



Operations and Maintenance Manual

Fort Ward, Orchard Rocks, Clam Bay, and Hope Island Net Pen

Updated: July 7, 2021

Cross Reference of Regulatory Requirements Between Plans and NPDES Permits

NPDES Permit Condition	NPDES Permit Condition Subject	Addressed by Cooke Plan	Cooke Plan Section
S.4.A	Operation and Maintenance Manual	O & M Manual	1.0
S.4.A.1.a	O &M Update Submittal	O & M Manual	1.0
S.4.A.1.b	O &M Changes	O & M Manual	1.0
S.4.A.1.c	O & M Copies	O & M Manual	1.0
S.4.A.1.d	Compliance	O & M Manual	1.0
S.4.A.2.a	Noncompliance Corrective Action	O & M Manual	4.0
S.4.A.2.b	Emergency Procedures	O & M Manual	3.0
S.4.A.2.c	Critical Components	O & M Manual	5.0
S.4.A.2.d	Directions to Staff	O & M Manual	2.0
S.4.A.2.e	Minimum Staffing Requirements	O & M Manual	6.0
S.4.A.3.a	Fish Feeding	Pollution Prevention Plan	4.0
S.4.A.3.b	Size of Feed	Pollution Prevention Plan	4.1.1
S.4.A.3.c	Excessive Fines and High Digestibility	Pollution Prevention Plan	4.1.2
S.4.A.3.d	Data	O & M Manual	7.2
S.4.A.3.e	Fish Carcasses	Pollution Prevention Plan	6.0
S.4.A.3.f	Fish Carcass Storage and Disposal	Pollution Prevention Plan	6.1
S.4.A.3.g	Disposal of Fish Mortalities, Harvest Blood, and Leachate	Pollution Prevention Plan	6.3
S.4.A.3.h	Maintenance of Net Pens	Fish Escape Prevention Plan	9.0
S.4.A.3.i	Net Cleaning and Cooke/DNR Net Hygiene Protocols	O & M Manual Fish Escape Prevention Plan	7.4.1 9.1
S.4.A.3.j	Storage and Secondary Containment of Daily Materials	Pollution Prevention Plan	3.2 and Appendix A
S.4.A.3.k	Prohibited Discharges	O & M Manual	9.0
S.4.A.3.l	Toxic Discharges	O & M Manual	9.1
S.4.A.3.m	Soaps, Detergents, and Disinfectants	O & M Manual	9.2
S.4.A.3.n	Pressure Washing	Pollution Prevention Plan	3.0
S.4.A.3.o	Debris Prevention	Fish Escape Prevention Plan	9.3
S.4.A.3.p	Floating Debris	Fish Escape Prevention Plan	9.3
S.4.A.3.q	Use of Tributyl tin	O & M Manual	10.0
S.4.A.3.r	Dropped or Lost Nets	O & M Manual	7.4.4
S.7	Net Pen Structural Integrity Assessment Report	Fish Escape Prevention Plan	7.0
S.8.A.2	Pollution Prevention Plan Changes or Updates	Pollution Prevention Plan	1.0
S.8.A.3	Annual Review	Pollution Prevention Plan	1.0
S.8.A.4	Pollution Prevention Plan Changes	Pollution Prevention Plan	1.0
S.8.A.5	Adherence to the Pollution Prevention Plan	Pollution Prevention Plan	1.0
S.8.B	Pollution Prevention Plan and Components	Pollution Prevention Plan	1.0
S.8.B.1	List of All Materials Stored on site	Pollution Prevention Plan	Appendix A
S.8.B.2	Description of Preventative Measures	Pollution Prevention Plan	Appendix A
S.8.B.3	Reporting System	Pollution Prevention Plan	2.0
S.8.B.4	Description of Response and Procedures	Pollution Prevention Plan	2.0
S.8.B.5	Staff Training	Pollution Prevention Plan	9.0
S.8.B.6	Fish Feeding	Pollution Prevention Plan	4.0
S.8.B.7	Disease Control Chemical Use	Pollution Prevention Plan	5.0
S.8.B.8	Disease Control Chemical Disposal	Pollution Prevention Plan	5.4
S.8.B.9	Solid and Biological Wastes	Pollution Prevention Plan	6.0

