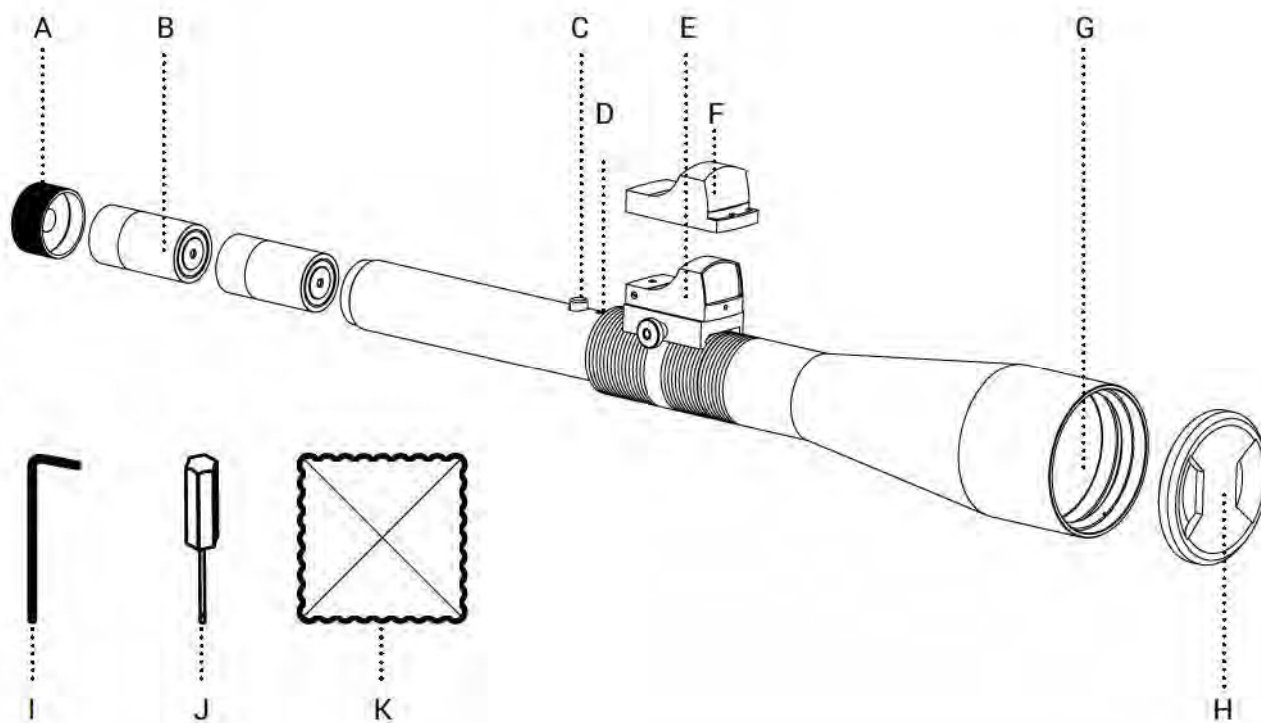
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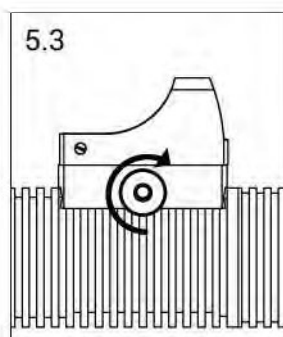
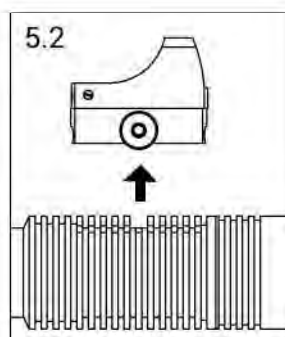
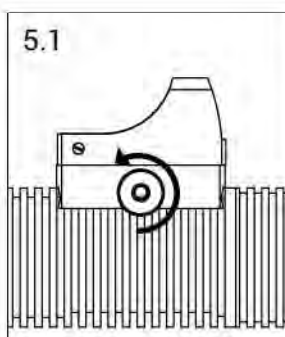
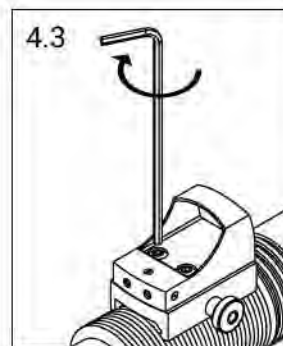
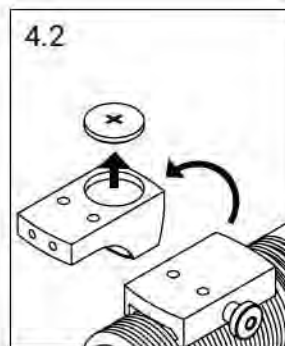
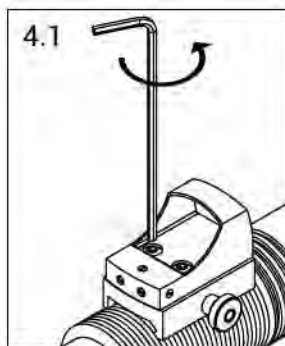
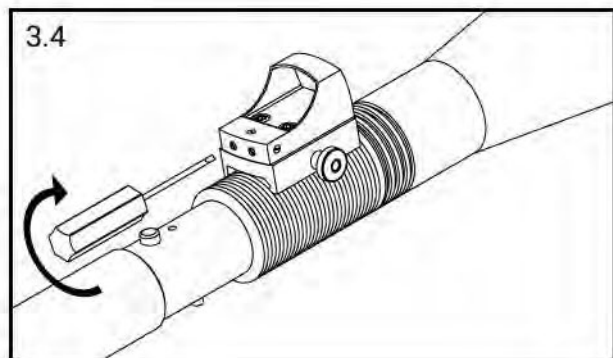
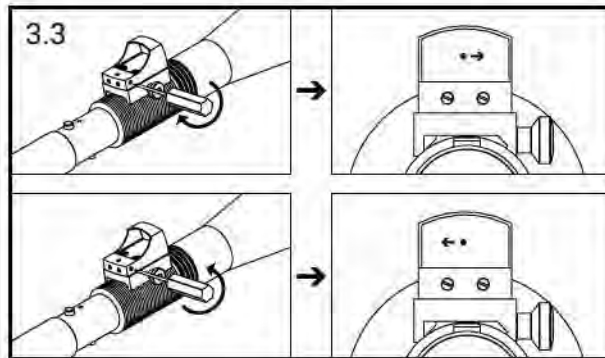
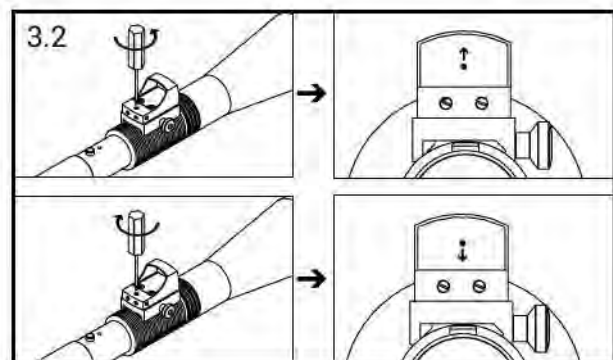
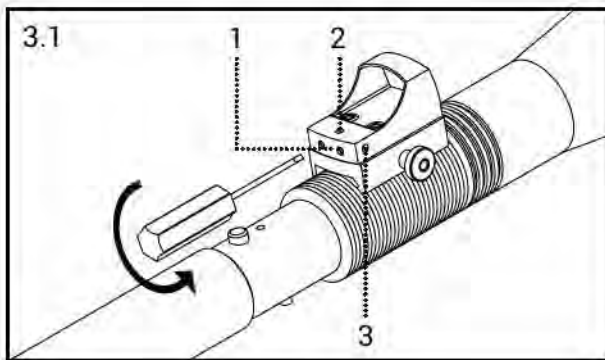
Manual de usuario ES

Manual do usuário PT

Руководство пользователя RU







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CAUTION - USE OF CONTROLS OR
ADJUSTMENTS OR PERFORMANCE OF
PROCEDURES OTHER THAN THOSE
SPECIFIED HEREIN MAY RESULT IN
HAZARDOUS RADIATION EXPOSURE

ENGLISH

Explanation of general view

A	Screw cap	G	Laser aperture
B	C battery (LR14)	H	Lens cap
C	ON/OFF button	I	Hex key
D	Output indicator	J	Screw driver
E	Aiming sight	K	Cleaning cloth
F	Protection cap		

Table of contents

Technical specifications	6
Safety instructions	7
Functional use	7
Aiming sight	9
Maintenance	9
Warranty	10
Spare parts	11
Troubleshoot	11

Thank you for your purchase of the Agrilaser® Handheld.

Agrilaser offers silent, effective and easy to use bird control products. Our patented optical technology is optimized for long distance bird repelling. Birds perceive the laser beam as an approaching physical danger and fly away in search for safer grounds. After consistent use birds will perceive the area as unsafe and will not return.

Package contents:

- 1x Agrilaser Handheld
- 1x Lens cap
- 2x LR14 battery
- 1x Aiming sight
- 1x Protection cap for aiming sight
- 1x Hex screw
- 1x Screw driver
- 1x Cleaning cloth
- 1x Storage case

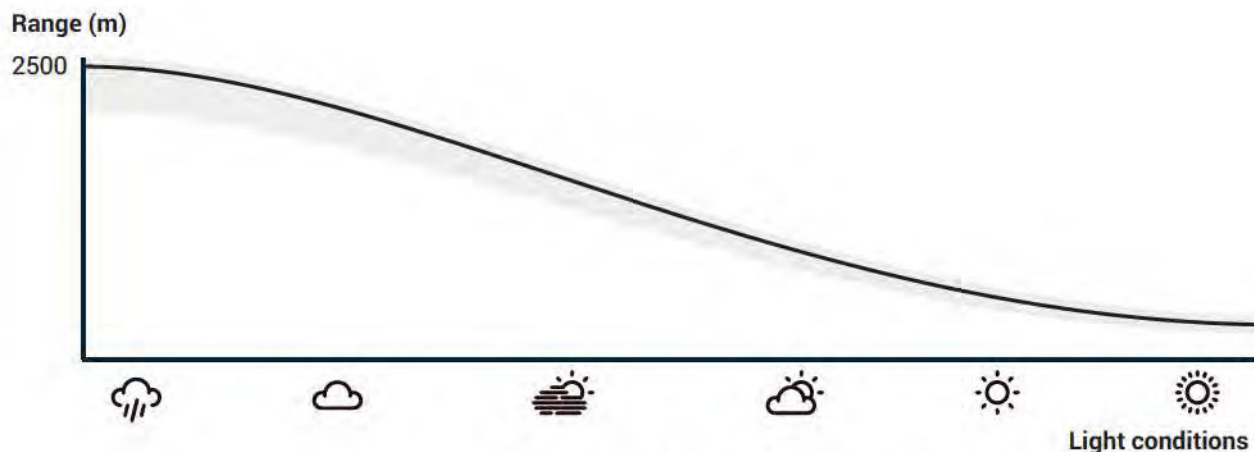


The "CE" mark indicates that this product complies with the applicable European Directives which relate to health, safety, environmental and customer protection.

