FACT SHEET FOR PACIFIC SHELLFISH – QUILCENE, LLC NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT WA0041114

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for Pacific Shellfish – Quilcene, LLC. This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty days before issuing the final permit. Copies of the fact sheet and draft permit for Pacific Shellfish – Quilcene, LLC, NPDES permit WA0041114, are available for public review and comment. For more details on preparing and filing comments about these documents, please see Appendix A - Public Involvement Information**.**

Pacific Shellfish – Quilcene, LLC reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, discharges, or receiving water prior to publishing this draft fact sheet for public notice. The edits and clarifications to the draft permit and fact sheet because of the entity review process is documented in Appendix F —Responsiveness Summary for Entity Review Comments.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this fact sheet as Appendix G — Response to Public Review and Comment, and publish it when issuing the final NPDES permit. Ecology generally will not revise the rest of the fact sheet. The full document will become part of the legal history contained in the facility's permit file.

Summary

Pacific Shellfish – Quilcene, LLC, is a shellfish hatchery that produces shellfish seed products of oyster, clam, and mussel species. Since the 1950's, the site was used for shellfish farming and eventually the business transitioned to a hatchery-only operation. The Coast Seafoods Company owned and operated this facility until 2011 when Pacific Shellfish, a subsidiary of the Pacific Seafood Group, purchased the hatchery.

The proposed permit is the first NPDES permit for the facility after a court decision in 2018 determined the hatchery discharged in a manner that required authorization in accordance with the Clean Water Act. The proposed permit establishes technology-based limits for solids, performance-based limits for temperature and ammonia, and water quality-based limits for turbidity, pH and total residual chlorine. The proposed permit contains a compliance schedule that sets milestones to prevent discharges of marine water to the freshwater creek. The compliance schedule requires the evaluation of all known, available, and reasonable methods of treatment and control (AKART) for removed solids in backwash, pH and ammonia in segregated discharges, and temperature (heat load) of all discharges. The AKART evaluation must include a proposal of minimum treatment and source controls for the parameters of concern.

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I. INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The Legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 Revised Code of Washington (RCW).

The following regulations apply to industrial NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC)
- Water quality criteria for surface waters (chapter 173-201A WAC)
- Water quality criteria for ground waters (chapter 173-200 WAC)
- Whole effluent toxicity testing and limits (chapter 173-205 WAC)
- Sediment management standards (chapter 173-204 WAC)
- Submission of plans and reports for construction of wastewater facilities (chapter 173-240 WAC)

These rules require any industrial facility owner/operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for performance requirements imposed by the permit.

Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See Appendix A-Public Involvement Information for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft NPDES permit. Ecology will summarize the responses to comments and any changes to the permit in Appendix G.

II. BACKGROUND INFORMATION

Table 1 - Facility Information

Applicant (Owner and Permittee):	Pacific Seafood Group
Facility Name and Address	Pacific Shellfish – Quilcene, LLC 1601 Linger Longer Road (PO Box 327) Quilcene WA 98376-0327
Contact at Facility (Operator)	Name: Ron Lau Telephone #: (808) 936-9093 Email: rlau@pacseafood.com
Contact for Facility	Name: Miranda Ries Title: Director of Regulatory Affairs Address: PO Box 97, Clackamas OR 97015-0097 Telephone #: (360) 951-7334 Email: mries@pacseafood.com
Legal Responsible Official	Name: Jon Steinman Title: Vice President of Processing and Resources Address: PO Box 97, Clackamas OR 97015-0097 Telephone #: (971) 285-2238 Email: jsteinman@pacseafood.com
Industry Type	Shellfish hatching and rearing – Individual Permit
Categorical Industry	Not applicable
Type of Treatment	Dechlorination/neutralization of cleaning residual wastestream
SIC Codes	0273 Animal Aquaculture
NAIC Codes	112512 Shellfish Farming and Shellfish Hatcheries
Facility Location (Latitude, Longitude in NAD83/WGS84 reference datum)	47.802526, -122.868616
Discharge Waterbody Name and Location (Latitude, Longitude in NAD83/WGS84 reference datum)	Outfalls to Quilcene Bay (marine) Q01: 47.802861, -122.867861 Q03: 47.802181, -122.867392 Q04: 47.802152, -122.867348 Q05: 47.802139, -122.867306 Outfalls to Un-named Creek (freshwater) U01 (formerly 02A & 02B): 47.802607, -122.868746 U02 (formerly 02D): 47.802573, -122.869061

	U03 (formerly 02F): 47.802610, -122.868721 U04 (formerly 02E-40S): 47.802695, -122.867858 U05 (formerly 02E-50S): 47.802599, -122.868806 U06 (formerly 02E-60S): 47.802553, -122.869243 U07 (formerly 02E-70S): 47.802619, -122.868646
Q03 Intake Structures (location of withdrawal) (Latitude, Longitude in NAD83/WGS84 reference datum)	Subtidal Marine Wells: W01 - Algae Dept.: 47.802142, -122.866950 W02- Larvae Dept.: 47.802150, -122.866831 W03 - Larvae Dept.: 47.802133, -122.867011 Bay Water: B01 (shallow): 47.802167, -122.864817 B02 (deep): 47.802217, -122.865367