NPDES Permit Condition	NPDES Permit Condition Subject	Addressed by Cooke Plan	Cooke Plan Section
S.8.B.10	Inspection Schedule	Fish Escape Prevention Plan	7.0
S.8.B.11	Stormwater	Pollution Prevention Plan	8.0
S.8.B.12	Routine Maintenance	Pollution Prevention Plan	3.0
S.8.B.13	Unusual Event Notifications	Pollution Prevention Plan	10.0
S.9.F		Fish Escape Prevention Plan	3.1
S.9.	Fish Escape Plan	Fish Escape Prevention Plan	1.0
S.9.A	Technology to Minimize Fish Escape	Fish Escape Prevention Plan	9.4
S.9.B	Normal Daily Operations	Fish Escape Prevention Plan	5.0
S.9.C	Net Pen and Repair	Fish Escape Prevention Plan	4.0
S.9.D	Inspection Schedule	Fish Escape Prevention Plan	7.0
S.9.E	Routine Repairs and Emergencies	Fish Escape Prevention Plan	4.0
S.9.F	Ecology Notification	Fish Escape Prevention Plan	2.0
S.9.G	Stocking and Harvesting	Fish Escape Prevention Plan	6.0
S.9.H	Pen Stabilization	Fish Escape Prevention Plan	2.3
S.9.I	Training	Fish Escape Prevention Plan	8.0
S.9.J	Net Cleaning & Cooke/DNR Net Hygiene Protocols	Fish Escape Prevention Plan	9.1
S.9.K	Holes in Nets	Fish Escape Prevention Plan	9.2
S.9.L	Fish Tracking	Fish Escape Prevention Plan	10.0
S.10.A	Emergency Contact List	Fish Escape Response and Reporting Plan	2.0
S.10.B	24-Hr Notification and Reporting	Fish Escape Response and Reporting Plan	2.0
S.10.C	Emergency Procedures	Fish Escape Response and Reporting Plan	5.0
S.10.D	Technology to Minimize Fish Escape	Fish Escape Response and Reporting Plan	6.0
S.10.E	Personnel Training Unified Command System	O & M Manual	7.1
S.10.F	Unified Command, Incident Command, and Preparedness	O & M Manual	7.1
S.10.G	Fish Recapture	Fish Escape Response and Reporting Plan	4.0
S.10.H	Antibiotics	Fish Escape Response and Reporting Plan	3.1
S.10.I	Antibiotic Reporting	Fish Escape Response and Reporting Plan	3.1
S.10.J	Annual Fish Release Report	Fish Escape Response and Reporting Plan	8.0

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1. Overview

Cooke Aquaculture Pacific (Cooke) owns and operates several marine net pen aquaculture operations in Washington. Juvenile fish are raised to smolt-size at a land-based freshwater hatchery and then transported to the marine net pens where they are grown to larger harvestable sized fish. The marine net pens will begin growing only native fish species starting in 2021. A modified NPDES permit was issued by Ecology on January 6, 2021, for the Cooke marine facilities which approves the rearing of all-female, triploid Steelhead trout (*Oncorhynchus mykiss*) in the fish pens covered under the modified NPDES permit. Native Steelhead will be grown to marketable sizes before being harvested out of the pens and transferred by boat to a land-based processing facility. The fish are processed, cleaned, and packaged at the processing plant and then sold and shipped to local markets, as well as to commercial seafood buyers primarily in the western United States. In 2019, the Washington State Department of Ecology (Ecology) re-issued new, updated NPDES permits for the Cooke net pen facilities. These permits clearly identify the operating requirements, current regulations, and water quality standards for the marine net pens. Each facility is issued an individual NPDES permit, shown in Table 1 below.

2021 Permit Modifications and Operational Updates for the Cooke Net Pen Sites:

As of October 2020, Cooke harvested all the remaining Atlantic salmon from their marine net pen facilities. No new populations of Atlantic salmon will be planted into the Cooke marine pens. In 2018, Cooke made the decision to transition to growing native fish species and applied for the environmental permits to reach this goal. On January 21, 2020, after substantial scientific review and public input, the Washington Department of Fish and Wildlife (WDFW) issued a Marine Finfish Aquaculture Permit that approved the culturing of all-female triploid steelhead trout stocks at the marine fish pens. Cooke submitted applications to Ecology at the same time requesting the modification to the recently renewed NPDES permits that would allow the change of species to be reared at the Cooke facilities from Atlantic salmon to sterile Steelhead trout. The NPDES permit modifications underwent thorough scientific review by Ecology, and extensive agency input and public comment periods. Additional provisions, updates and clarifications were incorporated into the permits and the modified NPDES permits were issued January 6, 2021.