Technical specifications


Agrilaser® Handheld

Laser class	2M (classified according to NEN EN 60825-1:2007)
Laser beam color	Green
Service life laser source (during normal operating conditions)	5,000 h
Power source	Agrilaser Handheld: 2x C battery (LR14) Aiming sight: 1x CR2032 battery
Power input	3 VDC – 3.6 VDC
Energy consumption	4 W
Dimensions	424 (16.7) x 66 (2.6) x 83 (3.3) mm (in) (LxWxH)
Weight	760 g (27 oz)
Operating temperature	10 °C to 35 °C (50 °F to 95 °F)
Storage temperature	-10 °C to 50 °C (14 °F to 122 °F)





* actual range of effective bird repelling depends on environmental conditions

Safety instructions

 **WARNING:** Carefully read all safety warnings and all instructions. Save all safety warnings and all instructions for future reference.

Agrilaser Handheld

 **WARNING:** Staring into the beam or viewing the laser output with certain optical instruments designed for use at a distance (for example, telescopes or binoculars) may pose an eye hazard.

 **WARNING:** The laser beam of the Agrilaser Handheld could cause dazzle or after images, particularly under low ambient light conditions. This may have indirect safety implications if experienced while performing safety-critical operations.

 **CAUTION:**

- The Agrilaser Handheld should be used by adults only.
- The Agrilaser Handheld has no serviceable parts inside.
- To reduce risk of injury, only use the supplied batteries.
- Operate only in undamaged condition. Use of the product when damaged may result in exposure to hazardous laser radiation.

The safety labels as shown in figure 6.1 can be found on the bottom side of the Agrilaser Handheld body.

Contact your local Agrilaser dealer for any questions related to product safety.

Batteries


 **CAUTION:**

- To prevent product malfunction, always insert batteries in correct orientation.

- Do not short circuit batteries.
- Misuse or abuse of batteries may result in leakage, burns, fire or explosion/disassembly causing personal injury or damage to other devices.
- Eye contact with battery contents may cause severe irritation. If battery is leaking and material contacts the eye, flush thoroughly with copious amounts of running water for 15 minutes. Seek immediate medical attention.
- Skin contact with battery contents may cause irritation. If battery is leaking and material contacts the skin, remove any contaminated clothing and flush exposed skin with copious amounts of running water. If irritation, injury or pain persists, seek medical attention.
- Inhalation of vapors or fumes released due to a large number of leaking batteries may cause respiratory and eye irritation. High concentration may cause central nervous system effects including headache, dizziness and nausea.
- Do not swallow batteries. Irritation to the internal/external mouth area, may occur following exposure to a leaking battery. If battery is leaking, contents may be irritating to respiratory passages. Move to fresh air. If irritation persists, seek medical attention.
- In case of fire, use dry chemical, alcohol foam, water or carbon dioxide as appropriate for the surrounding fire. For incipient fires, carbon dioxide extinguishers are more effective than water. Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing. Fight fire from a distance or protected area. Cool fire exposed batteries to prevent rupture. Use caution when handling fire-exposed batteries as they may explode in heat of fire.

Functional use

Preparing for use

 **CAUTION:**

- Point the laser towards to ground when inserting batteries.

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- Do not drop. The product may malfunction if subjected to strong shocks or vibration.
- Avoid sudden changes in temperature: Sudden changes in temperature, such as those that occur when entering or leaving a heated building on a cold day, can cause condensation inside the device. To prevent condensation, keep the device in a storage box or plastic bag before exposing it to sudden changes in temperature.

Perform the following steps to replace the batteries of the Agrilaser Handheld:

1. Turn the end cap anti-clockwise to open the battery compartment (figure 1.1).
2. Insert the two batteries with the positive side facing the end cap (figure 1.2). Make sure the batteries are charged.
3. Turn the end cap clockwise to close the battery compartment (figure 1.3).



Only disperse birds with landowner's permission.



Never point the laser device towards aircraft, windows and vehicles.



Never point the laser device at humans.



Never point the laser device towards water or reflective surfaces such as mirrors, windows and metallic objects.

Using the Agrilaser® Handheld

CAUTION:

- The Agrilaser Handheld is a handheld laser device intended for bird repelling purposes only.
- When using the Agrilaser Handheld, always take into account the safety precautions as described in this document.
- The Agrilaser Handheld is not suited for continuous use. Use for short repelling actions only.

Perform the following steps to prepare the Agrilaser Handheld for active bird repelling:

1. Remove the lens cap (figure 2.1)
2. Remove the protection cap to activate the aiming sight (figure 2.2).

Important: To increase battery life, always replace the protection cap of the aiming sight after using the Agrilaser Handheld.

3. Point the Agrilaser Handheld towards the ground (figure 2.3).
4. Switch on the Agrilaser Handheld by pushing the ON/OFF button (figure 2.4).
5. Project the laser dot on the ground in front of you and slowly move the dot towards the birds. Make sure no reflective objects, vehicles or people are between you and the birds. The Agrilaser Handheld should not be used like a gun, i.e. point and shoot.

Weather conditions: The Agrilaser Handheld is most effective during sunrise, sunset and overcast, rainy or foggy weather conditions. During bright weather conditions, make sure that the birds are positioned between the user and the sun. If not, bright sunlight could inhibit the repelling action.

Rain: Make sure the Agrilaser Handheld is kept out of the rain. Remove any moisture with a dry cloth.

Protected species: : Local regulations may prohibit the deterrence of certain (protected) bird species. Always consult local legislation before using the Agrilaser Handheld.

Aiming sight

Aligning the aiming sight

Applicable when the red dot is not aligned with the laser beam.



CAUTION: Do not stare into laser beam while aligning the aiming sight.

Step 1: Preparing for alignment

Unlock the two locking screws (number 1 on the aiming sight) at the back of the aiming sight (figure 3.1). For each locking screw, execute three full counter-clockwise rotations with the screwdriver.

Step 2: Vertical alignment.

1. Switch on the laser and project the beam on a distant object. Make sure that the green dot is visible through the aiming sight.
2. Rotate the adjustment screw (number 2 on the aiming sight) in clockwise direction to move the red dot downwards and vice versa (figure 3.2).

Continue to the horizontal alignment after the red dot is correctly aligned in vertical position.

Step 3: Horizontal alignment.

1. Project the beam on a distant object and make sure that the green dot is visible through the aiming sight.
2. Rotate the adjustment screw (number 3 on the aiming sight) in clockwise direction to move the red dot to the left and vice versa (figure 3.3).

Step 4: Securing new position

Fasten the two locking screws (number 1 on the

aiming sight) in clockwise direction to secure the new alignment position (figure 3.4). Do not use excessive force.

Replacing the battery of the aiming sight

Applicable when the red dot is not visible.

1. Unscrew the two hex screws using the hex key (figure 4.1).
2. Remove the upper compartment of the aiming sight from its base to replace the CR2032 battery (figure 4.2).
3. Place the upper compartment in original position and fasten the hex screws using the hex key (figure 4.3).

Replacing the aiming sight

Applicable when the aiming sight is defective.

1. Unscrew the locknut by hand (figure 5.1).
2. Remove the aiming sight from the body of the Agrilaser Handheld (figure 5.2).
3. Place the aiming sight on the body of the Agrilaser Handheld and fasten it by hand (figure 5.3).

Maintenance

Cleaning

Body (Agrilaser Handheld and aiming sight)

Use a soft dry cloth to remove dust and dirt from the Agrilaser Handheld and the aiming sight. Do not use any liquids.

Important: Dust and other foreign matter inside the Agrilaser Handheld may cause damage not covered under warranty.

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Lens (Agrilaser Handheld and aiming sight)

The lenses are easily damaged. Remove dust and dirt with a soft dry cloth. To remove fingerprints and other stains, apply a small amount of lens cleaner to a soft cloth and clean with care.

Storage

When the Agrilaser Handheld is not used for an extended period, replace the lens cap and remove the batteries. To prevent mold or mildew, store the Agrilaser Handheld in a dry, well-ventilated area.

Do not store your Agrilaser Handheld in a location that is:

- poorly ventilated or subject to humidity's of over 60%.
- next to equipment that produce strong electromagnetic fields, such as televisions or radios
- exposed to temperatures above 65°C (149°F) or
- below -20°C (-4°F).

Store batteries in the original storage box together with the Agrilaser Handheld.

Disposal



Do not dispose of the Agrilaser Handheld, aiming sight or batteries together with household material. Recycle in accordance with local regulations.



Always recycle batteries.

Warranty



CAUTION: Disassembly attempts of the product voids warranty.

The Agrilaser Handheld is developed and produced according to the highest quality standards. Should you encounter any problems with your model, please carefully read this manual. If you encounter defects, please contact your local Agrilaser dealer. Should any defect arise as a result of production faults, free repair or replacement is guaranteed. The Agrilaser Handheld has a warranty period of 12 months, starting on the date of purchase. In case of replacement, the warranty period of the original product will remain valid.

Warranty conditions

The warranty is valid only if the Agrilaser Handheld is used according to the instructions as presented in the user manual. In addition, warranty only applies if a valid receipt is presented, showing the date of purchase, the name of dealer and the product name.

The warranty is invalid if:

- Water damage or damage due to falling or jolting occurred.
- The serial number has been removed.
- Any repairs have been carried out by unauthorized individuals.
- Any defects occurred as a result of misuse or use in environments that are not prescribed.
- The defect is due to wear of replaceable parts, such as batteries.
-

Spare parts

The following parts are available as spare parts for the Agrilaser Handheld. For requests of spare parts contact your local Agrilaser dealer.

Spare parts
Agrilaser Handheld battery (LR14 battery)
Screw cap
Lens cap
Aiming sight
Protection cap (for aiming sight)
Hex key
Screw driver
Cleaning cloth

Troubleshoot

Agrilaser Handheld

Check the following if the Agrilaser Handheld appears non-functional:

- Is the ON/OFF button activated?
- Is the lens cap removed?
- Are the batteries charged?
- Are both batteries inserted in correct orientation (as shown in figure 1.2)?

Aiming sight

Check the following if the aiming sight appears non-functional:

- Is the battery not empty?
- Is the protection cap removed?
- Are all screws sufficiently tightened?

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Explication de la vue globale

A	Capuchon à vis	G	Ouverture laser
B	Pile C (LR14)	H	Capuchon d'objectif
C	Bouton Marche/Arrêt	I	Clé hexagonale
D	Voyant de sortie	J	Tournevis
E	Viseur	K	Chiffon de nettoyage
F	Capuchon de protection		

Table des matières

Spécifications techniques	13
Consignes de sécurité	14
Utilisation fonctionnelle	15
Viseur	16
Entretien	17
Garantie	17
Pièces de rechange	18
Dépannage	18

Merci d'avoir acheté l'Agrilaser® Handheld.

Agrilaser offre des produits de dissuasion d'oiseaux silencieux, efficaces et faciles d'utilisation. Notre technologie optique brevetée est optimisée pour la dissuasion d'oiseaux à distance. Les oiseaux perçoivent le faisceau laser comme un danger physique en approche et s'envolent pour trouver un endroit plus sûr. Après une utilisation persistante, les oiseaux considéreront cet endroit comme peu sûr et ne reviendront pas.

