

# FINFISH AQUACULTURE SITE AQUACULTURE STEWARDSHIP COUNCIL REPORT CONCEPCION POINT, NOOTKA SOUND, BC

*SITE LICENSE: AQ1789*

*SURVEY TYPE: ASC*

*SURVEY DATE: JUNE 13 AND 14, 2022*

*REPORT DATE: JULY 14, 2022*

***PREPARED FOR:***

*GRIEF SEAFOOD BC, LTD*

*CAMPBELL RIVER, BC*

*V9W 5P7*



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## Summary

This document presents the qualitative and quantitative assessment of sediment obtained during the survey completed at the Concepcion Point finfish aquaculture site operated by Grieg Seafood in Clayoquot Sound, BC, on June 13 and 14, 2022. Sediment was collected and the data analyzed according to the *Aquaculture Activities Regulations* (AAR) and adapted to address Criterion 2.1 and 5.2 of the Aquaculture Stewardship Council (ASC) Salmon Standard.

This was the first ASC survey attempted at the Concepcion Point site after the installation of a new circle pen containment array (Figure 2.). Sample grabs inside and outside the AZE on Transect B were not successful in obtaining any sediment due to the unsuitable substrate at the sampling stations (Table 2) and Station 0A could not be sampled as the site feed shed, compressor floats and feed pipes were blocking access the area.

The measured and observed characteristics of the sediment collected during the sampling confirmed that the stations outside the Allowable Zone of Effect (AZE) on Transects A and C had mean sulphide levels less than the ASC Salmon Standard acceptable limit of 1500 µm. Redox potential measured in sediment obtained outside the AZE on Transect A and C was greater than the ASC Salmon Standard acceptable lower limit of 0 mV.

As required by Criterion 5.2 of the ASC monitoring for parasiticide residue was completed at the station outside the AZE on Transects A and C, and at two reference stations. Emamectin benzoate was below detectable limits in all collected samples.

An assessment and identification of the benthic organisms present in the sediment was not completed to evaluate for potential impacts to habitat, as BC salmon farms have been granted a variance to Indicators 2.1.2 and 2.1.3 and instead rely on the scientifically proven and federally regulated sulfide surrogates (ASC VR224)<sup>1</sup>.

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<sup>1</sup> <http://variance-requests.asc-aqua.org/questions/vr-224-benthic-biodiversity-and-benthic-effects-salmon-v1-0-2-1-2-2-1-3/>

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## 1.0 Introduction

This document presents the marine sediment data collected as part of a benthic study completed at the Concepcion Point finfish aquaculture site operated by Grieg Seafood (Campbell River, BC). The Concepcion Point site is located in Nootka Sound, BC (Figure 1).

The study was completed by adapting the methodology required for operational monitoring of waste dispersion required under *Aquaculture Activities Regulations* (AAR) and comparing the results with the indicators listed in Criterion 2.1 of the Aquaculture Stewardship Council (ASC) Salmon Standard. Additional analysis of the collected sediment was also completed to address Criterion 5.2 of the ASC.

The purpose of the ASC Salmon Standard is to evaluate concerns of potential environmental impact related to salmon farming. The Standard is based on a combination of requirements and performance levels that must be reached in order to determine if potential impacts are being addressed. Principle 2 of the Standard addresses the “*potential impacts from salmon farms on natural habitat, local biodiversity and ecosystem function*” (ASC, 2012).

This survey was specifically designed to address Criterion 2.1 within Principle 2 of the ASC Salmon Standard which involved the collection of sediment within and outside of the Allowable Zone of Effect (AZE). Sediment was analyzed for redox potential and sulphide levels to evaluate benthic habitat conditions. In addition, testing for parasiticide residue in sediment collected at two reference stations and at the stations outside the AZE was completed to address Criterion 5.2.1 of the ASC.

An assessment and identification of the benthic organisms present in the sediment was not completed to evaluate for potential impacts to habitat, biodiversity and ecosystem function, as BC salmon farms have been granted a variance to Indicators 2.1.2 and 2.1.3 and instead rely on the scientifically proven and federally regulated sulfide surrogates (ASC VR224).