The July 2021 updates to the O & M Manual, Fish Escape Prevention Plan and Fish Escape Response and Reporting Plan, and the Pollution Prevention Plan are being made to incorporate new conditions in the modified permits and to update any changes to operational procedures being used to comply with these and the other updated permits.

Table 1: Facility NPDES Permit Numbers

Facility	NPDES Permit Number
Fort Ward	WA0031534
Orchard Rocks	WA0031542
Clam Bay	WA0031526
Hope Island	WA0031593

This Operations and Maintenance Manual (O&M Manual), together with the Pollution Prevention Plan, Fish Escape Prevention Plan, and Fish Escape Response and Reporting Plan (the Plans), satisfy the requirements of the 2021 modified NPDES individual facility permits for the Fort Ward, Orchard Rocks, Clam Bay, and Hope Island net pen facilities.

The Plans describe the proper operation and maintenance of each facility to ensure compliance with the permits. Staff at each facility must follow the instructions and procedures of this manual and Plans. The Permit Coordinator reviews and updates the Plans annually and as needed. If the Plans are changed or updated, the Permit Coordinator will submit them to Ecology for comments and review. The facility's NPDES permits, and the Plans will be posted at the facilities.

2. Directions to Staff

The Pollution Prevention Plan, Fish Escape Prevention Plan, Fish Escape Response and Reporting Plan, and this Operation and Maintenance Manual are used in conjunction with each other, and function collectively as directions to staff. The most effective way to find applicable directions is to use the regulatory cross reference at the beginning of this manual.

This **Operations and Maintenance Manual** contains directions to staff on:

- Emergency procedures (Section 3)
- Unusual Events and/or Emergency Event Reporting Procedures and Contacts (3)
- Responding to and correcting actual or potential permit non-compliance (4)
- Actions required to inspect and maintain critical components (5)
- Minimum staffing levels required for operation (6)
- Requirements for normal operation, inspections, and maintenance (7)
- Net pen maintenance, cleaning, dropped or lost nets, and debris (7.4)
 - Net cleaning roles are:
 - Site staff inspect and report on status of machines
 - Site Managers ensure machines are maintained adequately and communicate need for additional machines before one breaks down
 - Permit Coordinator or Business Support Analyst ensures an extra machine is provided when needed
- Net Hygiene Inspection, Reporting and WDNR Video Compliance Procedures (7.4)
- Material storage and secondary containment (8)
- Unusual Events, Emergency Contacts List (Appendix A)

The **Pollution Prevention Plan** contains directions to staff on:

- Emergency spill response and reporting (Section 2)
- Unusual Events reporting and contact lists (3)
- Facility site maps and spill kit locations and contents (3)
- Procedures for routine maintenance to prevent pollutants from entering the water (4)
- Fish feeding procedures (5)
- Monthly reporting to Ecology, WDFW and DNR on Feed Use, Disease Control Chemical Use, Biomass, Mortality, Fish Inventory, Harvesting, and average Feed Conversion Rates (5)
- Disease control chemical use, storage, and disposal (6)
- Handling and disposing of fish mortality and biological wastes (7)
- Procedures to Identify new or potential stormwater pollution (10)
- Unusual Events, Emergency Contacts Lists (Appendix A)

The **Fish Escape Prevention Plan** includes directions to staff on:

- Notifying Ecology of major or emergency repairs or structural problems (Section 2)

- Unusual Events reporting and contact lists (3)
- Net pen stabilization (4)
- Routine procedures and best management practices to reduce fish escapes (5)
- Stocking and harvesting fish (6)
- Procedures to reduce escapements during repairs (8)
- Inspection schedules and procedures (9)
- Net Hygiene, net scoring and WDNR compliance procedures (9)
- Additional information on net cleaning, repairs, or debris prevention (11)
- Unusual Events, Emergency Contacts Lists (Appendix A)

The **Fish Escape Response and Reporting Plan** contains directions to staff on:

- Reporting Procedures in case of fish escape (Section 3)
- Unusual Events (3)
- Fish recapture procedures (4)
- Emergency procedures to limit the further escape of fish (5)
- Unusual Events, Emergency Contacts Lists (Appendix A)