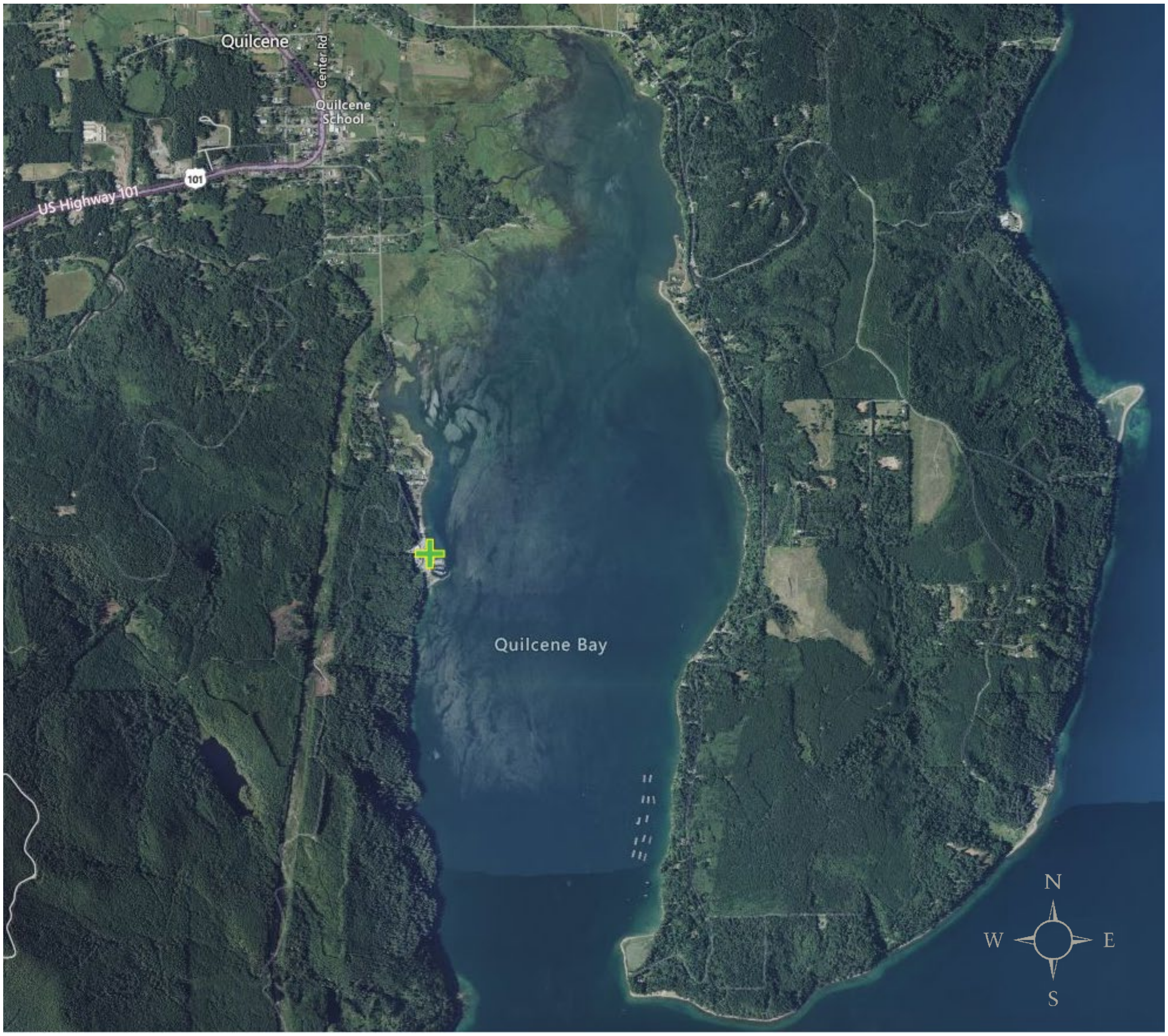
Table 2 - Permit Status

Application for Permit - Receipt Dates	December 3, 2018 June 4, 2019 June 22, 2021
Date of Ecology Acceptance of Application	September 22, 2021

Table 3 - Inspection Status

Date of Last Non-sampling Inspection Date	Reconnaissance Site Tour September 23, 2019

Figure 1 - Facility Location Map



A. Facility description

Pacific Shellfish – Quilcene, LLC, is a shellfish hatchery (the Hatchery) that hatches and cultures oysters primarily but also clams and mussels, creating products called shellfish seed. This seed is either distributed to company owned sites or sold to entities that continue to grow the shellfish on marine tidelands or from rafts until they reach harvestable sizes for commercial sale (i.e., shellfish farming). The hatchery is located in Jefferson County just south of Quilcene, Washington on the western side of Quilcene Bay, adjacent to the Herb Beck Marina. The Pacific Seafood Group owns the hatchery building property and shoreline down to the mean lower low water (MLLW) line while leasing the remaining property from the Port of Port Townsend.

History

The Coast Seafoods Company owned and operated this facility until 2011 when Pacific Shellfish, a subsidiary of the Pacific Seafood Group, purchased the hatchery. Beginning in the 1950's, the site operated as a shellfish farm. In 1978, the hatching and culturing of larval shellfish for the production of seed began (i.e., operating as a shellfish hatchery). In 2000, shellfish farming ceased, and the facility has since operated solely as a shellfish hatchery.