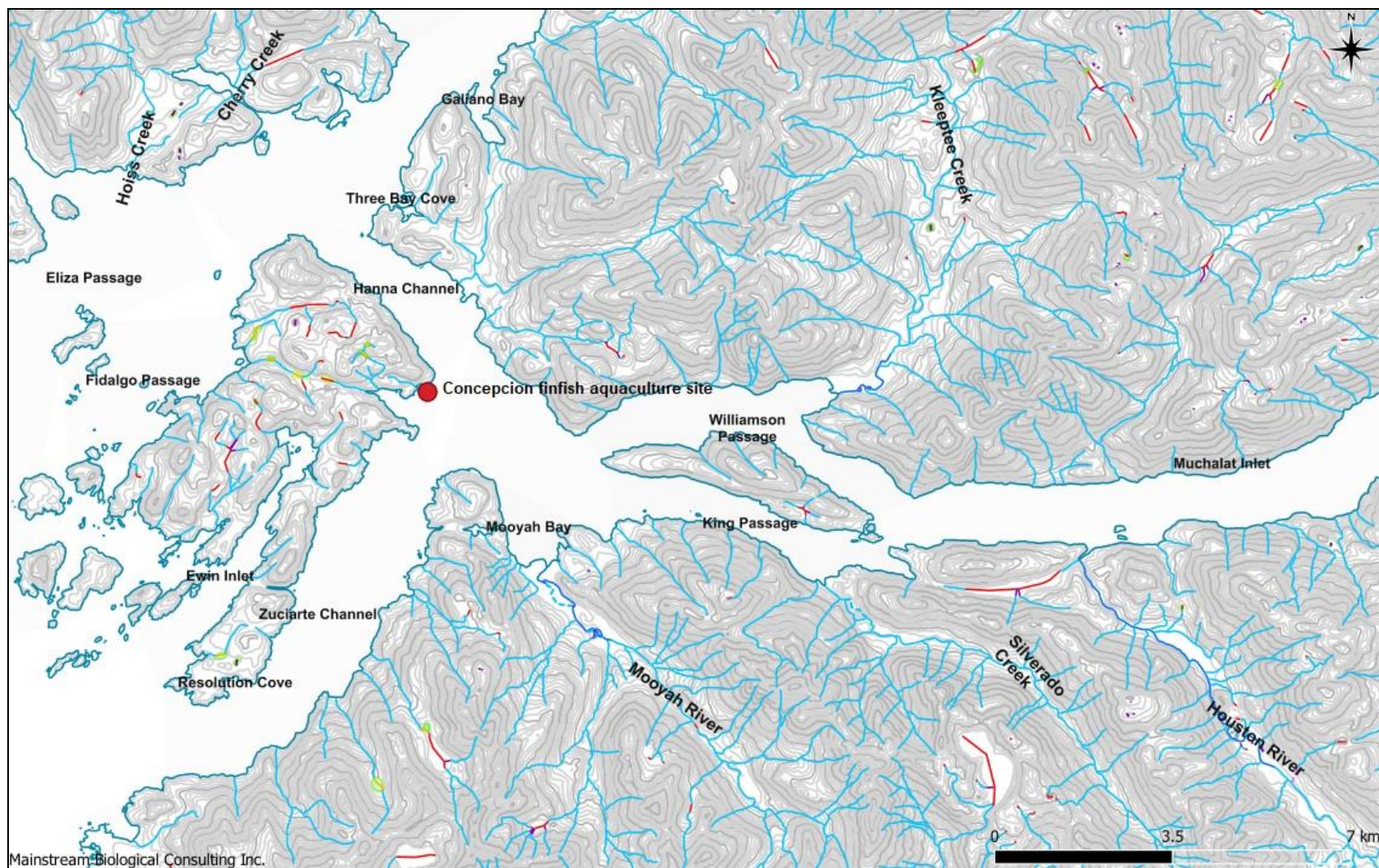


Figure 1: An overview map showing the approximate location of the Concepcion Point finfish aquaculture farm site (red dot) in Nootka Sound BC.

## 2.0 Methods

The substrate at the designated sampling locations at the Concepcion Point finfish aquaculture site had not been previously identified to consist of “soft” sediment as a new containment array had been installed. Therefore, the field activities involved attempts to collect sediment samples for physical and chemical analysis. Any sampling stations where sediment could not be obtained were document.

### 2.1 Field Sampling

The locations of sediment sampling stations were provided by Grieg Seafood.

Individual sediment sampling stations were located along three Transects A, B and C. Stations within the AZE were located 5 m inside the 1 g DEPOMOD contour (Figure 2) and stations outside the AZE were located 25 m outside of the 1 g DEPOMOD contour. Stations were also located at the edge of the containment system on Transects A and B. Additional stations were established at two reference sites within the range of 500 m to 1000 m from the aquaculture containment system as outlined in the ASC Salmon Standard (Figure 3).

Sediment was collected using a Petite Ponar sampler. Two sediment samples were collected at each station when possible.

The coordinates of the sample locations were recorded using a Trimble GeoExplorer GeoXT (Firmware v1.05) using TerraSync 3.30 software and equipped with an external Hurricane antenna.

Data filters were set to standards recommended by the Resource Inventory Standards Committee (RISC)<sup>2</sup>, with at least 15 fixes taken per location, using satellites greater than 15 % above the horizon with signal to noise ratios (SNR) greater than 40 and a horizontal dilution of precision (HDOP) of five. The GPS data was corrected post-mission with Pathfinder Office v5.40 software using data from the Gold River Base Station (GLDR).

The Trimble antenna was attached to the grab davit and positional fixes were obtained while the grab was completing the estimated bottom third of its descent. Positional fixes were completed when the grab was on the bottom and the drop line was as close to vertical as possible.

The time at which each sample was successfully obtained and physical characteristics of the collected sediment were recorded. A digital photograph of each sample was also taken. As per Indicator 2.1.1, levels of free sulphides and redox potential of each sediment sample were measured in the field using an Orion A324 meter and the appropriate ISE probes. A digital thermometer was used to measure the temperature of the sediment.