3. Emergency Procedures

3.1 Accidental Release of Oil or Hazardous Material

The Pollution Prevention Plan describes emergency procedures for responding to spills of oil and hazardous materials. In the event of an accidental oil, petroleum product, or hazardous material spill at the facility, staff must identify the spill source, stop the release, and contain the impacted area. Additionally, facility staff must initiate the spill reporting call tree located in the Pollution Prevention Plan- Emergency Spill Response Procedures, Section 2. Spill containment and cleanup efforts take priority over all other work activities. After the spill is cleaned up, the Site Manager performs a full site inspection. Facility staff must record the incident on the spill documentation form (Pollution Prevention Plan, Appendix C) and must label and properly dispose of the used cleanup materials.

3.2 Accidental Release of Fish

The Fish Escape Response and Reporting Plan describes emergency procedures for responding to the accidental release of fish. Staff must notify all appropriate Cooke, state agency and tribal contacts in the event of an accidental release of fish using the Emergency Contact List call tree, located in Section 2 of the Fish Escape Response and Reporting Plan. Staff must take quick action to minimize or cease the escapement of fish, keeping the safety of staff and the containment and potential recovery of fish at the forefront of decision-making. Fish removal and re-inventory processes will be initiated as soon as practicable after the discovery of an accidental release of fish.

3.3 Structural Integrity

Emergency procedures for responding to and reporting structural instability or collapse of the net pen structure or mooring system are described in the Fish Escape Prevention Plan. In the event the net pen structure or mooring system becomes substantially damaged, Cooke management must work quickly to stabilize the structure and

notify the state agencies of the situation. Actions to reduce or eliminate the likelihood of escaped fish must be immediately enacted.

3.4 Unusual Event Notification

Ecology, DNR, and WDFW will be notified of unusual events which could lead to or may cause structural issues that could require major repair or that could produce a release of fish and/or spill of material into the water. An “unusual event” is something which an uncommon event or abnormal situation that could lead to an increased potential for accidental fish escapement or spill.

Examples of unusual events would be an accidental boat strike which damages the fish pens, or an intense storm event that has caused substantial damage to the fish pen structure. A description of the procedures for identifying what constitutes an unusual event and the state agency reporting procedures are found in the Pollution Prevention Plans and Fish Escape Prevention Plans. An Unusual Event Emergency State Agency Contact List is included in Appendices of each of the Plans. Actions to reduce or eliminate the likelihood of escaped fish, or spill of material into the water must be enacted as quickly as possible by staff.

4. Noncompliance Corrective Actions

Cooke employees must follow all company plans and procedures and take immediate action to correct any condition that is noncompliant with the NPDES permit issued to the facility. This includes the release of fish and exceedances of the water quality standards. Procedures for addressing the accidental release of fish can be found in the Fish Escape Response and Reporting Plan. Any noncompliance that endangers health or the environment must be reported to Ecology within 24 hours. Appropriate and proportional corrective actions must be taken to address the noncompliance identified.

The Permit Coordinator must submit a written report within five days that contains a description of the noncompliance and its cause, the exact period of noncompliance, the estimated time the noncompliance is expected to continue if not already rectified, and steps taken or planned to reduce, eliminate, or prevent a recurrence.

4.1 Sediment Management Standards and Water Quality Criteria

The NPDES permits require that discharges of waste from permitted net pen facilities comply with Washington’s Sediment Management Standards (Chapter 173-204 WAC) and Surface Water Quality Criteria (Chapter 173-210A WAC) to protect biological resources and human health. Those standards are outlined in Table 2, below.

Table 2: Sediment Management Standards and Water Quality Criteria

Parameter	Standard
total organic carbon (TOC)	0.5-2.6 % dry weight, as a function of silt-clay % dry weight
zinc	410 mg/kg dry weight
copper	390 mg/kg dry weight
dissolved oxygen	Record high, low, and average at each corner and the center of the pens. May not cause a decrease in dissolved oxygen over 0.2 mg/L.
benthic infauna	Statistically different from the reference sample, meaning a t-test p value less than or equal to 0.05.

The NPDES permits require that Cooke sample and analyze sediment, water quality, and evaluate benthic quality at each facility annually during the critical summer period (August 15 to September 30). Cooke does not use copper anti-fouling agents on the nets or cage systems and is no longer required to analyze sediment samples for copper. The sediment, water quality, and benthic quality sampling and analysis is also required whenever the peak biomass for a generation (considered to be the period within 45 days of the first harvest of each generation) falls outside of the critical summer period.