In 2016, the Olympic Forest Coalition filed a citizen suit under § 505 of the Clean Water Act alleging that discharges from the shellfish hatchery through pipes, ditches, and channels violate § 301(a) of the Act because the hatchery had not obtained a NPDES permit. The complaint alleged that a 2013 effluent study documented several pollutants and later water sampling indicated chlorine in the discharges.

Ecology's position leading up to the U.S. Court of Appeals decision in 2018 was the hatchery did not meet EPA's Concentrated Aquatic Animal Production Facility definition as a point source (40 C.F.R. § 122.24; 40 C.F.R. pt. 122, App. C) and as a result did not require an NPDES permit to authorize the discharges. Furthermore, Ecology reviewed the permittee's 2013 effluent study by Rensel Associates and determined that Quilcene Bay water quality was unlikely to be altered.

In March 2018, the U.S. Court of Appeals for the Ninth Circuit held in Olympic Forest Coalition v. Coast Seafoods Co., 884 F.3d 901, that pipes, ditches, and channels that discharge pollutants, specifically chlorine, from non-concentrated aquatic animal production facilities are point sources within the meaning of the Clean Water Act (CWA 33 U.S.C. § 1362(14)).

In November 2018, the Permittee submitted their first permit application package. Ecology met with the Permittee in the spring of 2019 to discuss what shellfish hatchery operations entail, the application materials and the necessity of an engineering report that meets WAC 173-240-130(2). Ecology received a draft engineering report in June 2019. While this first draft engineering report lacked sufficient information to characterize all the processes and discharges, the report was the first for this industry and laid the groundwork for Ecology, the Permittee, and the engineering consultant, SLR International, to determine how best to proceed next. Ecology performed a joint site visit to observe and review the hatchery processes, seawater intakes, and wastewater discharges. Afterwards, Ecology provided technical assistance regarding site improvements and next steps to submit a more complete engineering report. The goal for the final engineering report was to provide source water and wastewater characterization that included all the processes to pump and precondition the source water and identify added constituents to the wastewater to begin writing a permit.

One major facility improvement the Permittee performed after Ecology's technical assistance was to consolidate 24 outfalls, according to the final engineering report. The Permittee and Ecology worked towards an approved sampling and analysis plan for wastewater characterization, water balance and hydrogeologic connectivity in late summer of 2020. The permittee submitted the results in an updated draft engineering report and application package in spring and summer of 2021, respectively. Ecology accepted the final application package that contained an engineering report with sufficient information of the source water and the discharges to begin drafting a permit in September 2021.

Industrial Category

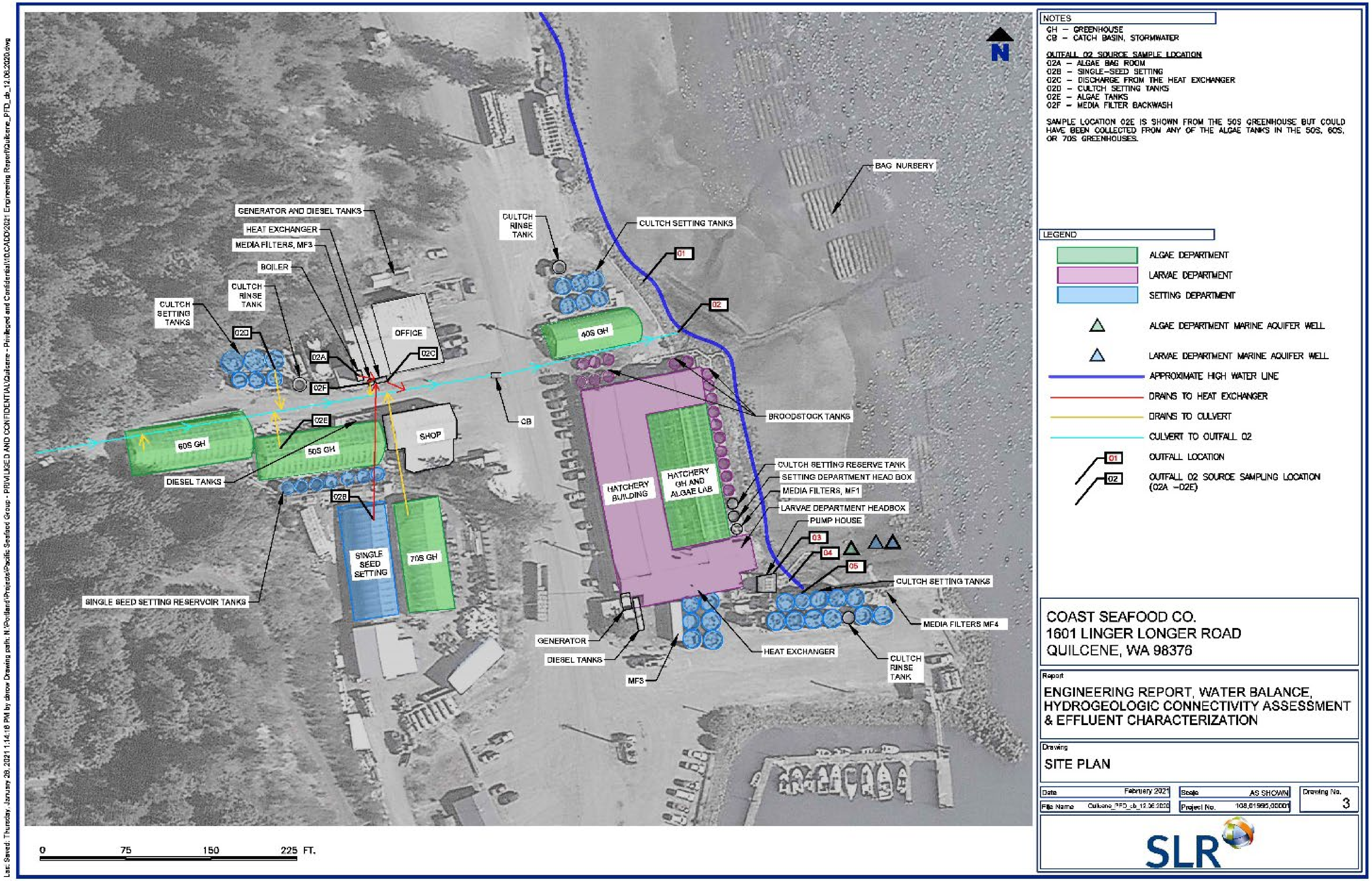
The Hatchery is not an industry with established categorical Effluent Limit Guidelines. Ecology has used best professional judgement to establish technology-based limits and other appropriate means to control the Hatchery discharge.