As per Indicator 5.2.1, portions of the grab samples collected at the stations outside the AZE on Transects A and C as well as the reference stations were retained for analysis. Retained samples were stored at 4° Celsius and transported to SGS Canada Inc for analysis for emamectin benzoate.

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<sup>2</sup> Integrated Land Management Bureau. 2008. Province of British Columbia Standards, Specifications and Guidelines for Resource Surveys Using Global Positioning System (GPS) Technology. Release 4.0d.

## 2.2 Data Analysis

To evaluate if the benthic conditions at and near the Concepcion Point site met the requirements of Criterion 2.1 of the ASC Salmon Standard, the data collected was compared to required levels for indicators of potential finfish farm impacts. These indicators represent a combination of chemical and biodiversity measurements to evaluate the status of benthic health, biodiversity and ecosystem function and to detect potential impacts related to the salmon farm operation. The indicators considered for this assessment are summarized below in Table 1.

Additional analysis of parasiticide residue was completed to fulfill the requirement for monitoring of these chemicals but there is no required level presented in the ASC to compare these results to.

Table 1: Summary of indicators of benthic health, biodiversity and ecosystem function that were considered during the evaluation of the Concepcion Point finfish aquaculture site. The indicators have been adopted from Criterion 2.1 of the ASC Salmon Standard.

| Criterion Number | Indicator  | ASC Salmon Standard Requirement |
|------------------|--|---------------------------------|
| 2.1.1            | Redox potential in sediment outside the AZE <sup>1</sup> . | >0 millivolts (mV)              |
| 2.1.1            | Sulphide levels in sediment outside the AZE.               | ≤1500 microMoles / L (μM)       |