Contenu du colis :

- 1x Agrilaser Handheld
- 1x capuchon d'objectif
- 2x piles LR14
- 1x viseur
- 1x capuche de protection du viseur
- 1x vis hexagonale
- 1x tournevis
- 1x chiffon de nettoyage
- 1x boîtier de rangement



La marque « CE » indique que ce produit est conforme aux directives européennes en vigueur qui ont trait à la santé, la sécurité, l'environnement et la protection des clients.

Thank You





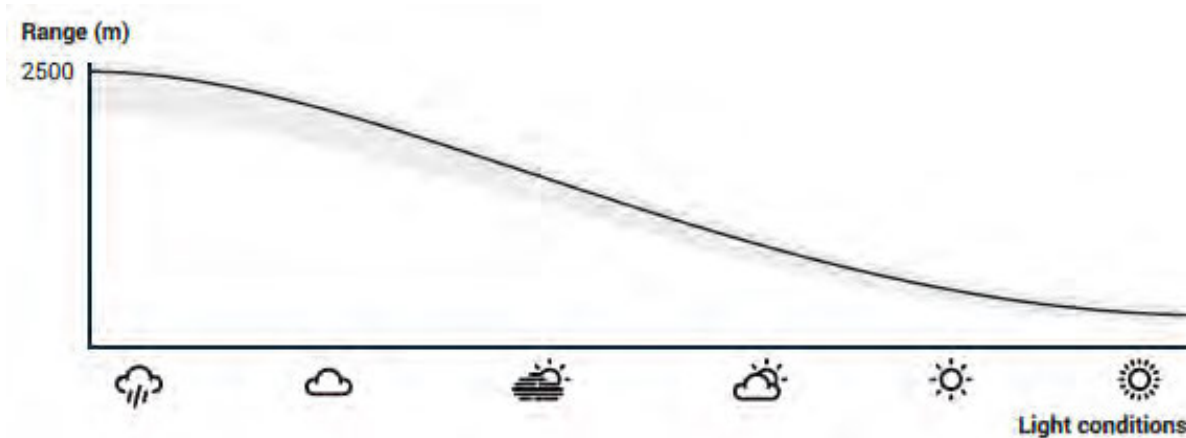
Safe Operation Agreement: Bird Control Group Agrilaser® Handheld 200/500

Background

The Agrilaser® Handheld 200 and Handheld 500 are products developed by the Bird Control Group used as an active control measure to discourage birds from landing on our cages. This product requires responsible safe handling.



The beam produced from the Agrilaser® Handheld 200/500 is classified as a 3B Laser with an effective range of 2,500m. Birds see the laser beam differently than humans and see the beam as a physical danger. The goal is that after consistent use, the birds will perceive the farm as unsafe and will not return. Range of the laser is highly dependent upon weather conditions, with the longest range seen on dark or cloudy days.



Source: Bird Control Group Agrilaser® Handheld Manual)_EN V.1.0

Safe Operations

This product is only to be used as a visual deterrent to discourage birds from landing on cages and nets. Prior to use, ensure that you have read and understood the user manual, are familiar with the local regulations and be aware of your surroundings. This product is classed as a Class 3B Laser and as such is subject to the following non-permissible actions, warnings and cautions:

Non-Permissible Actions:

- **Never** project the laser device towards **Aircraft, Vessels, or Vehicles.**
- **Never** project the laser device at **Humans.**
- **Never** project the laser device into the **“Infinite Sky”/Horizon.**
- **Never** project this laser device towards reflective surfaces such as **Mirrors, Windows, or Metallic Objects.**

Warning:

- Avoid Direct Eye exposure to the laser beam. Direct eye exposure or exposure to direct reflections can result in serious eye damage. Diffuse reflections are considered safe.
- Viewing the laser output with optical instruments designed for use at a distance (For example, telescopes, or binoculars) may pose an eye hazard.
- This Laser product is only to be used by trained personnel in a **controlled environment.**
- The Laser Beam of the handheld could cause dazzle or after images, particularly under low ambient light conditions. This may have indirect safety implications if experienced while performing safety-critical operations.
- Only operate this product in undamaged condition. Use of this product when damaged may result in in exposure to **hazardous laser radiation.**

Caution:

- To operate this laser safety training is required.
- The handheld should be used by responsible adults only.
- The handheld should be used for bird repelling only.
- The handheld has no serviceable parts inside.
- To reduce the risk of injury, use only the supplied battery.

Acknowledgement

By signing below, I acknowledge that I have read and understand this Safe Operation Agreement in its entirety. I further agree to read and understand the user manual of the Handheld 200/500 prior to its use at my site(s).

Please Print Full Name	Inventory Control Verification
Signature	Date Unit Given
Date Agreement Signed	Date Returned

Maine Coastal Islands National Wildlife Refuges
P.O. Box 279 (Water Street)
Milbridge, ME 04658
207/546 2124

P.O. Box 1735 (9 Water Street)
Rockland, ME 04841
207/594 0600

Hearing-impaired visitors may call the Maine Relay Center:
1 800/457 1220 (voice) or 1 800/437 1220 (TDD)

U.S. Fish & Wildlife Service
1 800/344 WILD
<http://www.fws.gov>

September 2007



U.S. Fish & Wildlife Service

680

Maine Coastal Islands

*National Wildlife
Refuges*



Strung along the Maine coast like a strand of pearls, the islands of Maine Coastal Islands National Wildlife Refuges protect precious habitat for nesting seabirds, wading birds, and bald eagles. The refuge's mainland units complement the offshore gems by supporting migratory songbirds, shorebirds, and waterfowl.



Conserving the Nature of the Coast



This blue goose, designed by J.N. "Ding" Darling, has become a symbol of the National Wildlife Refuge System.

The Maine Coastal Islands National Wildlife Refuges span over 200 miles of Maine coastline and contain 49 offshore islands and four coastal parcels, totaling more than 8,000 acres. The refuge complex includes five national wildlife refuges — Petit Manan, Cross Island, Franklin Island, Seal Island, and Pond Island. The U.S. Fish and Wildlife Service manages the refuge complex as part of the National Wildlife Refuge System.

The Service's primary focus at Maine Coastal Islands is colonial seabird restoration and management. Refuge islands provide nesting habitat for common, Arctic, and endangered roseate terns, Atlantic puffins, razorbills, black guillemots, Leach's storm-petrels, laughing gulls, and common eiders. Over the last 25 years, the Service has worked to reverse the decline in these birds' populations. As a result, many species have returned to islands where they nested historically.

In addition to seabirds, wading birds and bald eagles nest on refuge islands. The mainland divisions provide habitat for songbirds, shorebirds, and waterfowl, as well as opportunities for bird watching and hiking.

Bald eagle

cover and facing photo:
Bill Silliker, Jr. ©

photo: Maine Dept.
of Inland Fisheries &
Wildlife



Seabird Struggles

Seabirds have always relied on Maine's offshore islands as havens for raising their young. Small, unforested, rocky islands provide a setting free of mammalian predators such as foxes, coyotes, and raccoons. Flying distance from the mainland discourages avian predators such as great horned owls. The cold waters surrounding the islands hold an abundant supply of fish for adults and young alike.



Black guillemots

Native Americans have used the coast's natural resources for more than 4,000 years. The Red Paint people camped on offshore islands in the summer and fished the deep ocean waters. Although they hunted seabirds and their eggs, they used sustainable methods, limiting harvest to certain islands and hunting any one colony once every three years.

Europeans began settling the islands in the 1600s, farming and raising sheep and hogs. The livestock disturbed nesting seabirds and trampled their habitat. The people hunted the birds and collected their eggs. In the late 1800s, the fashion industry posed an additional threat to the birds' existence. Women's hats were decorated with feathers. Egrets, herons, and terns were especially popular and, therefore, most harmed by the trend. At the start of the 20th Century, most seabirds in the Gulf of Maine were on the brink of extinction.

Concern for the future of all birds led to passage of the Migratory Bird Treaty Act in 1918. The Act protects migratory birds, their nests, and their eggs. At about the same time, trains and automobiles replaced boats as preferred forms of transportation. People relocated to the mainland, easing pressure on seabird habitat. Common and Arctic tern populations rebounded, reaching a high of almost 16,000 pairs along the Maine coast in

1940.

682

The recovery was short-lived, however. During the mid-1900s, the spread of open landfills along the coast and an increase in fishery waste provided easy pickings for herring and great black-backed gulls. These birds nest earlier than terns, claiming prime habitat and relegating terns to inferior nest sites. Some gulls also prey on tern eggs and chicks. The artificial food sources led to an explosion in gull populations. By 1977, the tern population in the Gulf of Maine had declined to roughly 5,000 nesting pairs.



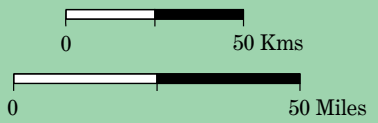
Common terns

Seabird Restoration

Between 1972 and 1980, the refuges in the Maine Coastal Islands National Wildlife Refuge were established for the protection of migratory birds, principally colonial nesting seabirds. The Service has focused on restoring terns because their populations were particularly low. The roseate tern, a federally endangered species, prefers large colonies of common or Arctic terns in which to nest. Therefore, saving this species requires assisting the other two.

To restore terns to an island, it must first be made suitable for the birds again. This requires discouragement of herring and great black-backed gulls. In some cases, human presence on the island during the start of the gull nesting season is enough. Small populations of gulls can be controlled

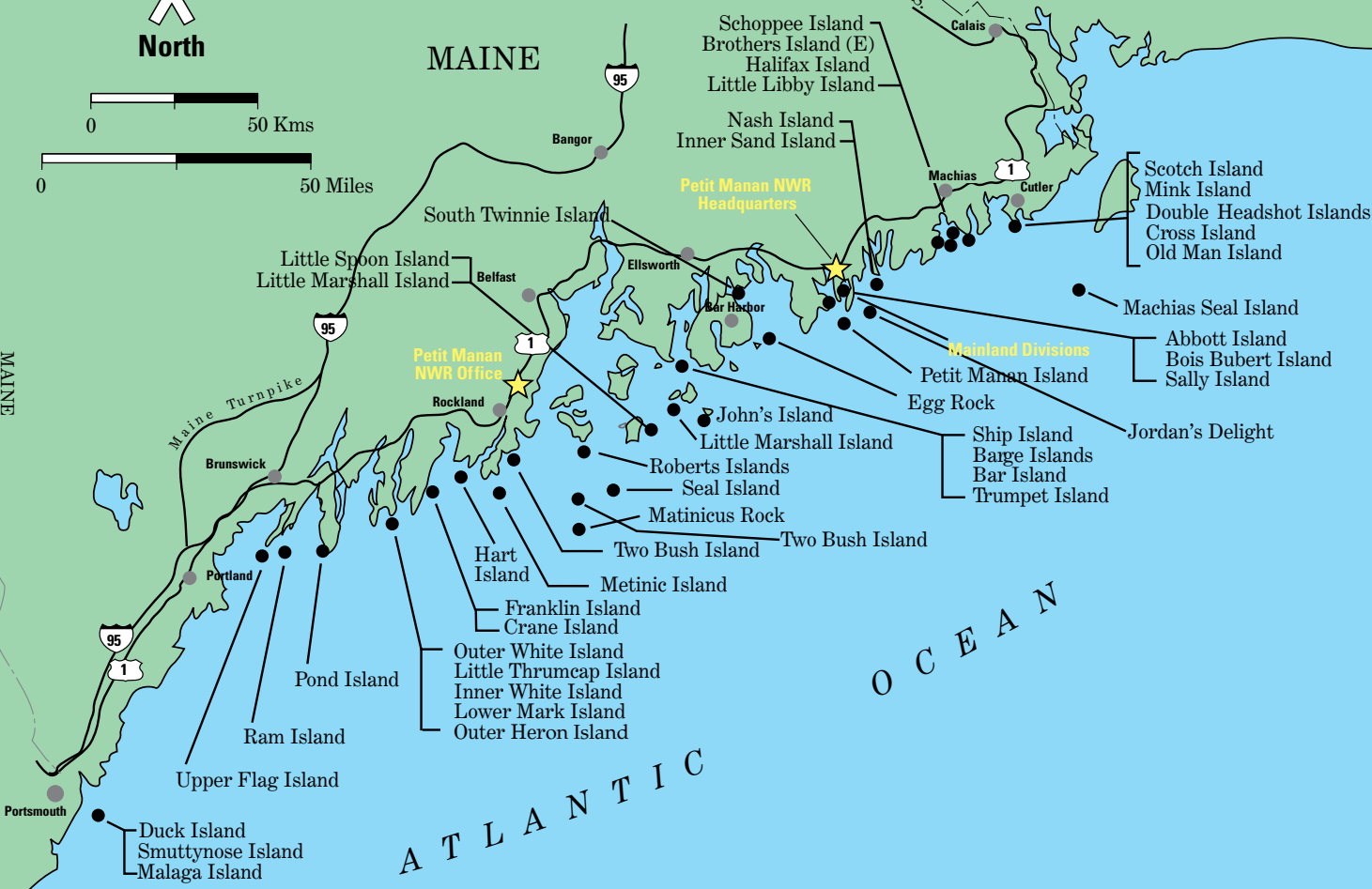
683 Maine Coastal Islands *National Wildlife Refuges*