Industrial Processes

The Hatchery operates yearlong, 24 hours, 7 days a week and employs 30 staff. Staffing varies seasonally. Production slows during the winter. The Permittee reports the discharge volumes and constituents vary little seasonally. The operation uses a collection of broodstock, which are the stock of shellfish held on site to spawn for larvae production. Hatchery staff maintain the broodstock, larvae, cultch, and single seed cultures in a variety of tanks. The seawater is either changed out in a static renewal or flow-through process with new seawater pumped from a combination of subtidal wells and Quilcene Bay. The permittee cultures algae on site and feeds a volume of concentrated algae in batches to each tank of shellfish. The staff regularly cleans the tanks to maintain algae and shellfish health and promote consistent production levels.

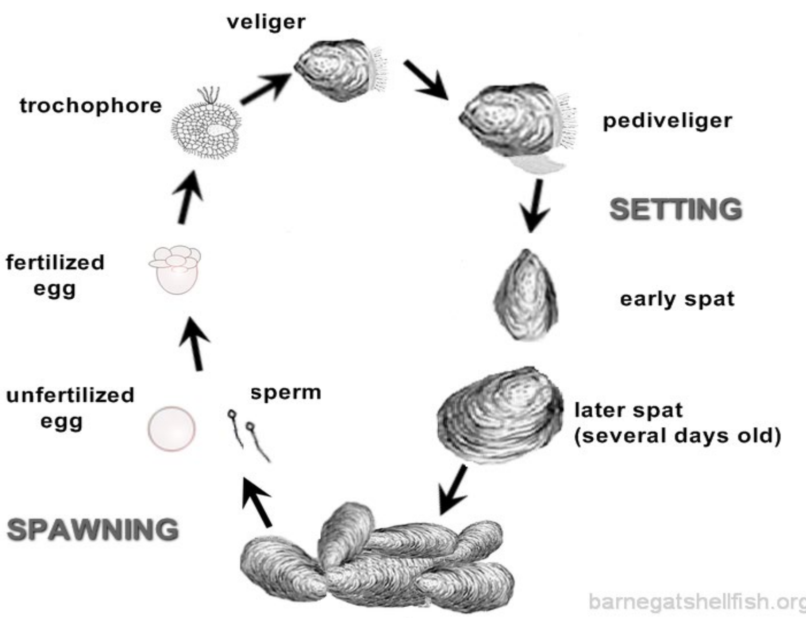
As reported by the Permittee, Figure 2 depicts buildings and tank areas colored to represent the department it supports. The Algae Department (Green) consists of the operations around culturing of algae to feed the shellfish. The Larvae Department (Pink) is all the operations to maintain the broodstock, hatch and grow the shellfish larvae to the pediveliger stage. The Setting Department (Blue) is all the operations to grow the oyster cultch and single seed products.

Figure 2 - Site Plan



Growing the algae: Marine well water is used to grow large volumes of a concentrated multi-species algae mix (approximately 100,000 gallons per day) in a complex of greenhouses on site. The algae cultures are started in the lab, grown in bags and then in tanks of increasing size until the algae mixture is of sufficient volume and concentration to feed out to the shellfish. Prior to inoculation, heated seawater is disinfected using non-chlorination methods to remove pathogens.

Figure 3 - Oyster growth cycle and stages. Photo credit: Auburn University, Marine Extension and Research Center



Growing the shellfish: The concentrated algae mix is pumped out to broodstock, larvae, cultch, and single seed held in a variety of tanks, in regular batches to sustain optimal growth. The shellfish filter-feed the algae, removing the algae from the water column until more algae needs to be added. The water that larvae, cultch, and single seed are maintained in is filtered and heated. Products are grown to various stages (Figure 3). The Hatchery sells oyster and the other shellfish larvae at the pediveliger stage. The hatchery also grows oyster spat that settle to grow on shell substrate called single seed or cultch until sold.

The products: The Hatchery produces primarily oysters but also clams and mussels, creating products called shellfish seed. The Permittee either distributes the seed to company owned sites (i.e., nurseries) or sells the seed to entities that continue to grow the shellfish on marine tidelands or from rafts until they reach harvestable sizes for commercial sale.