1: AZE = Allowable Zone of Effect



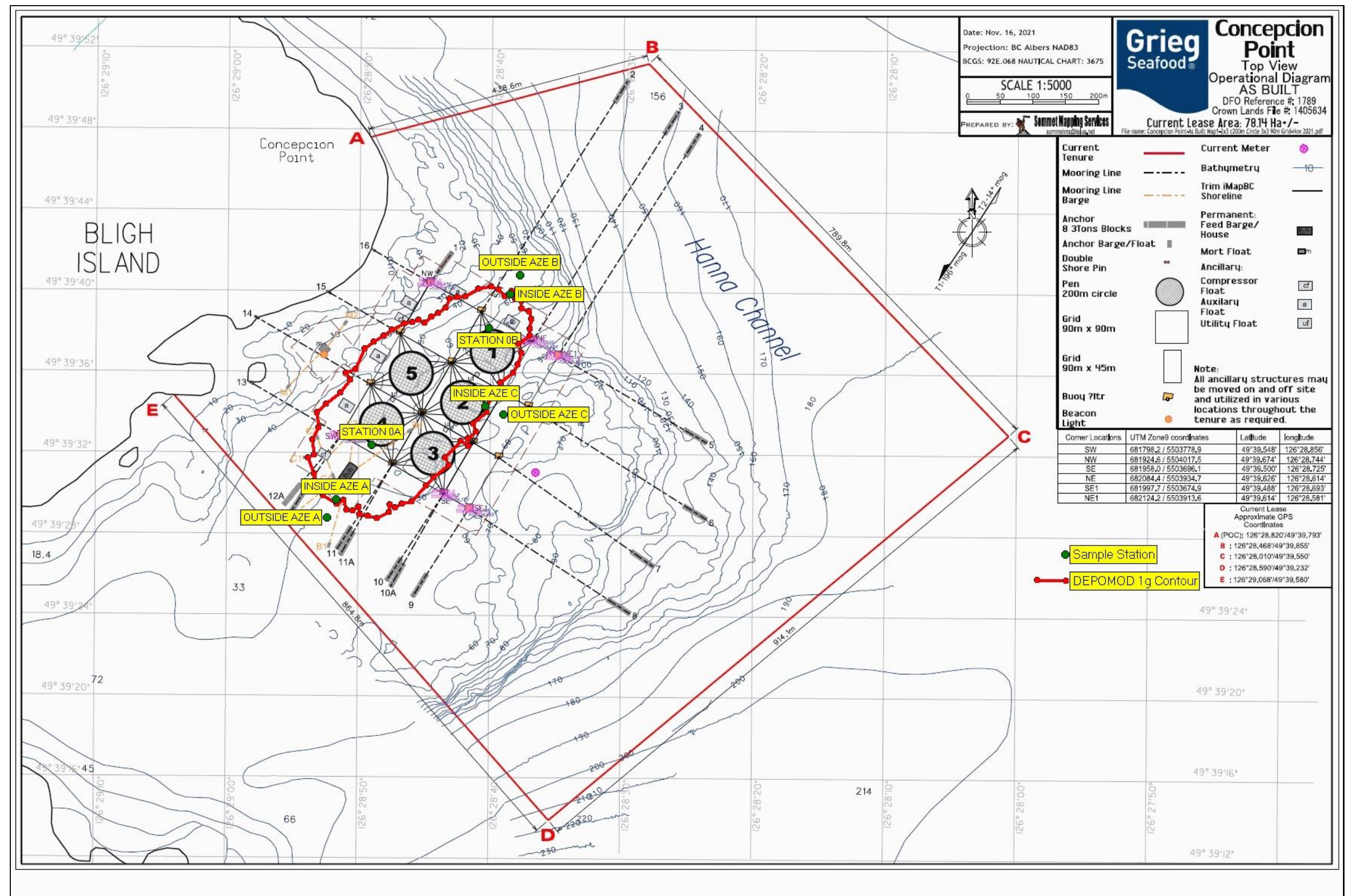


Figure 2: The locations of the attempted grab sampling stations for the ASC survey at the Conception Point finfish aquaculture site in relation to the pen system and surrounding area on June 13 and 14, 2022.



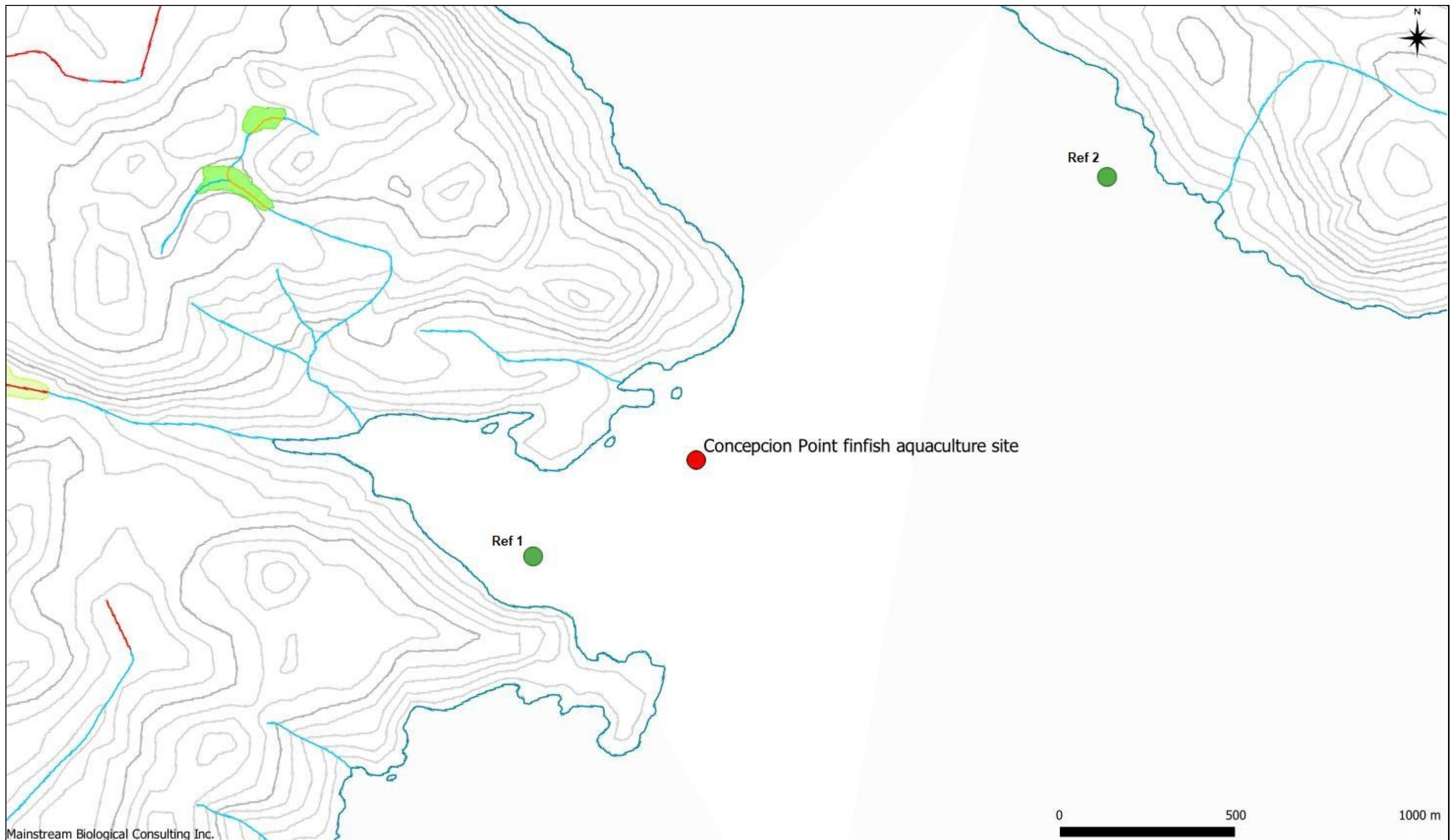


Figure 3: The locations of the reference stations for the ASC survey at the Concepcion Point finfish aquaculture site in relation to the site and surrounding area on June 13 and 14, 2022.

### 3.0 Results and Discussion

Representative photographs of sediment obtained at each sampling station are presented in Appendix 1. Raw data obtained from sediment sampled in the field is presented in Appendix 2 and the summarized data is presented in Appendix 3.