NEW HAMPSHIRE
MAINE

MAINE

CANADA
U.S.



Schoppee Island
Brothers Island (E)
Halifax Island
Little Libby Island

Nash Island
Inner Sand Island

Petit Manan NWR
Headquarters

Scotch Island
Mink Island
Double Headshot Islands
Cross Island
Old Man Island

South Twinnie Island
Little Spoon Island
Little Marshall Island

Petit Manan NWR
Office

Island Divisions

Machias Seal Island
Abbott Island
Bois Bubert Island
Sally Island

Rockland
Brunswick

Petit Manan Island
Egg Rock

Jordan's Delight

John's Island
Little Marshall Island
Roberts Islands
Seal Island
Matineus Rock

Ship Island
Barge Islands
Bar Island
Trumpet Island

Hart Island
Metinic Island
Franklin Island
Crane Island

Outer White Island
Little Thrumcap Island
Inner White Island
Lower Mark Island
Outer Heron Island

Pond Island
Ram Island
Upper Flag Island

Portsmouth
Duck Island
Smuttynose Island
Malaga Island

A T L A N T I C
O C E A N

Petit Manan National Wildlife Refuge: Mainland Divisions



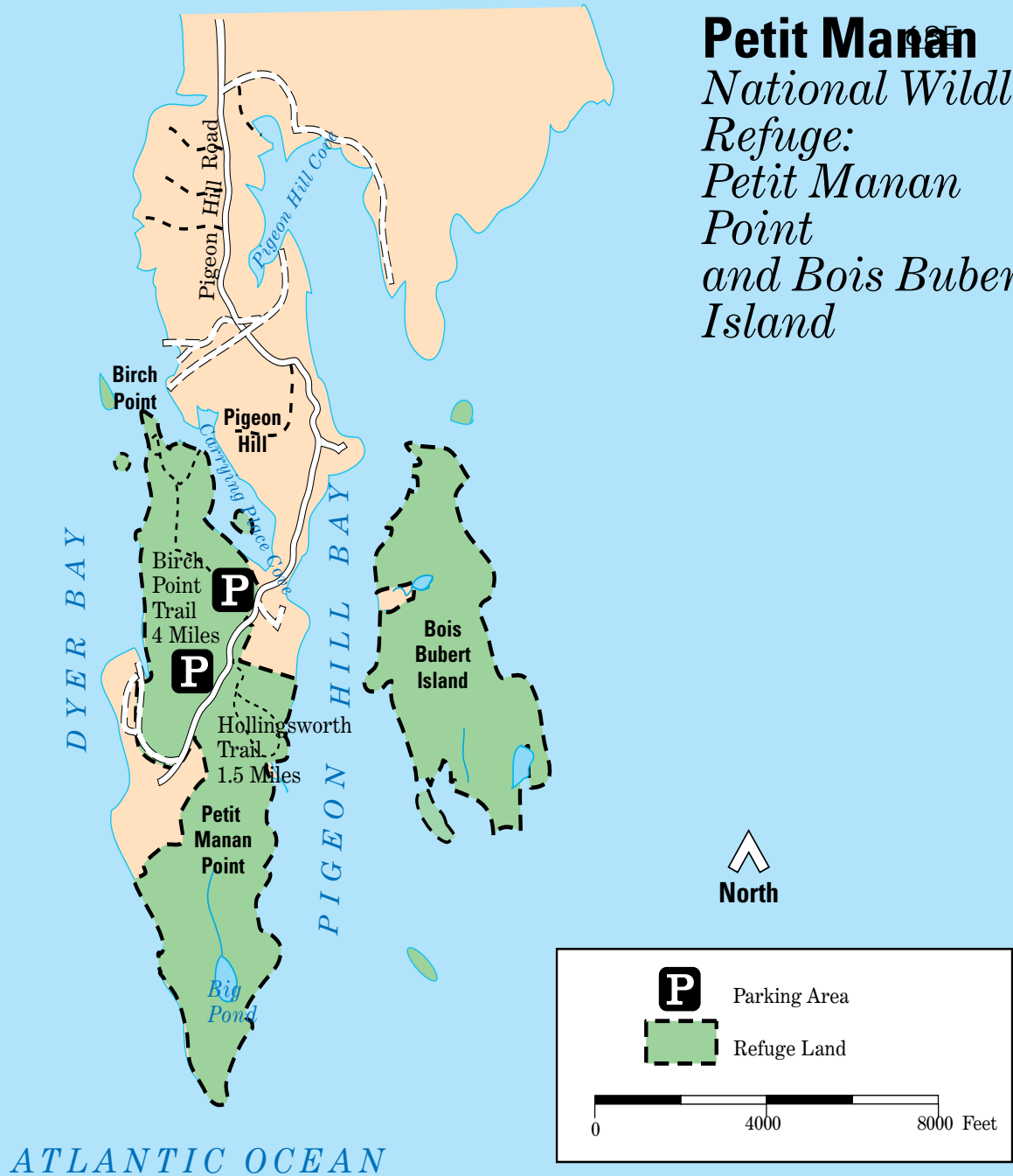
--- Mainland Divisions

--- Other Refuge Lands

⚓ Lighthouse

⚓ Petit Manan Island

Petit Manan National Wildlife Refuge: Petit Manan Point and Bois Bubert Island



through egg and nest destruction and noise-makers. If a gull colony has grown too large, these techniques may be ineffective. Lethal means, including limited shooting and the use of an avicide, may be necessary.

If terns have recently abandoned an island, they may return rapidly once the gulls are gone. However, in many cases, it has been decades since terns nested on an island. To entice them back, the Service uses sound systems playing recordings of a tern colony and tern decoys scattered in suitable nesting habitat. This method has been highly effective on several islands within the Gulf of Maine.

Tern restoration began in 1984 on Seal and Petit Manan islands, which now support large colonies of common and Arctic terns. Roseates have returned to Petit Manan. More recent restorations have occurred on Pond, Metinic, and Eastern Brothers islands. The goal is to establish tern colonies on numerous refuge islands. This will ensure that a singular catastrophic event such as disease, an oil spill, or a hurricane, will not wipe out a species.

Other colonial nesting seabirds have benefited from tern restoration efforts. Atlantic puffins, black guillemots, laughing gulls, Leach's storm-petrels, and common eiders have recolonized some islands. Petit Manan Island now hosts all of these species during the nesting season. Razorbills, a relative of the extinct great auk, are at the southern end of their range along the Maine coast and nest on three refuge islands: Seal, Matinicus Rock, and Old Man. Herring and great black-backed gulls and double-crested cormorants breed on some refuge islands.

A "Bed and Breakfast" for the Birds

In addition to seabirds, refuge islands provide habitat for raptors, wading birds, shorebirds, and songbirds. Some of the forested islands, including Outer Heron, Sally, Bois Bubert, and Mink, have active bald eagle nests. Outer White Island supports a black-crowned night heron rookery. Migrating peregrine falcons stop on Seal Island to hunt and rest. Warblers such as the bay-breasted and blackpoll, and shorebirds, including ruddy turnstones and semipalmated plovers, rely on the islands as stepping stones on their long trips north and south.

Tern decoys



Roseate tern

Points of Light

Eight refuge islands possess historic light houses. For more than a century, light keepers operated beacons on Petit Manan, Franklin, Pond, Nash, Two Bush, and Libby islands and Matinicus and Egg rocks to ensure safe travel for passing vessels. With the advent of underwater electric cables and solar power, automation of the lights became possible. The islands were transferred to the Service from the Coast Guard. The Coast Guard maintains all of the lights except Nash Island Light, which no longer functions. All are on the National Register of Historic Places, with the exception of Two Bush Island Light.



Petit Manan Island Light

Meanwhile, On the Mainland

The refuge's four mainland properties are located in Hancock and Washington counties. Upland areas are characterized by spruce-fir forests with some mixed hardwoods. The 2,195-acre Petit Manan Point Division, in Steuben, also includes jack pine stands, coastal raised heath peatlands, blueberry barrens, old hayfields, freshwater and saltwater marshes, cedar swamps,

granite shores, and cobble beaches. The Gouldsboro Bay Division, in Gouldsboro, protects 623 acres, including a large tidal saltmarsh and mudflat. The 1028-acre Sawyer's Marsh Division lies at the head of a broad saltmarsh in Milbridge, just north of Petit Manan Point.

The Corea Heath Division is a 431-acre raised coastal peatland situated on the Corea peninsula in Gouldsboro.

A Seasonal Home

Neotropical migratory songbirds thrive in the forests of the mainland divisions. These birds breed in North America and winter in the Caribbean, Mexico, and Central and South America. Recently, populations of species such as the American redstart, Swainson's thrush, and song sparrow, have declined due to habitat loss throughout their migratory routes.



Sid Bahrt

Yellow warbler

The Service monitors songbird populations by conducting surveys at the height of the breeding season each year. Experts walk designated routes, stopping at set intervals to identify and count birds by sight and song. Other studies use banding to identify individuals and track their survival and productivity.

The saltmarshes and mudflats of the mainland divisions attract waterfowl, wading birds, and shorebirds. Black ducks, great blue herons, and American bitterns ply the waters of the saltmarshes. Semipalmated sandpipers, short-billed dowitchers, greater and lesser yellowlegs, and dunlins probe the mudflats for invertebrates.

During fall migration, the 80-acre Cranberry Flowage on Petit Manan Point is filled with over 4,000 ducks. Black ducks, green-winged teal, and mallards rest and feed on wild rice

in preparation for the long flight south. Long-tailed duck, surf, black, and white-winged scoters, common goldeneyes, and common eiders winter in coastal waters.