Cooke assesses compliance with the Sediment Management Standards and Water Quality Criteria by implementing Sampling and Analysis Plans (SAP) in accordance with condition S2 of the NPDES permits. Cooke contracts with aquatic science consultants to develop the SAP, perform the sampling and benthic analysis activities, and prepare the Sediment Data Reports required by the permit. The analysis report compares sediment total organic carbon (TOC) and zinc against the Sediment Management Standards.

If the Sediment Data Reports indicate that sediments fail to meet the standards, Cooke will work with Ecology and the third-party consultant to perform Exceedance and Enhanced Monitoring.

4.1.1 Exceedance Monitoring Procedure

1. A third-party consultant collects additional samples at permit-specific locations.
2. The Permit Coordinator reviews and submits an SAP to Ecology by January 31 for sampling between August 15 and September 30, and no less than 90 days before the next estimated peak biomass period. Ecology needs 45 days to review and approve the SAP.

4.1.2 Enhanced Monitoring Procedure

1. If the exceedance monitoring results are above permit limits, a third-party contractor collects additional samples.
2. The Permit Coordinator submits an SAP to Ecology by January 31 for sampling between August 15 and September 30, and no less than 90 days before the next estimated peak biomass period. Ecology needs 60 days to review and approve the SAP.

4.1.3 Exceedance of the Sediment Management Standards for TOC Procedure

1. The Permit Coordinator notifies the Cooke General Manager.
2. Site Managers ensure feed wastage is not occurring at the site by providing additional oversight of the feeding process.
3. The Permit Manager follows up with the Site Manager to ensure that feeding levels have been correct, checks that feed conversion rates fall within the expected levels, and checks on feed delivery methods to ensure the feed process is occurring correctly.
4. The Site Managers, in consultation with the Permit Manager, consider whether a full or partial removal of biomass from the net pens is required to reduce the amount of feed. This step could be employed as a method to correct the noncompliance with the Sediment Management Standards.

4.1.4 Exceedance of the Sediment Management Standards for Zinc Procedure

1. The Site Managers and the Permit Coordinator will request that the feed suppliers measure their supplemental zinc levels and submit sample splits to an independent lab work to ensure there is the correct amount of supplemental zinc in the fish food. If the results of this analysis show that the amount of supplemental zinc exceeds the expected zinc metabolization rates of the fish, the composition of the feed will be corrected.
2. Site Managers provide additional oversight of the feeding process by ensuring feed wastage is not occurring at the site, as uneaten feed accumulation in the benthic environment may cause zinc levels to increase. The zinc supplement added to the feed is a highly digestible form and easily metabolized by the fish, but uneaten feed pellets have un-metabolized zinc, potentially increasing zinc levels in the sediments if allowed to accumulate.
3. The Permit Coordinator follows up with the Site Manager to ensure that feeding levels have been correct, to check that feed conversion rates fall within the expected levels, and to check on feed delivery methods to ensure the feed process is occurring correctly.

4. The Site Managers, in consultation with the Permit Manager, consider whether a full or partial removal of biomass from the net pens is required to reduce the amount of zinc discharged. This step could be employed as a method to correct the noncompliance with the Sediment Management Standards.

4.2 Release of Net Pen Cultivated Fish Stocks

The procedures to prevent, respond to, and report fish escape are detailed in the Fish Escape Prevention and Response and Reporting Plans.

5. Review of Critical Structural Components

Floating marine net pen cage systems consist of a semi-rigid steel or plastic floating structure held in place by a series of external mooring lines attached around the perimeter of the structure. The fish containment nets (stock nets) attach to the floating cage structure above the surface of the water. The bottom of each square stock net attaches to sinker tubes or other types of weighting systems that submerge and hold the net in place. The combination of the semi-rigid floating structure and the net weighting system creates the open growing space (fish pen) in which the fish can be reared. Additional netting materials cover the surface of each fish pen to prevent avian predation and surround the perimeter of the submerged stock nets to protect against marine mammal predation.