The sediment successfully collected at the Concepcion Point sampling stations typically consisted of grey sandy-mud, with some terrigenous material and shell hash present.

This was the first ASC survey attempted at the Concepcion Point site after the installation of a new circle pen containment array (Figure 2.). Sample grabs inside and outside the AZE on Transect B were not successful in obtaining any sediment due to the unsuitable substrate at the sampling stations (Table 2) and Station 0A could not be sampled as the site feed shed, compressor floats and feed pipes were blocking access to the area.

Table 2: The location and results of each unsuccessful grab attempt at the Concepcion Point finfish aquaculture site on June 13 and 14, 2022.

| Station Name | Replicate Number | Latitude   | Longitude    | Distance from Pens (m) | Sampling Device | Comments     |
|--------------|------------------|------------|--------------|------------------------|-----------------|--------------|
| B-5M         | 1                | 49 39.6613 | -126 28.6450 | 40                     | Petite Ponar    | Skiff, sand. |
| B-5M         | 2                | 49 39.6612 | -126 28.6455 | 40                     | Petite Ponar    | Skiff, sand. |
| B-5M         | 3                | 49 39.6613 | -126 28.6443 | 40                     | Petite Ponar    | Skiff, sand. |
| B-5M         | 4                | 49 39.6616 | -126 28.6457 | 40                     | Petite Ponar    | Skiff, sand. |
| B+25M        | 1                | 49 39.6789 | -126 28.6336 | 70                     | Petite Ponar    | Skiff        |
| B+25M        | 2                | 49 39.6788 | -126 28.6334 | 70                     | Petite Ponar    | Skiff        |
| B+25M        | 3                | 49 39.6791 | -126 28.6339 | 70                     | Petite Ponar    | Skiff        |
| B+25M        | 4                | 49 39.6782 | -126 28.6319 | 70                     | Petite Ponar    | Skiff        |

#### 3.1 Redox Potential and Sulphide Levels

Following Criterion 2.1.1 of the ASC Salmon Standard, the results of redox potential and sulphide testing at the station outside the AZE were analyzed to help evaluate if the Concepcion Point facility was meeting the certification requirements (Appendix 3).

The mean sulphide level in sediment collected at the stations outside AZE on Transects A and C (155  $\mu\text{M}$  and 306  $\mu\text{M}$  respectively) on June 13 and 14, 2022, were less than the ASC Salmon Standard sulphide upper limit of 1500  $\mu\text{M}$ .

Mean redox potential in sediment collected at the stations outside the AZE on Transect A and C (199.9 mV and 7.2 mV respectively) were greater than the 0 mV minimum requirement cited in Criterion 2.1.1 of the ASC Salmon Standard.

#### 3.2 Parasiticide Residue

Analysis of the sediment collected from the stations outside the AZE on Transects A and C and the two reference stations for emamectin benzoate are shown in Table 3. The analysis was completed to fulfill the requirement of the ASC Salmon Standard Criterion

number 5.2.1. All of the collected sediment samples analyzed had parasiticide residue concentrations less than the laboratory detectable limit.

Table 2: The parasiticide residue concentration of collected sediment at the stations outside the AZE on Transects A and C and the two reference stations at the Concepcion Point aquaculture site on June 13, 2022.

| Station Name    | Sample Number | Enamectin Benzoate (ppm) |
|-----------------|---------------|--------------------------|
| Detection Limit |               | 1.0                      |
| Outside AZE A   | 1             | <1.0                     |
| Outside AZE A   | 2             | <1.0                     |
| Outside AZE C   | 1             | <1.0                     |
| Outside AZE C   | 2             | <1.0                     |
| Reference 1     | 1             | <1.0                     |
| Reference 1     | 2             | <1.0                     |
| Reference 2     | 1             | <1.0                     |
| Reference 2     | 2             | <1.0                     |

## 4.0 References

- Aquaculture Stewardship Council. 2012. ASC Salmon Standard Version 1.3. Available online: [www.asc-aqua.org](http://www.asc-aqua.org).
- Salas, F., Patrício, J. and Marques, J.C. 2006. Ecological Indicators in Coastal and Estuarine Environmental Quality Assessment - A user friendly guide for practitioners. Imprensa da Universidade de Coimbra.



## Appendix 1 – Sample Photographs



**Photo 1**

Sediment sample collected at the station inside the AZE on Transect A at the Concepcion Point site on June 13, 2022.



**Photo 2**

Sediment sample collected at the station outside the AZE on Transect A at the Concepcion Point site on June 13, 2022.



**Photo 3**

Sediment sample collected at the 0B station at the Concepcion Point site on June 13, 2022



**Photo 4**

Sediment sample collected at the station inside the AZE on Transect C at the Concepcion Point site on June 14, 2022.





**Photo 5**

Sediment sample collected at the station outside the AZE on Transect C at the Concepcion Point site on June 14, 2022.



**Photo 6**

Sediment sample collected at the Reference 1 at the Concepcion Point site on June 14, 2022.



**Photo 8**

Sediment sample collected at the Reference 2 at the Concepcion Point site on June 14, 2022.