The former pastures and blueberry fields on Petit Manan Point provide nesting habitat for grassland birds such as bobolinks and savannah sparrows. In the spring, American woodcock use the clearings for their unique courtship displays. Whimbrels stop off here during their fall migration from the Arctic tundra to the southern United States. The Service maintains open areas through periodic mowing and controlled burning.

Some species call the refuge's mainland "home" year-round. Resident wildlife include ruffed and spruce grouse, white-tailed deer, bobcats, snowshoe hares, porcupines, coyotes, and raccoons.

A Group Effort

Partnerships between the Service and other public and private organizations are key to the success of seabird restoration efforts at the refuge. Since 1984, refuge staff have worked closely with representatives from

Razorbill



Linda Welch/USFWS



Linda Welch/USFWS

Atlantic Puffin

the Maine Department of Inland Fisheries and Wildlife, College of the Atlantic, National Audubon Society, Maine Audubon Society, and Canadian Wildlife Service in the Gulf of Maine Seabird Working Group. The Group guides restoration efforts on Maine's offshore islands, including those in the refuge.

Since the early 1980s, the National Audubon Society has worked with the Service to restore seabirds to Seal Island, located 21 miles southeast of Rockland, Maine. Through its Project Puffin, the Society successfully re-introduced Atlantic puffins to the island by transporting chicks from Newfoundland, Canada, and hand-raising them. Puffins now nest on the island, after a 150-year absence. Seal Island also supports the largest tern colony in the Gulf of Maine, with 2,000 pairs. National Audubon is working with the Service to manage and restore seabirds on Matinicus Rock and Pond Island.



Tom Goette/USFWS

Old Man Island

The Service works with private organizations at the local, state, and national levels to add land to the refuge. These groups serve a vital function by purchasing property from willing sellers and protecting it until it can be acquired by the Service. Through conservation easements, refuge staff help landowners manage their properties for wildlife.

Where You Come In

Wildlife comes first on national wildlife refuges. All human activities must be compatible with the needs of wildlife. Six priority public uses are encouraged when they do not interfere with the individual refuge's mission. These are: hunting, fishing, wildlife observation and photography, environmental education, and interpretation.

The refuge offers excellent opportunities for bird watching and hiking. Foot trails wind through a variety of habitats, from spruce-fir woodlands to grasslands to freshwater and saltwater marshes to mudflats. On Petit Manan Point, the Hollingsworth Trail is a 1.5-mile



Hollingsworth Trail - Petit Manan Point

loop with views of heaths and cobble beaches. Interpretive signs offer insight into refuge wildlife, habitats, and management. The Birch Point Trail (four miles round trip) begins in a blueberry field and leads to the saltmarshes of Dyer Bay, passing through a mixed-wood forest. A hiking trail on the Gouldsboro Bay Division is under development.

Cross, Scotch, Halifax, and Bois Bubert islands are open to visitors all year. Seal Island and Duck

Island are closed at all times. The remaining refuge islands are open from September 1 through March 31 and closed during the seabird nesting season, April 1 - August 31. Commercial tour boats provide views of nesting seabirds on Petit Manan and Machias Seal islands.



USFWS

Parts of the refuge are open to hunting. Contact the refuge office for a list of open areas and current regulations.

To reach the Petit Manan Point Division, take

Pigeon Hill Road off U.S. Route 1 in Steuben. The parking area for the Birch Point Trail is 5.8 miles from Route 1, and the parking area for the Hollingsworth Trail is 6.2 miles. The Gouldsboro Bay, Corea Heath and Sawyer's Marsh divisions have no public use facilities at present.

Your Cooperation is Appreciated....

To protect the refuge's wildlife and habitats, please comply with the following:

The refuge is open during daylight hours only.

Dogs are allowed on mainland divisions only and must be on hand-held leashes no longer than 10 feet.

All-terrain vehicles and open fires are not allowed.

Blueberries may be hand-picked; raking is not allowed.

The following species are protected under SARA (Species at Risk Act) and/or COSEWIC (Committee on the status of Endangered Wildlife in Canada). Of the protected species found in New Brunswick and the Atlantic Ocean, these either have (recently) been observed in the area of southwestern NB's aquaculture sites or they are likely to be found in the area of the aquaculture sites due to their environmental preferences. If any of these animals are found in distress around the aquaculture sites, Canadian Coast Guard should be contacted at **1-800-565-1633**. If any of these animals are observed, care should be exercised to avoid causing them any harm.



Atlantic Cod (*Gadus morhua*), Southern population

Habitat: Shoreline to continental shelf in Northeast Atlantic
Description: Brown to green or grey with spots on dorsal surface, pale underside. Distinctive chin barbell.
 3 dorsal fins and 2 anal fins.
Max. size: 2 m, 96 kg



Atlantic Salmon (*Salmo salar*), iBoF population

Habitat: Fresh water streams in winter then migrates out to Bay
Description: Sides and belly are silvery, back varies from shades of brown to green and blue.
Adult size: 60 cm, 3 kg
Season of Concern: Spring, summer and fall



Atlantic Bluefin Tuna (*Thunnus thynnus*)

Habitat: Mostly pelagic species but can dive to depths of 500 to 100 m. Tolerates a wide thermal range (3 to 30°C).
Description: Fusiform body, conical head, pointed snout; blue-black dorsal surface, lighter blue sides, and silvery-grey underside; 2 dorsal fins.
Adult size: 400 kg, 270 cm FL
Season of Concern: Summer to late fall



Fin Whale (*Balaenoptera physalus*)

Habitat: Temperate, cool waters. Found in shallow and uneven depths of the Bay of Fundy.
Description: Baleen whale with a long and slender, streamline body; dark grey, white underneath. Narrow, V-shaped head, pointed snout, paired blowholes.
Adult Size: 20-27 m, 70,000 kg
Season of concern: Summer



Harbour Porpoise (*Phocoena phocoena*)

Habitat: Temperate and subarctic waters (<16°C). Inhabit marine and fresh waters, depths of < 650 m.
Description: Black back, grayish-white sides fading to white underneath
Max. size: 1.7 m, 65 kg



Thorny Skate (*Amblyraja radiata*)

Habitat: Ocean bottoms at depths of 18-1400 m, at temperatures of 0-10°C.
Description: Dark colored upper body, white under side. A row of 11-19 large thorns runs down the middle of its back and along the tail.
Adult Size: 110 cm, 12.5 kg



Porbeagle (*Lamna nasus*)

Habitat: Found at depths of 1 m to 700 m though more often on continental shelves. Prefers temperatures 5 – 10°C.
Description: Large shark with a powerful streamlined body. Grey-blueish black body with a white patch on the back of dorsal fin, white underside. Head is stout, snout is pointed.
Max. size: 3.5 m, 135 kg



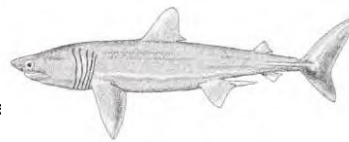
Leatherback Sea Turtle (*Dermochelys coriacea*)

Habitat: Offshore and coastal waters, at depth of 2 to 5033 m.
Description: Largest living sea turtle. Lacks a bony shell, instead its carapace is covered by bluish black skin.
Max. size: 2.4 m in length, 3.6 m wide, up to 725 kg
Season of Concern: April to December



Atlantic Wolffish (*Anarhichas lupus*)

Habitat: Bottom dweller, found in cold, deep waters. Prefers rock or hard-clay sediment.
Description: Rounded profile, heavy head, blunt snout, lacking pelvic fins. Body color ranges from slate blue to dull green to purplish brown with vertical, dark brown bars along the sides. Extensive teeth structure
Max. size: 150 cm, 20 kg



Basking Shark (*Cetorhinus maximus*)

Habitat: Prefers shallow coastal waters
Description: Blackish to grey-brown coloring, pointed snout, crescent-shaped caudal fin, elongated gill slits, large mouth with small teeth
Max. size: 15.2 m
Season of Concern: Summer



North Atlantic Right Whale (*Eubalaena glacialis*)

Habitat: Temperate northern waters (in summer)
Description: Large black baleen whale distinguished by the callosities (thick, hard, white bumps) on its head. Broad back, lacks a dorsal fin.
Adult Size: 16-17 m, 63,500 kg
Season of Concern: Summer and fall



American Eel (*Anguilla rostrata*)

Habitat: Found in all freshwater, estuarine, and marine waters that are connected to the Atlantic Ocean.
Description: Elongate and serpentine body with scales. Adults are grey with a white belly, juveniles have a dark back and a yellow, green, or olive-brown belly. A single fin extends from its back around the tail to its belly.
Adult size: 1 m (females), 0.4 m (males)



Harlequin Duck (*Histrionicus histrionicus*)
Habitat: Offshore islands, rocky coastline where surf breaks against rock and ice build-up is minimal.
Description: Small sea duck. Males have slate-blue plumage, chestnut sides, and streaks of white, chestnut and black on head. Females are plain, brownish-grey with patches of white
Adult size: 45cm
Season of Concern: Winter



Red Knot rufa (*Calidris canutus rufa*),
Tierra del Fuego/Patagonia wintering population
Habitat: (migration) coastal areas with sandflats
Description: Medium size shorebird with sandpiper profile. Non-breeding plumage is plain with white underparts and pale grey back.
Adult size: 23- 25 cm, 135 g
Season of Concern: May/June and July/August



Red-necked Phalarope (*Phalaropus lobatus*)
Habitat: near water surface where there are prey aggregations
Description: (non-breeding plumage) white along the head, throat, breast and underparts with dark upper parts, eye stripe, and crown
Adult size: 18 cm
Season of Concern: April – May and August - October



Peregrine Falcon *anatum/tundrius* (*Falco peregrinus*)
Habitat: cliffs or buildings for nesting, open landscapes for foraging, with nearby waterbodies
Description: (adults) bluish-grey/darker upper parts and pale under parts with dark spotting and barring; (immatures) pale to slate or chocolate brown upper parts, under parts are buffy with blackish streaks
Adult size: (males) 36-49 cm long, 650 g; (females) 45-58 cm long, 950 g



Lesser Yellowlegs (*Tringa flavipes*)
Habitat: uses freshwater and marine shorelines during migration
Description: small, slender shorebird with greyish plumage, a long neck, straight black bill, and long yellow legs
Adult size: 23 – 25 cm, 67-94 g
Season of Concern: Fall and spring



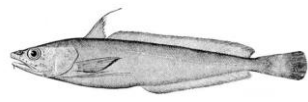
Spiny Dogfish (*Squalus acanthis*)
Habitat: Occurs world-wide from the intertidal to the continental shelf slope, most common at 10-100 m depth. Usually found at temperatures of 5-15°C.
Description: Small shark, grey-brown on the upper body and whitish on the under side.
Max. size: 112 cm TL (female), 94 cm TL (male)



Leach's Storm-Petrel (*Oceanodroma leucorhoa*)
Habitat: Forages in open ocean waters, breeds on vegetated islands, nests on island with other seabirds.
Description: A small, tube-nosed seabird, dark blackish-brown plumage, long wings, forked tail.
Adult size: 45 g



Killer Whale (*Orcinus orca*)
Habitat: Occur in all oceans; tolerate a wide range of salinity, temperature, and turbidity
Description: Distinctive black and white coloration, tall triangular dorsal fin.
Adult size: 9 m, 6600 kg (males); 7.7 m, 4700 kg (females)



White Hake (*Urophycis tenuis*)
Habitat: Groundfish, prefers depths of 144-358 m and temperatures between 4 and 8°C.
Description: Elongated body, small barbel at the tip of the lower jaw, 2 dorsal fins. Color ranges from muddy or purple brown on the dorsal side, bronze or golden sides, white or yellow-white belly with small dots.
Max. size: 133-135 cm, 21.5 – 22.3 kg



White Shark (*Carcharodon carcharias*),
Atlantic population
Habitat: Inshore and offshore waters; just below surface to 1100 m depth; off sandy beaches, rocky shores; enters bays, harbours.
Description: Heavy, torpedo-shaped body, grey/black back and white underside, pointed dorsal fin, cone-shaped snout
Adult size: 2 – 6 m length



Lumpfish (*Cyclopterus lumpus*)
Habitat: found in benthic and pelagic environments; seem to prefer temperatures of 5°C
Description: thick, ball-shaped fish with a sucker on the underside, rounded snout
Max. size: 55 cm



Shortfin Mako (*Isurus oxyrinchus*)
Habitat: Prefers temperatures of 17-22°C thus likely doesn't reside extensively in Canadian waters.
Description: Dark colored dorsal surface, white underside. Pointed snout, small eyes, U-shaped mouth. First dorsal fin height greater than base length.
Max. size: 4.5 m TL

Newfoundland and Labrador Protected Wildlife

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Acadian Redfish (*Sebastes fasciatus*)

Habitat: Smaller fishes live in shallow waters and adults are found in deeper waters.