The Fort Ward, Orchard Rocks, and Clam Bay marine net pen systems are Ocean Catamaran cages built by Pro Ocean. They are constructed on a series of large steel pontoons sections that provide the floatation of the structure. The steel pontoons and crossbeams attach with series of steel hinges. Walkway structures welded to each pontoon and crossbeam section create the working platform for employees and the surface attachment points for containment nets, predator nets, and mooring line. The perimeter of the steel structure has a series of attachment points where each mooring line connects.

The Hope Island site marine net pen was constructed by Wavemaster and consists of hinged galvanized steel walkways that have numerous plastic foam-filled floats attached underneath. These foam floats provide buoyancy for the steel walkways structure and cage system. The walkways create the working platform for the employees and the attachment points for the stock nets, predator nets, and support for other fish-growing equipment. Hinged mooring plates are located around the outside perimeter of the walkways for the attachment of the mooring lines.

5.1 Engineer Structural Integrity Inspections and Reporting Requirements

Routine inspections by a professional engineering firm with experience in marine cage structure and mooring system design, analysis and modeling are carried out approximately every 2 years at each farm site. The engineering firm will produce a report discussing the results of their inspection and engineering analysis on the mooring and cage system design with respect to the safety and structural integrity of those systems using environmental condition data that is consistent with the Norwegian aquaculture standard NS 9415. Final copies of the engineer’s report are submitted to Ecology, WDFW and WDNR for review. There is additional information on the net pen maintenance procedures in the Pollution Prevention Plans and Fish Escape Prevention Plans.

Table 3, below, details critical components common to the net pen systems at each facility, their most probable mode of failure, and the Best Management Practices (BMPs) implemented to ensure their continued structural integrity.

Table 3: Critical Structural Components and BMPs

Component	Most Probable Mode of Failure	Best Management Practices
Steel Cage Structure	Metal fatigue. Excessive corrosion/loss of material. Mooring failure.	<ul style="list-style-type: none"> ■ Maintenance and repair reporting and recordkeeping through Weekly Surface Inspection Reports. ■ Inspections every two years by marine engineering firm assessing structural integrity, mooring analysis, and analysis of risk.
Steel Flotation Pontoons	Excess corrosion or mechanical damage leading to loss of	<ul style="list-style-type: none"> ■ Maintenance and repair reporting and recordkeeping through Weekly Surface Inspection Reports.

Component	Most Probable Mode of Failure	Best Management Practices
	airtight chambers in steel pontoons.	<ul style="list-style-type: none"> ■ Annual below-surface inspections. ■ Ultrasonic survey of metal thickness of steel pontoons every two years. ■ Inspections every two years by marine engineering firm assessing structural integrity, mooring analysis, and analysis of risk.
Foam-filled Plastic Flotation	Mechanical damage	<ul style="list-style-type: none"> ■ Maintenance and repair reporting and record keeping through Weekly Surface Inspection Reports. ■ Annual below surface inspections. ■ Inspections every two years by marine engineering firm assessing structural integrity, mooring analysis, and analysis of risk.
Surface Mooring Line Attachment Point System and Connections	Metal fatigue. Excessive corrosion/loss of material. Exceeding safety factor of the Ultimate Limit State (ULS) or Accident Limit State (ALS).	<ul style="list-style-type: none"> ■ Maintenance and repair reporting and recordkeeping through Weekly Surface Inspection Reports. ■ Inspections every two years by marine engineering firm assessing structural integrity, mooring analysis, and analysis of risk. ■ Mooring components sized correctly to meet recommended safety factor. ■ Repair and maintenance to keep components in good working order.
Mooring lines	Mechanical damage. Exceeding safety factor of ULS or ALS.	<ul style="list-style-type: none"> ■ Weekly Surface Inspections Reports ■ Daily observation by facility staff to identify mooring line failure. ■ Inspections every two years by marine engineering firm assessing structural integrity, mooring analysis, and analysis of risk. ■ Mooring components sized correctly to meet recommended safety factor. ■ Mooring components inspected from surface to anchor on an annual basis, noting the condition of components. Conditions noted in the annual inspections dictate repair and maintenance.
Mooring Chains	Excessive corrosion/loss of material. Exceeding safety factor of ULS or ALS.	<ul style="list-style-type: none"> ■ Weekly Surface Inspections Reports ■ Daily observation by facility staff to identify mooring line failure. ■ Inspections every two years by marine engineering firm assessing structural integrity, mooring analysis, and analysis of risk. ■ Mooring components correctly sized to meet recommended safety factor. ■ Mooring chains inspected from surface to anchor on an annual basis, noting the condition of components. Conditions noted in the annual inspections dictate repair and maintenance.
Mooring Shackles	Excessive corrosion/loss of material. Exceeding ULS or ALS.	<ul style="list-style-type: none"> ■ Weekly Surface Inspections Reports ■ Daily observation by facility staff to identify mooring shackle failure. ■ Inspections every two years by marine engineering firm assessing structural integrity, mooring analysis, and analysis of risk. ■ Mooring components correctly sized to meet recommended safety factor.