Appendix 2 – Concepcion Point Field Data

| Reference Information:      |                                       |
|-----------------------------|---------------------------------------|
| <b>Farm site:</b>           | Concepcion Point                      |
| <b>Aquaculture Company:</b> | Grieg Seafood                         |
| <b>Site Reference #:</b>    | AQ1789                                |
| <b>Geographic Region:</b>   | Nootka Sound, BC                      |
| <b>Field Crew:</b>          | E. Cicon, C. Rodger, M. Haswell       |
| <b>Field Investigator:</b>  | Mainstream Biological Consulting Inc. |
| <b>Laboratory:</b>          | SGS Canada Inc                        |

| <i>Transect Name</i> | <i>Sampling Station Name</i> | <i>Replicate Number</i> | <i>Transect Bearing (Magnetic)</i> | <i>Reference Station (Y/N)</i> | <i>Distance from Pens (m)</i> | <i>Sampling Device Type</i> | <i>Sampling Device Capacity (m2)</i> | <i>Quality Control Replicate (Y/N)</i> | <i>Replicate Analysis Type</i> | <i>Sample Date (YYYY-MM-DD)</i> | <i>Sample Time (24HH:MM)</i> | <i>Sample Latitude (Degrees)</i> | <i>Sample Latitude (Minutes)</i> | <i>Sample Longitude (Degrees)</i> | <i>Sample Longitude (Minutes)</i> | <i>GPS Correction Status</i> | <i>Ocean Depth (m)</i> | <i>Sample Depth (cm)</i> |
|----------------------|------------------------------|-------------------------|------------------------------------|--------------------------------|-------------------------------|-----------------------------|--------------------------------------|--|--------------------------------|---------------------------------|------------------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|------------------------------|------------------------|--------------------------|
| A                    | Inside A                     | 1                       | 116                                |                                | 111                           | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-13                      | 14:12                        | 49                               | 39.4931                          | -126                              | 29.8602                           | Post-process Corrected       | 55                     | 6                        |
| A                    | Inside A                     | 2                       | 116                                |                                | 111                           | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-13                      | 14:16                        | 49                               | 39.4920                          | -126                              | 28.8575                           | Post-process Corrected       | 53                     | 7                        |
| A                    | Outside A                    | 1                       | 116                                |                                | 142                           | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-13                      | 14:45                        | 49                               | 39.4779                          | -126                              | 28.8718                           | Post-process Corrected       | 53                     | 7                        |
| A                    | Outside A                    | 2                       | 116                                |                                | 142                           | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-13                      | 14:49                        | 49                               | 39.4770                          | -126                              | 28.8706                           | Post-process Corrected       | 59                     | 8                        |
| B                    | 0B                           | 1                       | 189                                |                                | 0                             | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-13                      | 10:55                        | 49                               | 39.6411                          | -126                              | 28.6524                           | Post-process Corrected       | 60                     | 8                        |
| B                    | 0B                           | 2                       | 189                                |                                | 0                             | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-13                      | 11:09                        | 49                               | 39.6407                          | -126                              | 28.6520                           | Post-process Corrected       | 60                     | 7                        |
| B                    | 0B                           | 2                       | 189                                |                                | 0                             | Petite Ponar                | 0.02                                 | Y                                      | Duplicate                      | 2022-06-13                      | 11:09                        | 49                               | 39.6407                          | -126                              | 28.6520                           | Post-process Corrected       | 60                     | 7                        |
| B                    | 0B                           | 2                       | 189                                |                                | 0                             | Petite Ponar                | 0.02                                 | Y                                      | Triplicate                     | 2022-06-13                      | 11:09                        | 49                               | 39.6407                          | -126                              | 28.6520                           | Post-process Corrected       | 60                     | 7                        |
| C                    | Inside C                     | 1                       | 277                                |                                | 0                             | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-14                      | 10:05                        | 49                               | 39.5649                          | -126                              | 28.6636                           | Post-process Corrected       | 64                     | 6                        |
| C                    | Inside C                     | 2                       | 277                                |                                | 0                             | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-14                      | 10:11                        | 49                               | 39.5644                          | -126                              | 28.6484                           | Post-process Corrected       | 64                     | 7                        |
| C                    | Outside C                    | 1                       | 277                                |                                | 18                            | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-14                      | 10:27                        | 49                               | 39.5657                          | -126                              | 28.6487                           | Post-process Corrected       | 62                     | 7                        |
| C                    | Outside C                    | 2                       | 277                                |                                | 18                            | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-14                      | 10:42                        | 49                               | 39.5628                          | -126                              | 28.6468                           | Post-process Corrected       | 62                     | 6                        |
| Ref                  | Ref 1                        | 1                       |                                    |                                | 700                           | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-14                      | 12:07                        | 49                               | 39.3968                          | -126                              | 29.2970                           | Post-process Corrected       | 45                     | 5                        |
| Ref                  | Ref 1                        | 2                       |                                    |                                | 700                           | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-14                      | 12:14                        | 49                               | 39.3941                          | -126                              | 29.2894                           | Post-process Corrected       | 44                     | 5                        |
| Ref                  | Ref 2                        | 1                       |                                    |                                | 1000                          | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-14                      | 12:27                        | 49                               | 39.9094                          | -126                              | 27.9278                           | Post-process Corrected       | 50                     | 6                        |
| Ref                  | Ref 2                        | 2                       |                                    |                                | 1000                          | Petite Ponar                | 0.02                                 | N                                      |                                | 2022-06-14                      | 12:36                        | 49                               | 39.9033                          | -126                              | 27.9365                           | Post-process Corrected       | 50                     | 5                        |