Description: Spiny-rayed with distinctive flame-red colouring and fan of bony spines.

Adult size: 60 cm in length.



American Eel (*Anguilla rostrata*)

Habitat: Uses all salinities during life stage, found in all freshwaters that are accessible to the Atlantic Ocean.

Description: Elongated, grey with cream colour belly.

Adult size: Male: 0.4 m; Female: 1.0 m.

Contact: Provincial Biologist – 1.709.637.2043



American Plaice (*Hippoglossoides platessoides*)

Habitat: Juveniles prefer finer sediment to partially or fully bury themselves while adults are less stringent.

Description: Laterally flattened. The eyed side is typically red to grayish brown and the blind side is white. Small head with a relatively large mouth.

Adult size: 61 cm in length.



Atlantic Bluefin Tuna (*Thunnus thynnus*)

Habitat: Seasonal migrants and occurs in the area during its summer feeding migration.

Description: Large, stout but fusiform body. Dorsal surface is dark blue to black, shading to lighter blue on the sides and silvery grey below.

Adult size: 270 cm fork length and 400 kg or more.



Atlantic Cod – Laurentian North (*Gadus morhua*)

Habitat: Migrates inshore to their feeding grounds.

Description: Brown to green or grey with spots on dorsal surface, pale underside. Distinctive chin barbell, 3 dorsal and 2 anal fins.

Adult Size: 2 m and 96 kg



Atlantic Salmon – South NL (*Salmo salar*)

Habitat: Requires rivers or streams that are generally clear, cool, and well-oxygenated, but undertakes lengthy feeding migrations in the North Atlantic Ocean as older juveniles and adults

Description: Fusiform body shape.

Adult size: 100 + cm in length.



Atlantic Wolffish (*Anarhichas lupus*)

Habitat: Bottom dwellers, prefer rock or hard clay.

Description: Rounded profile, heavy head, blunt snout. Colour ranges from slate blue to dull green to purplish brown with vertical, dark brown bars along the sides.

Extensive teeth structure.

Adult size: 150 cm in length and 20 kg.



Blue Whale (*Balaenoptera musculus*)

Habitat: Off the south coast of Newfoundland.

Description: Largest animal on earth, coloured dark and light grey, smallish dorsal fin and pointed pectoral flippers.

Adult size: 30 m in length and 181 MT.

Contact: Whale Release and Strandings group
1.888.895.3003



Fin Whale (*Balaenoptera physalus*)

Habitat: Temperate, deep, cool waters.

Description: Long, slender body, V-shaped head, paired blowholes, asymmetrical colouring.

Adult size: 20 to 27 m in length and 70 MT.

Contact: Whale Release and Strandings group
1.888.895.3003



Leatherback Sea Turtle (*Dermochelys coriacea*)

Habitat: Can be found close to shore and at times in relatively shallow waters to feed on jellyfish aggregations in late summer.

Description: Largest living sea turtle. Lacks a bony shell, its carapace is covered in bluish black skin.

Adult size: 2.4 m in length, 3.6 m wide, 725 kg.

Contact: Whale Release and Strandings group 1.888.895.3003



North Atlantic Right Whale (*Eubalaena glacialis*)

Habitat: Temperate northern waters in summer.

Description: Large black baleen whale distinguished by the callosities (thick, hard, white bumps) on its head.

Adult size: 16 to 17 m in length, 64 MT.

Contact: Whale Release and Strandings group 1.888.895.3003



Northern Wolffish (*Anarhichas denticulatus*)

Habitat: Inhabits cold waters usually between 2- 5°C and mainly at depths of 400-1000 metres. Prefers rocky or muddy sea floor.

Description: Thick and heavy set, with a large head, small sharp teeth with grey to dark chocolate colour appearance.

Adult size: 1.4 m in length and 20 kg.



Porbeagle (*Lamna nasus*)

Habitat: Pelagic, epipelagic, or littoral, found far from land in ocean basins and close inshore.

Description: Streamlined body, dark grey - bluish black back and white underneath. Stout head and large eyes.

Adult size: 3 m in length.

Contact: NL shark sightings DFO -1.844.400.7870



Thorny Skate (*Amblyraja radiata*)

Habitat: Found on sand, gravel, mud and broken shells.

Description: Disk spade to heart-shaped, corners rounded, rounded snout, tail 1.0-1.1 times its body length, and a single dominant mid-dorsal row of 11-19 large thorns.

Adult size: 110 cm in length.



White Shark (*Carcharodon carcharias*)

Habitat: Breakers off sandy beaches, rocky shores, and readily enters enclosed bays and estuaries.

Description: Heavy spindle-shaped body with sharp coloured contrast between its backside and underside

Adult size: 3.8 to 6 m in length.

Contact: NL shark sightings DFO -1.844.400.7870

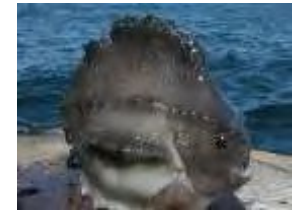


Spotted Wolffish (*Anarhichas minor*)

Habitat: Arctic and Atlantic Ocean, 200-750 m on the continental shelf or deep trenches.

Description: Large head and rounded snout, yellow, grey, or brown with dark spots.

Adult size: Max. size 150 cm weighing up to 22 kg.



Lumpfish (*Cyclopterus lumpus*)

Habitat: Prefer hard rocky bottom with lots of vegetation in cold water.

Description: Short, stubby, with a small mouth and slightly rounded tail.

Adult size: Max. size: 60 cm, weighing up to 10kg.



Harbour Porpoise (*Phocoena phocoena*)

Habitat: Found primarily over continental shelves, and occasionally in deeper waters

Description: Robust body, dark grey fins and flipper, light grey sides, and whiter underside.

Adults size: 1.9 m in length and 76 kg.

Contact: Local DFO Office – 1-709-885-2520



Loggerhead Sea Turtle (*Caretta caretta*)

Habitat: Atlantic, Pacific, and Indian Oceans

Description: head and carapace are reddish-brown, flippers are chestnut brown, the bridge, plastron, underside of throat, flippers and tail are yellow

Adult size: 200 to 350 pounds

Contact: Whale Release and Strandings group – 1.888.895.3003



Harlequin Duck (*Histrionicus histrionicus*)

Habitat: Turbulent mountain streams in summer, rocky coastal waters in winter.

Description: Males have slate-blue plumage, chestnut sides, streaks of white, chestnut, and black on head. Females are plain, brownish grey with patches of white.

Adult size: 45 cm in length.

Contact: Provincial Biologist – 1.709.637.2026



Piping Plover (*Charadrius melodus melodus*)

Habitat: Nests and forages for on ocean beaches, sand spits, or barrier beaches.

Description: Small, thrush-sized shorebird primarily the colour of dry sand with distinctive black markings, a white rump, and bright orange legs.

Adult size: 18 cm in length.

Contact: Provincial Biologist – 1.709.637.2026



Red Knot (*Calidris canutus rufa*)

Habitat: Use coastal mudflats, salt marshes, sandy estuaries, and sand flats during their fall migration

Description: Medium-sized shorebird. Long bill, long legs, long tapered wings with elongated body.

Adult size: 25 cm in length.

Contact: Provincial Biologist – 1.709.637.2026



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American Eel (*Anguilla rostrata*)

Habitat: Uses all salinities during life stage, found in all freshwaters that are accessible to the Atlantic Ocean.

Description: Elongated, grey with cream colour belly.

Max Size: Male: 0.4 m; Female: 1.0 m



Basking Shark (*Cetorhinus maximus*)

Habitat: Prefers temperatures of 8 to 14.5 °C and is often seen close to land and near surface as it slowly feed on plankton.

Description: Cavernous jaw and obvious gill slits. Colours range from dark brown to black or blue dorsally and fade to a dull white on the underside.

Max Size: 15+ m



Atlantic Cod (*Gadus morhua*)

Habitat: Shoreline to continental shelf in Northeast Atlantic

Description: Brown to green or grey with spots on dorsal surface, pale underside. Distinctive chin barb. 3 dorsal fins and 2 anal fins

Max Size: 2 m; 96 kg



Fin Whale (*Balaenoptera physalus*)

Habitat: Temperate, deep, cool waters.

Description: Long, slender body, V-shaped head, paired blowholes, asymmetrical colouring.

Max Size: 20 to 27 m in length and 70 MT.



Atlantic Wolffish (*Anarhichas lupus*)

Habitat: All around Nova Scotia. Deep, rocky continental shelf. Periodically found on sandy or muddy bottom.

Description: Rounded profile, heavy head, blunt snout, lacking pelvic fins. Colour ranges from slate blue to dull green to purplish brown with vertical, dark brown bars along the sides. Extensive teeth structure

Max Size: 150 cm, 20 kg



Harbour Porpoise (*Phocoena phocoena*)

Habitat: Found primarily over continental shelves, and occasionally in deeper waters

Description: Robust body, dark grey fins and flipper, grey sides, and whiter underside.

Max Size: 1.9 m in length and 76 kg.

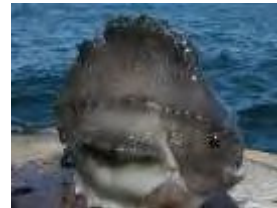


Blue Whale (*Balaenoptera musculus*)

Habitat: North shore of the Gulf of St Lawrence and off Eastern Nova Scotia during spring, summer, and fall.

Description: Tapered, elongated body, pleated grooves in the skin of the neck, small dorsal fin, mottled dark blue and grey.

Max Size: 30 m, 181 MT



Lumpfish (*Cyclopterus lumpus*)

Habitat: Prefer hard rocky bottom with lots of vegetation in cold water.

Description: Short, stubby, with a small mouth and slightly rounded tail.