Component	Most Probable Mode of Failure	Best Management Practices
		<ul style="list-style-type: none"> Mooring components inspected from surface to anchor on an annual basis, noting the condition of components. Conditions noted in the annual inspections dictate repair and maintenance.
Anchors	Anchor not “setting” into substrate.	<ul style="list-style-type: none"> Mooring components are inspected from the surface connections down to the anchor location in the seafloor on an annual basis. Conditions noted in the annual inspections dictate repair and maintenance. Anchors are typically buried below the seafloor surface as they are pulled into position and “set”. Annual underwater inspections note if an anchor is completely buried, half buried or on surface. Anchor weights and types are used in mooring system that meet or exceed recommended safety factors specified in the marine engineering firm mooring analysis. Ground tackle (chain, shackles) connected to the anchors are sized correctly to meet recommended safety factor. Repositioned or re-set anchors are inspected again by divers or ROV’s to verify correct orientation for setting.
Stock Net Attachment Points, Handrails, Net Tie Rail	Excessive corrosion/loss of material.	<ul style="list-style-type: none"> Weekly Surface Inspections Reports Daily observation by facility staff to identify potential problems. Inspections every two years by marine engineering firm assessing structural integrity, mooring analysis, and analysis of risk. The condition of components is noted in marine engineer inspection reports. Repairs or replacement of materials are scheduled accordingly.
Fuel and oil containment devices	Mechanical damage. Human error.	<ul style="list-style-type: none"> Include fuel, fuel holding, transfer hoses, and equipment in the monthly Stormwater Prevention Inspection report. Only double-walled fuel cells or tanks with secondary containment are used for the diesel generators and air compressors at the facility. Spill containment kits are located in areas where fuel tanks for the machinery is located. Diesel fuel transfer into the equipment fuel tanks is carried out by personnel that have been trained on safe fuel handling techniques. Farm sites have several employees that have HAZWOPER training.

6. Minimum Staffing

Table 4 below details the minimum staffing needed for proper operation and maintenance of the facility, broken down by task. These tasks apply to all Cooke facilities.

Table 4: Minimum Staffing per Task

Task	Minimum Staff	Details
Fish feeding	1	Standard operating procedures require one person to feed the fish.
Dive operations	3	Dive operations are described in the Cooke Dive Safety Handbook. Normal mortality retrieval dives are a minimum of three times per week, with the exception of adverse weather conditions.
Supply delivery	2	Cooke-operated supply vessels must have two persons onboard for operating the vessel. This is standard operating procedure.
Harvesting	4	Standard operating procedures for harvest operations require four people.
Net cleaning	1	One person required to operate or monitor a net cleaning machine.

Task	Minimum Staff	Details
Net rotation	7	Standard operating procedures state that net rotations require a dive team (3 people), a Cooke-operated supply vessel (2 people), and a surface crew (2 people) in order to carry out the task.
Facility structure maintenance	2	Typically carried out by the Cooke-operated supply vessel crew.
Mooring maintenance	2	The Cooke-operated supply vessel crew performs routine mooring maintenance.
No activity	0	Normal operations are seven days a week during work hours. Provided that the facility is operating normally, as indicated by regular and thorough inspections, there are times, e.g., during intermittent fallowing periods, lunch breaks, when the minimum number of people required to operate and maintain the facilities is temporarily zero. Cooke management emergency contact information is posted at each facility and upland farm office. Company management and key employees are provided with company cell phones. Staff members can arrive at the net pen sites within an hour of emergency notification.

7. Operating Requirements

Operating requirements are set by Cooke to ensure the safe and compliant operation of net pen facilities. Cooke requires that all staff follow these requirements in the performance of their duties.

7.1 Fish Feeding

Cooke Site Managers and fish feeding staff must perform fish feeding according to the procedures in the Pollution Prevention Plan, Section 4.0. This section of the Pollution Prevention Plan addresses the Operating Requirements of fish feeding regulated by Permit conditions S4.A.3 a-d.