| <i>Transect Name</i> | <i>Sampling Station Name</i> | <i>Replicate Number</i> | <i>Free Sulphide (micromolar)</i> | <i>Sediment Temperature (deg C)</i> | <i>Eh Uncorrected (mV)</i> | <i>Eh Corrected (mV)</i> | <i>Cu (micro-g/g)</i> | <i>Zn (micro-g/g)</i> | <i>Li (micro-g/g)</i> | <i>Gravel Percent</i> | <i>Sand Percent</i> | <i>Mud Percent</i> | <i>TVS Percent</i> | <i>Beggiatoa Observed (Y/N)</i> | <i>OPC Observed (Y/N)</i> | <i>Fish Feed Observed (Y/N)</i> | <i>Fish Feces Observed (Y/N)</i> | <i>Odour Rating</i> | <i>Black Sediment Observed (Y/N)</i> | <i>Gas Bubbles Observed (Y/N)</i> |
|----------------------|------------------------------|-------------------------|-----------------------------------|-------------------------------------|----------------------------|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------|--------------------|--------------------|---------------------------------|---------------------------|---------------------------------|----------------------------------|---------------------|--------------------------------------|-----------------------------------|
| A                    | Inside A                     | 1                       | 287                               | 9.1                                 | 67.4                       | 282.4                    |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 1                   | N                                    | N                                 |
| A                    | Inside A                     | 2                       | 517                               | 9.2                                 | -86.7                      | 128.3                    |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 1                   | N                                    | N                                 |
| A                    | Outside A                    | 1                       | 157                               | 9.6                                 | 3.8                        | 218.8                    |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 0                   | N                                    | N                                 |
| A                    | Outside A                    | 2                       | 152                               | 9.5                                 | -34.0                      | 181.0                    |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 0                   | N                                    | N                                 |
| B                    | 0B                           | 1                       | 18500                             | 9.0                                 | -447.6                     | -232.6                   |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 4                   | N                                    | N                                 |
| B                    | 0B                           | 2                       | 12000                             | 9.2                                 | -393.3                     | -178.3                   |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 4                   | N                                    | N                                 |
| B                    | 0B                           | 2                       | 10300                             | 9.2                                 | -403.0                     | -188.0                   |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 4                   | N                                    | N                                 |
| B                    | 0B                           | 2                       |                                   | 9.2                                 | -405.3                     | -190.3                   |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 4                   | N                                    | N                                 |
| C                    | Inside C                     | 1                       | 930                               | 10.4                                | -176.8                     | 37.2                     |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 2                   | N                                    | N                                 |
| C                    | Inside C                     | 2                       | 11900                             | 9.8                                 | -371.8                     | -157.8                   |                       |                       |                       |                       |                     |                    |                    | Y                               | N                         | N                               | N                                | 4                   | N                                    | N                                 |
| C                    | Outside C                    | 1                       | 387                               | 10.4                                | -206.3                     | 7.7                      |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 1                   | N                                    | N                                 |
| C                    | Outside C                    | 2                       | 224                               | 10.9                                | -206.3                     | 6.7                      |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 0                   | N                                    | N                                 |
| Ref                  | Ref 1                        | 1                       | 96.3                              | 10.9                                | -26.3                      | 186.7                    |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 0                   | N                                    | N                                 |
| Ref                  | Ref 1                        | 2                       | 114                               | 10.7                                | -42.1                      | 170.9                    |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 0                   | N                                    | N                                 |
| Ref                  | Ref 2                        | 1                       | 134                               | 9.4                                 | -297.9                     | -82.9                    |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 0                   | N                                    | N                                 |
| Ref                  | Ref 2                        | 2                       | 126                               | 10.5                                | -94.2                      | 118.8                    |                       |                       |                       |                       |                     |                    |                    | N                               | N                         | N                               | N                                | 0                   | N                                    | N                                 |