Max Size: 60 cm, weighing up to 10kg.



Atlantic Bluefin Tuna (*Thunnus thynnus*)

Habitat: Seasonal migrant and occurs in the area during its summer feeding migration.

Description: Large, stout but fusiform body. Dorsal surface is dark blue to black, shading to lighter blue on the sides and silvery grey below.

Max Size: 270 cm fork length and 400 kg or more



Porbeagle (*Lamna nasus*)

Habitat: Pelagic, epipelagic, or littoral, found far from land in ocean basins and close inshore.

Description: Streamlined body, dark grey - bluish black back and white underneath. Stout head and large eyes.

Max Size: 3 m in length



Atlantic Salmon – NS (*Salmo salar*)

Habitat: Throughout the inner Bay of Fundy following anadromous migration

Description: Sides and belly are silvery, back varies from shades of brown to green and blue

Max Size: 60 cm, 3 kg



Striped Bass (*Morone saxatilis*)

Habitat: Anadromous species spawns in freshwater, moves to coastal brackish or salt water to feed and mature. Found along the Atlantic Coast.

Description: Dark olive green back with pale silver striped sides and white belly

Max Size: 1.8 m



Barrow's Goldeneye (*Buscephala islandica*)

Habitat: Coastal waters throughout Atlantic Ocean

Description: Medium sized sea duck. High, rounded head is black with white patch under eye. Males are black and white; females are greyish brown and white.

Max Size: 53 cm, 1 kg



Leatherback Sea Turtle (*Dermochelys coriacea*)

Habitat: Can be found close to shore and at times in relatively shallow waters to feed on jellyfish aggregations in late summer.

Description: Largest living sea turtle. Lacks a bony shell, its carapace is covered in bluish black skin.

Max Size: 2.4 m in length, 3.6 m wide, 725 kg.



North Atlantic Right Whale (*Eubalaena glacialis*)

Habitat: Temperate northern waters in summer.

Description: Large black baleen whale distinguished by the callosities (thick, hard, white bumps) on its head.

Max size: 16 to 17 m in length, 64 MT.



Shortfin Mako (*Isurus oxyrinchus*)

Habitat: Prefers water temperatures between 17-22°C so it is unlikely to be found outside of summer in Canadian waters.

Description: Cylindrical shape with a vertically elongated tail. Metallic blue coloration dorsally and white on its underside.

Max Size: 4 m in length



White Shark (*Carcharodon carcharias*)

Habitat: Breakers off sandy beaches, rocky shores, and readily enters enclosed bays and estuaries.

Description: Heavy spindle-shaped body with sharp colour contrast between its backside and underside.

Max Size: 3.8 to 6 m in length



Harlequin Duck (*Histrionicus histrionicus*)

Habitat: Turbulent mountain streams in summer, rocky coastal waters in winter.

Description: Males have slate-blue plumage, chestnut sides, streaks of white, chestnut, and black on head. Females are plain, brownish grey with patches of white.

Max size: 45 cm in length.



Red Knot (*Calidris canutus rufa*)

Habitat: Migrate from Canadian Arctic to South America in July and August. Migration stops can include tidal sandflats and mudflats along the gulf of St Lawrence and Bay of Fundy.

Description: Shorebird with long straight bill, small head, and long legs. Brownish red face, neck, chest, and underparts. White stripe on upper part of wings.

Max Size: 26 cm in length.



Roseate Tern (*Sterna dougallii*)

696

Habitat: Occurs in large colonies on coasts and islands.

Description: Medium sized seabird with long forked tail. White with black head cap and bill.

Max Size: 40 cm, 130 g



Leach's Storm-petrel (*Oceanodroma leucorhoa*)

Habitat: Forages over the continental shelf during the breeding season, moving into open oceanic waters to feed on small fish and crustacea.

Description: Tube nosed with blackish-brown plumage, long wings angled at the carpal joint, and forked tail. Distinctive white rump

Max Size: 21 cm in length, 48 cm wingspan



Lesser Yellowlegs (*Tringa flavipes*)

Habitat: Utilizes intertidal habitat during migration south.

Description: Medium sized shorebird with yellow legs. Bill is short, slim, straight, and dark. Breast is streaked and flanks are finely marked with short bars.

Max size: 27 cm in length, 64 cm wingspan



Piping Plover (*Charadrius melodus melodus*)

Habitat: Nest and feed primarily on coastal sand or gravel beaches and sand flats. Found all along the southern shore of Nova Scotia

Description: Grey/brown sides and back, white under. Black spots around neck, on forehead, and at beak tip.

Max Size: 19 cm, 48 g



Red-necked Phalarope (*Phalaropus labatus*)

Habitat: Spends much of its nonbreeding season at sea.

Description: Small shorebird with red and orange on sides and base of its neck during breeding season. Non breeding plumage is white along the head, throat, breast and underparts, with dark upper parts, eye stripe, and crown.

Max Size: 20 cm in length



Short-eared Owl (*Asio flammeus*)

Habitat: Tundra, coastal barrens, sand dunes, field, and bog areas.

Description: Medium-sized, puffy white and brown owl with short ear tufts and yellow eyes.

Adult size: 43 cm, 475 g.



Thorny Skate (*Amblyraja radiata*)

Habitat: Ocean bottoms at depths of 18-1200 m, at temperatures of 0-10°C.

Description: Dark colored upper body, white under side. A row of 11-19 large thorns runs down the middle of its back and along the tail.

Adult Size: 110 cm, 12.5 kg



Peregrine Falcon *anatum/tundrius* (*Falco peregrinus*)

Habitat: cliffs or buildings for nesting, open landscapes for foraging, with nearby waterbodies

Description: (adults) bluish-grey/darker upper parts and pale under parts with dark spotting and barring; (immatures) pale to slate or chocolate brown upper parts, under parts are buffy with blackish streaks

Adult size: (males) 36-49 cm long, 650 g; (females) 45-58 cm long, 950 g



Spiny Dogfish (*Squalus acanthis*)

697

Habitat: Occurs world-wide from the intertidal to the continental shelf slope, most common at 10-100 m depth. Usually found at temperatures of 5-15°C.

Description: Small shark, grey-brown on the upper body and whitish on the under side.

Max. size: 112 cm TL (female), 94 cm TL (male)

From: Watts, Melinda <Melinda.Watts@novascotia.ca>
Sent: April 7, 2022 4:08 PM
To: Boudreau, Louise O <Louise.Boudreau@novascotia.ca>
Cc: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Lands and Forestry Comments Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Good afternoon Louise,

Kelly Cove Salmon has provided our Department an updated Wildlife Interaction Plan which incorporates additional control and monitoring measures related to interactions with other wildlife, including birds.

It was confirmed that although the company does not conduct bird surveys, they do record any interactions on their Liverpool site (AQ#1205) and will do the same for the two proposed sites (AQ#1432 and AQ#1433). There have not been any recorded bird interactions on this site to-date.

Thank you,
Melinda

Melinda Watts
Aquaculture Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca



WIP Wildlife
Interaction Plan 22.C

NOTE: REFER TO THE UPDATED WILDLIFE INTERACTION PLAN SUBMITTED BY KCS ON APRIL 6, 2022. This updated version incorporates additional control measures to address interactions with wildlife, as requested by Lands and Forestry (now Natural Resources and Renewables).

From: Watts, Melinda
Sent: July 18, 2023 9:27 PM
To: Boudreau, Susan M <Susan.Boudreau@novascotia.ca>
Cc: Blackburn, Lori M <Lori.Blackburn@novascotia.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: Liverpool Bay Aquaculture Applications (AQ#1205 AQ#1432 AQ#1433) - NRR Comments

Good day Susan and Lori,

Our department is preparing to refer an application package to the Nova Scotia Aquaculture Review Board (NSARB) for marine finfish licence and lease AQ#1205x (boundary amendment) and AQ#1432/AQ#1433 (new marine sites) in Liverpool Bay by Kelly Cove Salmon Ltd.

As a follow up to the request NRR (formerly Lands and Forestry) made on September 19, 2019, for additional information (see attached) a response from the applicant was provided by DFA on April 7, 2022, to NRR (see attached). During the preparation of the application package for the NSARB, we have noted that our department did not receive comment from NRR after the additional information was provided. Can you please confirm that the information that was provided satisfied your request for additional information?

This is a time sensitive issue so please confirm by **Monday, July 24th** to allow the applications to be submitted in a timely manner.

Please do not hesitate to reach out if you have any questions.

Thank you,
 Melinda

Melinda Watts
Aquaculture Development Advisor

Nova Scotia Department of Fisheries and Aquaculture
 1800 Argyle St. 6th Floor (Suite 603) - WTCC
 Halifax, NS B3J 3N8
 T: (902) 483-7668
 E: Melinda.Watts@novascotia.ca



Lands and Forestry
 Comments



L&F Response
 Kelly Co



2022.04.07 Email



WIP Wildlife
 Interaction Plan 22.C

NOTE: REFER TO THESE EMAILS AND DOCUMENT PREVIOUSLY INCLUDED ABOVE.

From: Boudreau, Susan M <Susan.Boudreau@novascotia.ca>
Sent: July 25, 2023 8:17 AM
To: Watts, Melinda <Melinda.Watts@novascotia.ca>
Cc: Mahoney, Meagan <Meagan.Mahoney@novascotia.ca>
Subject: AQ #1205, 1432, 1433

Good morning, Melinda...

Please see attached comments for the above AQs from Department of Natural Resources and Renewables. There were no changes to the areas who previously provided comments in 2019.

Thank you,



**Natural Resources and
Renewables**

1701 Hollis St.
PO Box 698
Halifax, NS B3J 2T9
Canada

Susan Boudreau
Policy Analyst
Strategic Policy & Planning Division
902-719-8040
susan.boudreau@novascotia.ca



Network Agency
Review Form 1205 1.

Network Agency Review of an Aquaculture Application

Agency	Department of Natural Resources and Renewables
Division (if applicable)	
Date	July 24, 2023
File No.	AQ 1205, 1432, & 1433
Type of application	Comments regarding wildlife management plan (from original comments from 2019)
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Mineral and Petroleum Titles Branch:

No exploration licenses currently.

No comments.

Public Notice and Disclosure

As part of the process for deciding on an application, it may be necessary for the Nova Scotia Department of Fisheries and Aquaculture (“Fisheries and Aquaculture”) to disclose the collected network review information to the applicant and other government bodies, including, if applicable, the Nova Scotia Aquaculture Review Board for use at an adjudicative hearing relating to the application in question.

In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

Privacy Statement

The network review information collected as part of an aquaculture application will only be used or disclosed by Fisheries and Aquaculture for the purpose of deciding on the application.

All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Watts, Melinda
Sent: July 25, 2023 3:12 PM
To: Boudreau, Susan M <Susan.Boudreau@novascotia.ca>
Cc: Mahoney, Meagan <Meagan.Mahoney@novascotia.ca>; Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: AQ #1205, 1432, 1433

Thank you Susan for your response and quick turnaround. We will file these as your closing comments for the noted aquaculture site applications.