The Hatchery produces three types of finished products. They include:

- Larvae sold in batches, which are placed in a coffee filter, sealed in a plastic bag, and shipped by FedEx to the customer.
- Cultch bags sold by the bag with each containing approximately 230 to 250 half shells with shellfish larvae attached. The cultch bags are loaded onto trucks then trucked to their location.
- Single seed oysters sold in increments of one thousand or sent to Pacific's own nurseries.

The Hatchery produces the following shellfish species:

Species	Annual Production (number of larvae)

Pacific Oyster (*Crassostrea gigas*)	25 billion
Manila Clam (*Venerupis philippinarum*)	1.2 billion
Mediterranean Mussel (*Mytilus galloprovincialis*)	1.4 billion
Kumamoto oyster (*Crassostrea sikamea*)	1 billion

Water Intake and Uses

The Hatchery pumps raw seawater water into the facility in combination from two bay intakes and three seawater wells, located in the subtidal zone, depending on the use or department. Figure 4 depicts the distribution by department. Depending on use, heat exchangers warm the influent to the required temperatures and media filters (n=26) are used to remove particles.

Bay water intakes: Two pipelines run from each intake location, i.e., there are four pipelines in total, two pipelines per intake. The intake pipelines are 10 inches in diameter, and the intakes are located in the Bay at an approximate depth of 52 feet below mean lower low water (MLLW). At the Hatchery, the two pipelines for each intake connect and merge into one pipeline (i.e., one pipeline per intake). The map below (Figure 5) indicates in green the location of the bay intake pipes.

Subtidal well water intakes: The hatchery uses three seawater wells. The wells are located in the subtidal zone in front of the hatchery building, adjacent to the bulkhead. The three wells are positioned such that the tops are submerged by seawater except during low tide. Each can be located on Figure 2. Using the Washington State Well Report Viewer, two well reports can be found for this facility. One well drilled in 1990 is 60 feet deep, and another drilled in 2010 is 32 feet deep. The reports indicate industrial use with static water level at sea level. The drilling log for the well drilled in 1990 was identified as a “salt water well”. The screened interval is from 20 to 60 feet below ground surface. Strata are described as water bearing (W.B.) sand and gravel for the entire 0 to 60 feet interval. The 2010 well was built with a slot screen from 6 to 32 feet and a sump at 34 feet.