7.2 Collecting Data

Environmental and biological factors influence the feeding rate of the fish. The total amount of feed fed to each net pen, and the rate at which it is distributed, is adjusted on a daily basis to ensure compliance with the permit and optimize feed conversion rates. The type of data collected, and the biological affect are presented in the Pollution Prevention Plan, Section 4.1.3.

The fish feeding stops when fish are observed to be less interested in the food. The daily feeding rate is compared to the expected feeding rate for signs of over or underfeeding. Periodic size samples of the fish population allow for comparison of actual growth and feed conversion rates to the projected growth and feed conversion rate. Site Managers and feeding technicians use this information to adjust daily feed amounts to the individual pens, the feed start and stop times, and specific feed rates.

7.3 Biological Waste Control

The containment and disposal of biological wastes including fish carcasses, harvest blood, leachate, and other solid and liquid wastes are addressed in the Pollution Prevention Plan, Section 6.0.

7.4 Net Pens

7.4.1 Net Hygiene, Maintenance and DNR Net Scoring and Reporting Program

A dive team regularly inspects nets for holes and biofouling. The divers carry net needles, make small repairs where needed, and inspect the nets against the Net Scoring Chart. This Net Scoring Chart was developed in collaboration with the Washington State Department of Natural Resources (DNR). Nets must not impede current flow or tidal exchange and must not be stored on the seafloor. More information on the maintenance of the nets and the Net Hygiene and Net Scoring and Reporting Program with DNR can be found in the Fish Escape Prevention Plan, Section 9.0.

7.4.2 Cleaning

Nets are washed in-situ using pressurized seawater and net-washing machines. A minimum of one (1) net washing machine is located and maintained in operating condition at each farm facility during the entire growing cycle when stock containment nets are in use. The net washing and hygiene report describes the functional status of each net washing machine located at the facility. Additional net washing machines will be brought in, as necessary. Specific roles are defined in Section 2, Directions to Staff. No anti-foulant paint is used on the nets. More information on net washing can be found in the Fish Escape Prevention Plan, Section 9.1.

7.4.3 Net Pen Structural Integrity Report

Approximately every two years, when the farm site is fallow, Cooke contracts a licensed engineering firm to conduct inspections and assess structural integrity of the net pens. Inspections include environmental data and projections for the farm location, cage component, and mooring assessments related to escapement potential, structural integrity, permit compliance, and operations. The net pen structural integrity assessment reports are certified by a licensed professional engineer and submitted to Ecology, WDFW and DNR within 60 days.

7.4.4 Dropped or Lost Nets

Any net accidentally dropped or lost during a storm event and not recovered immediately will be marked by GPS coordinates, a buoy, and reported to Ecology and DNR within 24 hours. The net will be recovered within 30 days and Ecology will be notified on the date it is recovered. Additional information on dropped or lost nets, major repair, or structural issues, can be found in the Fish Escape Prevention Plan, Sections 3 and 4. For more information on Emergency Structural Problems, notifications, and reporting, see the Fish Escape Prevention Plan, Section 2.

7.4.5 Debris

Items stored on the walkways and structural components of the net pens shall be secured in such a way as to not allow them to fall into the water. Debris that is discovered in the water shall be removed. More information on debris loss prevention and debris recovery are in the Fish Escape Prevention Plan, Section 9.3.

8. Storage and Secondary Containment of Materials

Chemicals, petroleum products, and other substances that could be harmful to the environment must be stored in labelled leak-proof containers in areas that provide secondary containment. Additional information on storage, use, and disposal procedures can be found in the Pollution Prevention Plan, Section 3, 4, 5, 6 and Appendix A.

9. Discharges

No discharges are allowed of sanitary waste, floating solids, visible foam (other than in trace amounts), or oily wastes that produce sheen on the surface of the receiving water.

9.1 Toxic Discharges Prohibited

No toxic discharges in toxic amounts shall be allowed to occur.

9.2 Soaps, Detergents, and Disinfectants

Discharging soaps, detergents, or disinfectants to the receiving water is prohibited. Soaps and detergents are not used at the facilities. More information on disinfectant use is located in the Pollution Prevention Plan, section 6.0.

10. Use of Tributyl Tin Prohibited

Tributyl tin is prohibited and has not been used at any of the facilities.