At the best,
Melinda

Melinda Watts
Aquaculture Development Advisor

Nova Scotia Department of Fisheries and Aquaculture
1800 Argyle St. 6th Floor (Suite 603) - WTCC
Halifax, NS B3J 3N8
T: (902) 483-7668
E: Melinda.Watts@novascotia.ca

APPENDIX L - NOVA SCOTIA DEPARTMENT OF FISHERIES AND
AQUACULTURE - INLAND FISHERIES DIVISION

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: Thursday, June 27, 2019 10:05 AM
To: shane.hood@inspection.gc.ca; david.macarthur@ec.gc.ca; rachel.gautreau@ec.gc.ca; Birch, Angela <Angela.Birch@novascotia.ca>; Miller, L (Dawn) <Dawn.Miller2@novascotia.ca>; Cottreau-Robins, Catherine M <Catherine.Cottreau-Robins@novascotia.ca>; Murrant, Darryl D <Darryl.Murrant@novascotia.ca>; Blackburn, Lori M <Lori.Blackburn@novascotia.ca>; Angela.Smith@canada.ca
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Watts, Melinda <Melinda.Watts@novascotia.ca>
Subject: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Attn: Network Review Agencies:

Attached please find the Boundary Amendment application and information for Kelly Cove Salmon AQ#1205 in Liverpool Bay, Queens County.

Please respond with your feedback by August 27, 2019.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
 Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
 Shelburne, NS BOT 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429
 Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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***Please refer to Application Package, Section 2.0 - Applicant's Aquaculture Development Plan, for documents sent to and reviewed by NSDFA – Inland Division.**

NOTE: THIS EMAIL WAS DUPLICATED FOR AQ#1432 AND AQ#1433 AND SENT TO THE SAME RECIPIENTS.

From: Murrant, Darryl D <Darryl.Murrant@novascotia.ca>
Sent: June 28, 2019 2:41 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: Kelly Cove Salmon - Boundary Amendment AQ1205 - Liverpool Bay, Queens County

Hi Lynn

No concerns here.

Darryl Murrant

Manager, Fisheries Enhancement



**NS Fisheries & Aquaculture
Inland Fisheries Division**

PO Box 700
91 Beeches Rd.
Pictou, NS, CAN B0K 1H0
Phone: (902) 485-7022
Fax: (902) 485-4014
Email: Darryl.Murrant@novascotia.ca

Network Agency Review of an Aquaculture Application

Agency	Fisheries & Aquaculture
Division (if applicable)	Inland Fisheries
Date	June 28, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1205 (Coffin Island), Queens County
Type of application	Boundary Amendment
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Public Notice and Disclosure

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In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

Privacy Statement

The network review information collected as part of an aquaculture application will only be used or disclosed by Fisheries and Aquaculture for the purpose of deciding on the application.

All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Murrant, Darryl D <Darryl.Murrant@novascotia.ca>
Sent: June 28, 2019 2:43 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: AQ#1432 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Brooklyn),
Queens County

Hi Lynn
No concerns here either.

Darryl Murrant
Manager, Fisheries Enhancement



NS Fisheries & Aquaculture
Inland Fisheries Division

PO Box 700
91 Beeches Rd.
Pictou, NS, CAN B0K 1H0
Phone: (902) 485-7022
Fax: (902) 485-4014
Email: Darryl.Murrant@novascotia.ca

Network Agency Review of an Aquaculture Application

Agency	Fisheries & Aquaculture
Division (if applicable)	Inland Fisheries
Date	June 28, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1432 (Brooklyn), Queens County
Type of application	Marine Finfish Cage Cultivation (Atlantic Salmon)
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

Public Notice and Disclosure

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In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

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All application information collected is subject to the Freedom of Information and Protection of Privacy Act (“FOIPOP”) and will only be used or disclosed in accordance with FOIPOP.

From: Murrant, Darryl D <Darryl.Murrant@novascotia.ca>

Sent: June 28, 2019 2:45 PM

To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>

Subject: RE: AQ#1433 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Mersey Point), Queens County

Hi Again Lynn

No concerns here either.

Have a good long week-end.

Darryl

Network Agency Review of an Aquaculture Application

Agency	Fisheries & Aquaculture
Division (if applicable)	Inland Fisheries
Date	June 28, 2019
File No.	Kelly Cove Salmon Ltd. AQ#1433 (Mersey Point), Queens County
Type of application	Marine Finfish Cage Cultivation (Atlantic Salmon)
Information Provided	

Please provide comments, concerns, recommendations, or requirements on the above stated application for a marine aquaculture licence. Please include the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. Similarly, if additional information is required to make a determination, please include the criterion /criteria within your jurisdiction or mandate that your request is based upon.

- No concerns regarding the proposed development
- Concerns with development are expressed below
- Request modifications to the proposed development (described below)
- Required or recommended conditions (described below)
- Request additional information (described below)
- Request meeting with applicant and NSDFA (described below)
- No comments on the application

Comments, concerns, recommendations, and/or required conditions including the criterion /criteria within your jurisdiction or mandate that your feedback is based upon. (Attach comments if preferred, or add additional pages, as required.):

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In accordance with departmental policy, which seeks to promote public involvement in the process for deciding on aquaculture applications, Fisheries and Aquaculture will disclose aquaculture application information, including network review information, on the departmental website.

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APPENDIX M – OFFICE OF ABORIGINAL AFFAIRS
(NOW OFFICE OF L'NU AFFAIRS)

From: Winfield, Lynn
Sent: June 27, 2019 9:16 AM
To: Rillie, Claire Z <Claire.Rillie@novascotia.ca>
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Feehan, Jennifer Kathleen <Jennifer.Feehan@novascotia.ca>
Subject: Kelly Cove Salmon - Boundary Amendment - AQ1205 ** E-mail 1 - Another email to follow **

Good Morning Claire,

Attached please find the Boundary Amendment application and information for Kelly Cove Salmon AQ#1205 in Liverpool Bay, Queens County.

I will forward the development plan to you in a separate email, as the attachments are too large for one.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
 Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
 Shelburne, NS B0T 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429
 Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

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OAA Network
 Memo & Attachmen

***Please refer to Appendix A for the Network Memo and Attachments.**

NOTE: THIS EMAIL WAS DUPLICATED FOR AQ#1432 AND AQ#1433 AND SENT TO THE SAME RECIPIENTS.

From: Winfield, Lynn
Sent: June 27, 2019 9:17 AM
To: Rillie, Claire Z <Claire.Rillie@novascotia.ca>
Cc: Goreham, Brennan CD <Brennan.Goreham@novascotia.ca>; Feindel, Nathaniel J <Nathaniel.Feindel@novascotia.ca>; King, Matthew S <Matthew.King@novascotia.ca>; Snyder, Anthony D <Anthony.Snyder@novascotia.ca>; Hancock, Bruce H <Bruce.Hancock@novascotia.ca>; Feehan, Jennifer Kathleen <Jennifer.Feehan@novascotia.ca>
Subject: Kelly Cove Salmon - Boundary Amendment - AQ1205 ** Email 2 of 2 **

Good Morning Claire,

Please see the attached Development Plan for the Kelly Cove Boundary Amendment AQ#1205 in Liverpool Bay, Queens County.

If you have any questions please do not hesitate to contact me.

Thanks,

Lynn

E. Lynn Winfield

**Licensing Coordinator,
 Nova Scotia Department of Fisheries and Aquaculture**



1575 Lake Road
 Shelburne, NS B0T 1W0
 Phone: 902-875-7440
 Fax: 902-875-7429
 Email: Lynn.Winfield@novascotia.ca

[NS Department of Fisheries & Aquaculture Website](#)

 Please consider the environment before printing this e-mail

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Developmental
 Plan-AQ1205-2019.0

***Please refer to Application Package, Section 2.0 - Applicant's Aquaculture Development Plan, for documents sent to and reviewed by OLA.**

From: Rillie, Claire Z <Claire.Rillie@novascotia.ca>
Sent: July 15, 2019 12:51 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: AQ#1433 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Mersey Point), Queens County

Hi Lynn,

Apologies for not getting back to you on these applications sooner; I've been out for a week for health reasons but I'm on the mend. I'm screening applications 1433, 1432 and 1205 as a package. I'll be recommending TOR consultation at the moderate with all 11 Assembly communities (and nothing for Sipekne'katik or Millbrook). I think in the name of expediency you could prepare the offer to consult letters and I'll add my screening details.

I'll send an official response including my rationale once I've had a chance to review property (likely by Friday).

If this (backwards) plan doesn't work for you please let me know.

Thanks!
Claire

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: July 15, 2019 12:55 PM
To: Rillie, Claire Z <Claire.Rillie@novascotia.ca>
Subject: RE: AQ#1433 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Mersey Point), Queens County

Thanks Claire, this works for me.

Thanks,
Lynn

E. Lynn Winfield
Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture

From: Rillie, Claire Z <Claire.Rillie@novascotia.ca>
Sent: July 16, 2019 1:29 PM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: AQ#1433 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Mersey Point), Queens County

Hi Lynn,

I have now completed my full screening on behalf of OAA for AQ applications 1205, 1432, and 1433 for Aboriginal consultation purposes. I am recommending TOR consultation at the moderate level for all 11 Assembly Communities. My rationale is as follows:

- The proponent, Kelly Cove Salmon Ltd. is proposing to more than triple the amount of farmed Atlantic Salmon in Liverpool Bay, Nova Scotia – total biomass, if all applications are approved, could reach 10 million Kg.
- Proposed sites will comprise a total footprint of 122.1 ha in Liverpool Bay.
- Numerous other fisheries, including commercial and Aboriginal fisheries, are known to have occurred or currently occur in Liverpool Bay.
- The Mersey River system, which drains into Liverpool Bay, is a known river of significance to the Mi'kmaq.
- The proponent has committed to employing management strategies to reduce the risk of fish escapes including building infrastructure strong enough to withstand weather, currents, ice flow etc.
- Cages will be designed to minimize farmed fish and wildlife interactions and will include predator deterrents.
- Site #1205 is immediately proximal to Coffin Island (nesting grounds for birds, migratory resting spot, duck habitat, etc).
- Site #1205 is less than 0.5 km from a known Mi'kmaq archaeological site at Coffin Island; #1433 is less than 3 km from 2 known Mi'kmaq archaeological sites in Liverpool.
- The proponent will require an NPA authorization from Transport Canada.
- Proposed sites are located approximately 30 km from Ponhook Lake IR 10 (Acadia FN).
- Limited engagement with the Mi'kmaq of Nova Scotian has been undertaken to date.

Please let me know if you have any questions or concerns and pass along the letter once you've added the important bits and I'll add my stuff!

Thanks,
Claire

From: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Sent: July 16, 2019 3:24 PM
To: Rillie, Claire Z <Claire.Rillie@novascotia.ca>
Subject: RE: AQ#1433 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Mersey Point), Queens County

Hi Claire,

Brennan would like to know if you would suggest a separate letter for each site or put it all into one letter?

Thanks,

Lynn

E. Lynn Winfield
Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture

E. Lynn Winfield
Licensing Coordinator,
Nova Scotia Department of Fisheries and Aquaculture

From: Rillie, Claire Z <Claire.Rillie@novascotia.ca>
Sent: Wednesday, July 17, 2019 11:47 AM
To: Winfield, Lynn <Lynn.Winfield@novascotia.ca>
Subject: RE: AQ#1433 - New Aquaculture Application - Kelly Cove Salmon Ltd. - Liverpool Bay (Mersey Point), Queens County

Hi Lynn,

All in one letter, please! I think they will be considered a package by the Mi'kmaq regardless.

Thanks,
Claire