Figure 4 - Process Flow Diagram

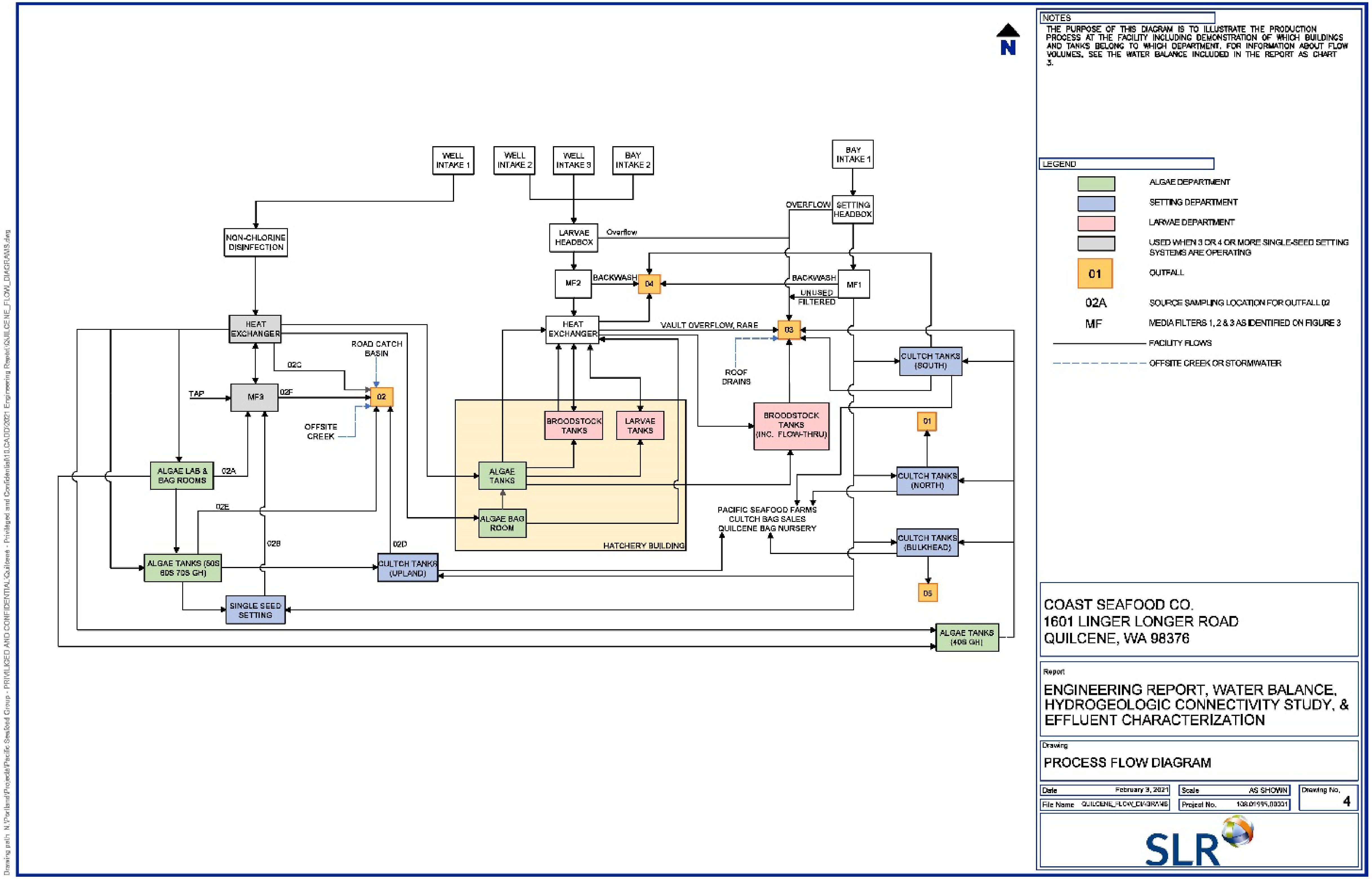
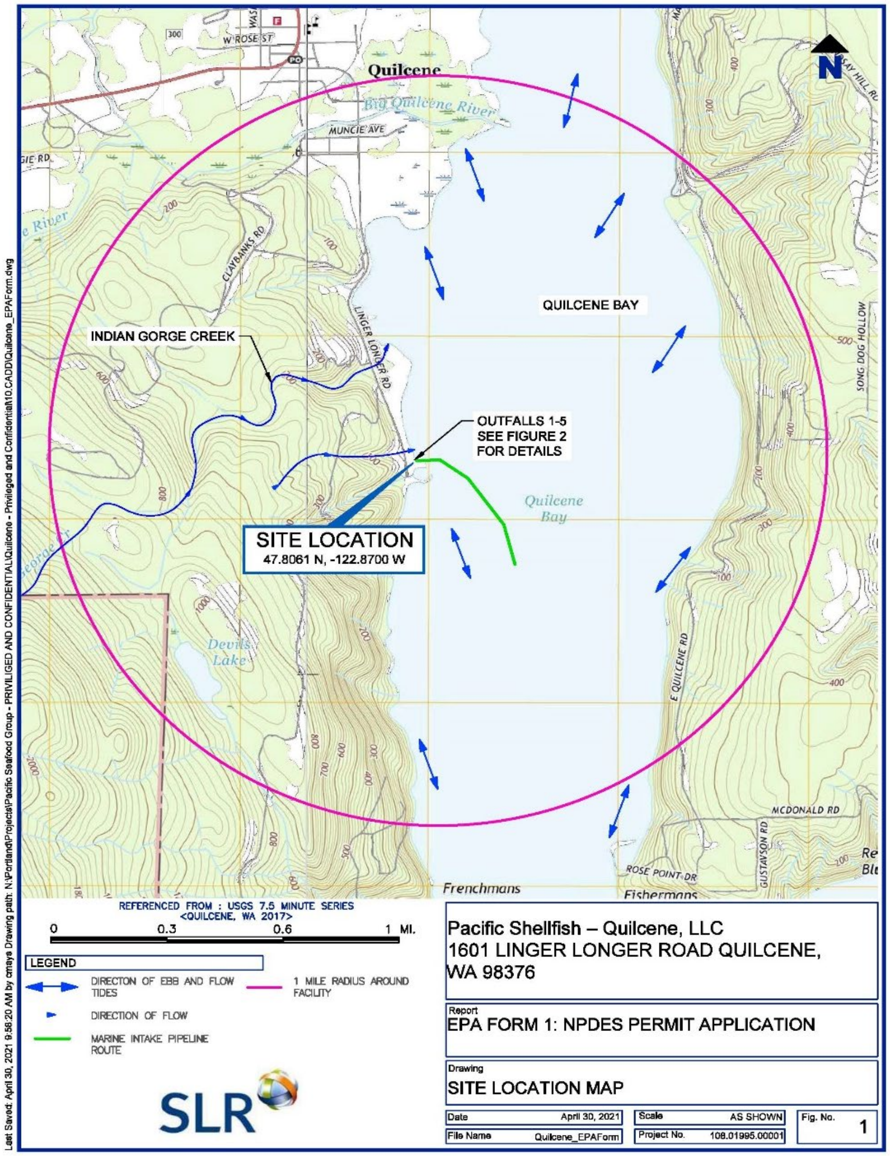
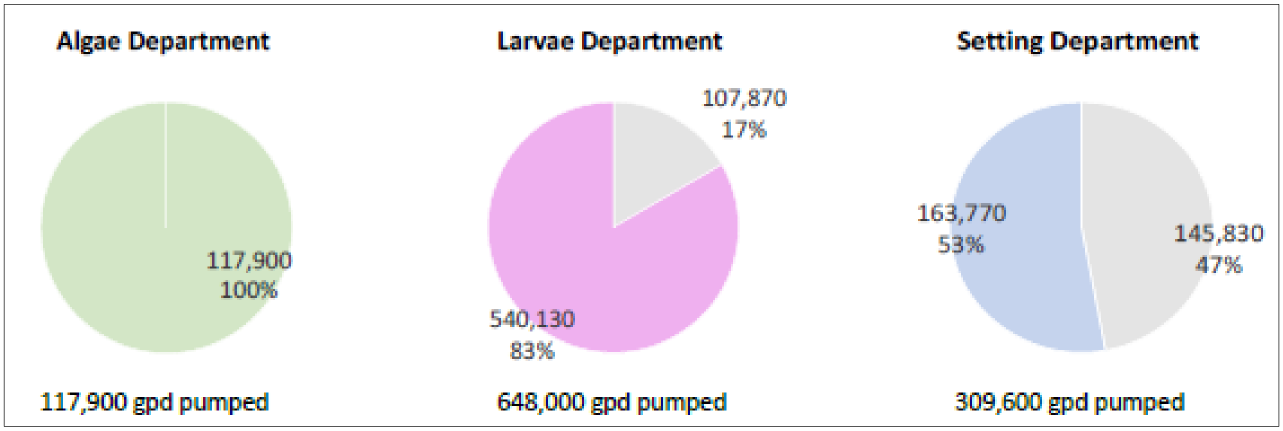