Table note:  
Odour rating: ranked on a scale of 0 (no odour) to 4 (very strong sulphide odour)

| <i><b>Transect Name</b></i> | <i><b>Sampling Station Name</b></i> | <i><b>Replicate Number</b></i> | <i><b>Flocculent Organic Material Observed (Y/N)</b></i> | <i><b>Shell Hash Observed (Y/N)</b></i> | <i><b>Terrigenous Material Observed (Y/N)</b></i> | <i><b>Farm Litter Observed (Y/N)</b></i> | <i><b>Macrophytes Observed (Y/N)</b></i> | <i><b>Megafauna Observed (Y/N)</b></i> | <i><b>Sediment Colour Observations</b></i> | <i><b>Sediment Texture Observations</b></i> | <i><b>Other Sample Observations (Comments)</b></i> |
|-----------------------------|-------------------------------------|--------------------------------|--|---|---|--|--|--|--|---|--|
| A                           | Inside A                            | 1                              | N  | Y                                       | Y   | N  | N  | Y                                      | Grey                                       | Mud   | 1 Worm   |
| A                           | Inside A                            | 2                              | N  | Y                                       | Y   | N  | N  | N                                      | Grey                                       | Mud   | 1 Worm   |
| A                           | Outside A                           | 1                              | N  | N                                       | N   | N  | N  | Y                                      | Brown                                      | Clay mud                                    | 1 Worm   |
| A                           | Outside A                           | 2                              | N  | Y                                       | Y   | N  | N  | Y                                      | Grey                                       | Mud   | 1 Worm   |
| B                           | 0B                                  | 1                              | N  | Y                                       | N   | N  | N  | N                                      | Grey                                       | Mud   |  |
| B                           | 0B                                  | 2                              | N  | Y                                       | Y   | N  | N  | N                                      | Grey                                       | Mud   | 1 Needle   |
| B                           | 0B                                  | 2                              | N  | Y                                       | Y   | N  | N  | N                                      | Grey                                       | Mud   |  |
| B                           | 0B                                  | 2                              | N  | Y                                       | Y   | N  | N  | N                                      | Grey                                       | Mud   |  |
| C                           | Inside C                            | 1                              | N  | Y                                       | Y   | N  | N  | N                                      | Grey                                       | Sandy mud                                   |  |
| C                           | Inside C                            | 2                              | N  | Y                                       | Y   | N  | N  | N                                      | Grey                                       | Sandy mud                                   | Trace Beggiatoa                                    |
| C                           | Outside C                           | 1                              | N  | N                                       | Y   | N  | N  | N                                      | Grey                                       | Mud   |  |
| C                           | Outside C                           | 2                              | N  | Y                                       | Y   | N  | N  | Y                                      | Grey                                       | Sandy mud                                   | Worms  |
| Ref                         | Ref 1                               | 1                              | N  | N                                       | Y   | N  | N  | N                                      | Brown grey                                 | Muddy sand                                  |  |
| Ref                         | Ref 1                               | 2                              | N  | N                                       | N   | N  | N  | N                                      | Brown grey                                 | Muddy sand                                  |  |
| Ref                         | Ref 2                               | 1                              | N  | N                                       | Y   | N  | N  | N                                      | Grey brown                                 | Sandy mud                                   |  |
| Ref                         | Ref 2                               | 2                              | N  | Y                                       | Y   | N  | N  | N                                      | Grey brown                                 | Sandy mud                                   |  |

## Appendix 3 – Concepcion Point ASC Survey Summary

|                        |                  |                     |                                 |
|------------------------|------------------|---------------------|---------------------------------|
| <b>Company:</b>        | Grieg Seafood    | <b>Sample date:</b> | June 13 and 14, 2022            |
| <b>Farm Site:</b>      | Concepcion Point | <b>Field crew:</b>  | E. Cicon, C. Rodger, M. Haswell |
| <b>Site License #:</b> | AQ1789           | <b>Analytical:</b>  | SGS Canada Inc                  |
| <b>Site Location</b>   | Nootka Sound, BC |                     |                                 |

| SULPHIDES Indicator 2.1.1 Requirement $\leq 1500$ ( $\mu\text{m}$ ) |       |       |   |       |                  |
|---|-------|-------|---|-------|------------------|
| Station   | Rep 1 | Rep 2 | n | Mean  | ASC Criteria Met |
| Inside AZE A  | 287   | 517   | 2 | 402   |                  |
| Outside AZE A   | 157   | 152   | 2 | 155   | Yes              |
| 0m B  | 18500 | 12000 | 2 | 15250 |                  |
| Inside AZE C  | 930   | 11900 | 2 | 6415  |                  |
| Outside AZE C   | 387   | 224   | 2 | 306   | Yes              |
| Reference 1   | 96.3  | 114   | 2 | 105   |                  |
| Reference 2   | 134   | 126   | 2 | 130   |                  |

| REDOX POTENTIAL Indicator 2.1.1 Requirement $> 0$ mV |        |        |   |        |                  |
|--|--------|--------|---|--------|------------------|
| Station  | Rep 1  | Rep 2  | N | Mean   | ASC Criteria Met |
| Inside AZE A   | 282.4  | 128.3  | 2 | 205.4  |                  |
| Outside AZE A  | 218.8  | 181.0  | 2 | 199.9  | Yes              |
| 0m B   | -232.6 | -178.3 | 2 | -205.5 |                  |
| Inside AZE C   | 37.2   | -156.8 | 2 | -59.8  |                  |
| Outside AZE C  | 7.7    | 6.7    | 2 | 7.2    | Yes              |
| Reference 1  | 187.7  | 171.9  | 2 | 179.8  |                  |
| Reference 2  | -82.9  | 119.8  | 2 | 143.3  |                  |