Figure 5 - Site location with bay intake pipe



Seawater use: Figure 6 below describes the quantity of water used in the Algae (green), Larvae (pink) and Setting (blue) Departments. Water pumped for use in the Larvae and Setting Departments is pumped in excess so to keep a pressurized head. The excess is overflow or filtered but returned without added constituents and discharged through outfalls blending with process water and wastestreams. Noted in gray below is the volume and proportion of returned seawater as either headbox overflow or unused filtered bay water. Only well water is used in the Algae Department and there is no overflow or unused water discharges.

Figure 6 - Water pumped and used by department.



Cooling Water Intakes

CWA § 316(b) requires the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. Since July 2013, Ecology has required a supplemental application for all applicants using EPA Form 2-C. Pacific Shellfish – Quilcene, LLC selected "Yes" on this form when asked if a cooling water intake is associated with the facility and answered the supplemental questions.

The hatchery takes in 1.224 million gallons per day and only uses 21% of this intake for cooling. CWA §316(b) requirements apply to all industrial NPDES permitted facilities with cooling water intake structures. EPA has promulgated best technology available (BTA) effluent guidelines for facilities meeting certain thresholds: This facility is below the thresholds requiring the facility to meet best technology available. However, an existing facility will be evaluated with Ecology's best professional judgment as per 40 CFR 125.90(b). Ecology has proposed in the permit a special condition that the Permittee must conduct an inspection of their intakes, determine the presence and type of screens, install screens if determined they are not present, and provide engineering drawings (i.e., as-built drawings) of all intakes.

Wastewater – Types Generated

There are two types of wastewater generated from Hatchery operations. The discharges can be categorized as either segregated wastestreams or process water effluent.

- ***<u>Segregated Wastestreams</u>:*** Ecology has identified several wastestreams that discharge intermittently or episodically without blending with continuously flowing excess or flow-through water prior to discharging to the receiving waterbody. Some wastestreams blend with the continuously flowing excess and flow-through water; other wastestreams do not and those are categorized as **segregated wastestreams**. Segregated wastestreams have a reasonable potential to discharge some pollutants above minimum treatment standards and water quality-based effluent limits.

  Segregated wastestreams result from three distinct activities at the Hatchery. These activities are tank drainage, tank cleaning, and backwashing media filters. Tank drainage occurs in preparation for feeding algae to the shellfish or after a growing cycle is complete. This wastestream discharge consists of draining some or all of the water in a tank that housed living shellfish. Tank cleaning produces cleaning waste residuals that are a result of the physical cleaning, disinfection, and neutralization of tank surfaces after a shellfish or algae growing cycle is complete. There are 26 total media filters that operate to filter intake water of the suspended solids. There are 14 media filters in grouping MF1 on the east side of the main hatchery building, eight in MF2 on the south side of the hatchery building, two in MF3 on the upland side of the road near the office, and two in MF4 on the end of the bulkhead. The filter groupings are located in four areas of the Hatchery and discharge to four separate outfall locations. Based on the entity review follow-up letter dated October 24, 2022, as of August 2022, media filter group 4 was decommissioned. The filters are backwashed regularly to keep running optimally, which creates a discharge of the removed solids.

- ***Process Water Effluent:*** Process water effluent consists of continuously flowing return flow and/or flow-through water and episodic mixing of previously mentioned wastestreams. Continuously flowing water can be two types. One is return flow from headbox overflow and unused filtered seawater, without exposure to animals. Second is flow-through outflow from holding tanks that maintain broodstock, larval shellfish, single seed and cultch. The abovementioned wastestreams blend into these two types of continuously flowing seawater creating process water effluent. A distinction is process water effluent is large volumes of continuously flowing return flow or flow-through water mixing with smaller volumes of wastestreams prior to discharging to the receiving waterbody.

Wastewater – Parameters of Concern

Wastestream of Tank Cleaning Waste Residuals: Sodium hypochlorite (i.e., bleach) is used to clean tanks in both the Setting and Larvae Departments as well as the tanks for growing algae. Currently, the cleaning residual is tested using a low range (0.02 mg/L) free chlorine colorimetric DPD test kit for field use (https://www.hach.com/free-chlorine-test-kit-model-cn-70f/product?id=7640219517) to test and affirm the absence of free residual chlorine prior to discharging. While inconsistent, cleaning residual discharges displayed elevated levels of solids and sometimes ammonia, and higher pH levels when discharged as a segregated wastestream relative to process water effluent. See Wastewater Characterization tables and Reasonable Potential Ammonia Calculations. The Permittee reported the following procedures:

- For cultch setting, algae, and larvae tanks, once emptied, a solution containing approximately 20 milliliters (mL) of 12.5% bleach in 5 liters of water is used to wash down tank interior surfaces (0.05% bleach solution). Tank cleaning is done by hand using a long-handled scrubber with an abrasive pad. The cleaning process results in approximately 10 gallons of cleaning solution and rinse water residuals in the bottom of the tank. The bleach in the cleaning residual is neutralized using sodium thiosulfate prior to discharge. Sodium thiosulfate in the efflorescent crystalline form is mixed into an aqueous working solution by adding 1,506 grams to 15 liters of water. A portion of this solution is poured into the cleaning solution residuals in the bottom of each tank and is mixed. The water is then tested using the colorimetric DPD field test for residual chlorine. No water is discharged until the beach has been successfully neutralized.

- In the single-seed setting system, cleaning entails draining the setting boxes, scrubbing the walls with an abrasive pad, refilling the boxes with salt water, adding approximately 0.75 quart of 12.5% bleach, and recirculating it through the system for a period of time. The bleach is neutralized by adding a comparable amount of 3% hydrogen peroxide to the recirculation water. The water is tested for residual chlorine and no discharge occurs until the beach has been successfully neutralized.

Wastestream of Tank Drainage: Tank drainage is the activity where a whole tank is emptied, or a portion of water is drained to either clean or feed. Parameters of concern in tank drainage are temperature and turbidity (see Wastewater Characterization tables).

Wastestream of Algae Bag Residuals: This is no longer a wastestream. Algae bag residuals, which were the unused, leftover algae unable to be used to inoculate the larger greenhouse tanks were originally reported in the 2021 Engineering Report to have been emptied into the floor drains. As indicated in the entity review follow-up letter dated October 24, 2022, this practice has ceased as of July 2022. Bags with algae remnants are discarded as trash and hauled offsite.

Wastestream of Media Filter Backwash: Filter backwash consists of the removed solids from intake source water, which contains concentrated natural organisms and suspended sediment. The Permittee indicates in its engineering report (SLR 2021) that they assumed the TSS levels in the media filter discharge would be nearer to the TSS levels in the cleaning residuals (approximately 800 mg/L TSS).

Process Water: Source water flows in through heat exchangers; however, the primary function of the heat exchange involves heating the source water for the growing of algae and shellfish. The secondary, indirect result is some heat load reduction in the process water that is discharged after flowing out of the heat exchanger. However, heat exchange is not directly used for treatment to reduce heat load of the process water discharges. Therefore, temperature of process water discharges can be warmer than the criteria (see Wastewater Characterization tables).

Other:

- The Algae Department uses muriatic acid (i.e., hydrochloric acid or HCl) and isopropyl alcohol to clean equipment and surfaces. Small quantities of muriatic acid is occasionally disposed in the process of cleaning and enters the effluent from the Algae Department blended with process water.

- Marine water used to grow a mixture of algae species is not directly discharged as a wastestream but is held, pretreated, and inoculated. The algae is cultured using a mixture of macro- and micronutrients to optimize growth. The algae are grown up through a series of increasingly larger rearing vessels until eventually fed out to shellfish in tanks where a portion of water has been drained (i.e., tank drainage wastestream).

Wastewater - Treatment

The final engineering report prepared by SLR (Feb 2021) stated the Permittee employs no treatment for an added constituent or other parameters of concern in their wastestreams and effluent. While the 2019 draft engineering report outlines other permits for shellfish hatcheries to manage parameters of concern, the Permittee has not performed an analysis of all known, available, and reasonable treatment technology or source control (i.e., AKART evaluation) for the limitation of the specific parameters of concern at this site as they relate to the different types of wastewater discharges (i.e., segregated and process water).

The Permittee employs a neutralization step after the use of hypochlorite (bleach) in its cleaning process. This is a form of treatment applied to the wastestream for cleaning residuals to prevent the discharge of total residual chlorine. The neutralization of the bleach is a best management practice. The proposed permit implements this as a required best management practice and required standardized procedures for reporting with additional accredited testing process to assure field testing meets precision and accuracy requirements.

Solid wastes

All trash, operational debris, and used materials, including discarded algae bags, are hauled off-site through Murrey's Olympic Disposal services.

Outfalls

The Hatchery's process water and segregated wastestream discharges flow from 12 discrete outfalls into two different receiving water bodies. SLR identified in the engineering report (2021) processes in the upper portion of the hatchery west of Linger Longer Road discharging to the underground, un-named seasonal creek and provided monitoring data for each discharge prior to mixing with the creek. The Permittee describes that all the hatchery processes, the creek, the road catch basin mix and flow out at Outfall 02. Outfall 02 is the end of a culvert that discharges this comingled effluent to Quilcene Bay. Ecology has determined that the locations where hatchery processes discharge to the underground creek are each individual, discrete outfalls (i.e., point of discharge) where permit compliance and water quality standards must be met. Outfall current and former names with locations are listed in Table 1 - Facility Information. The following map, table, and flow chart describe the outfalls, receiving water body, hatchery operation or processes, wastewater types and parameters of concern.

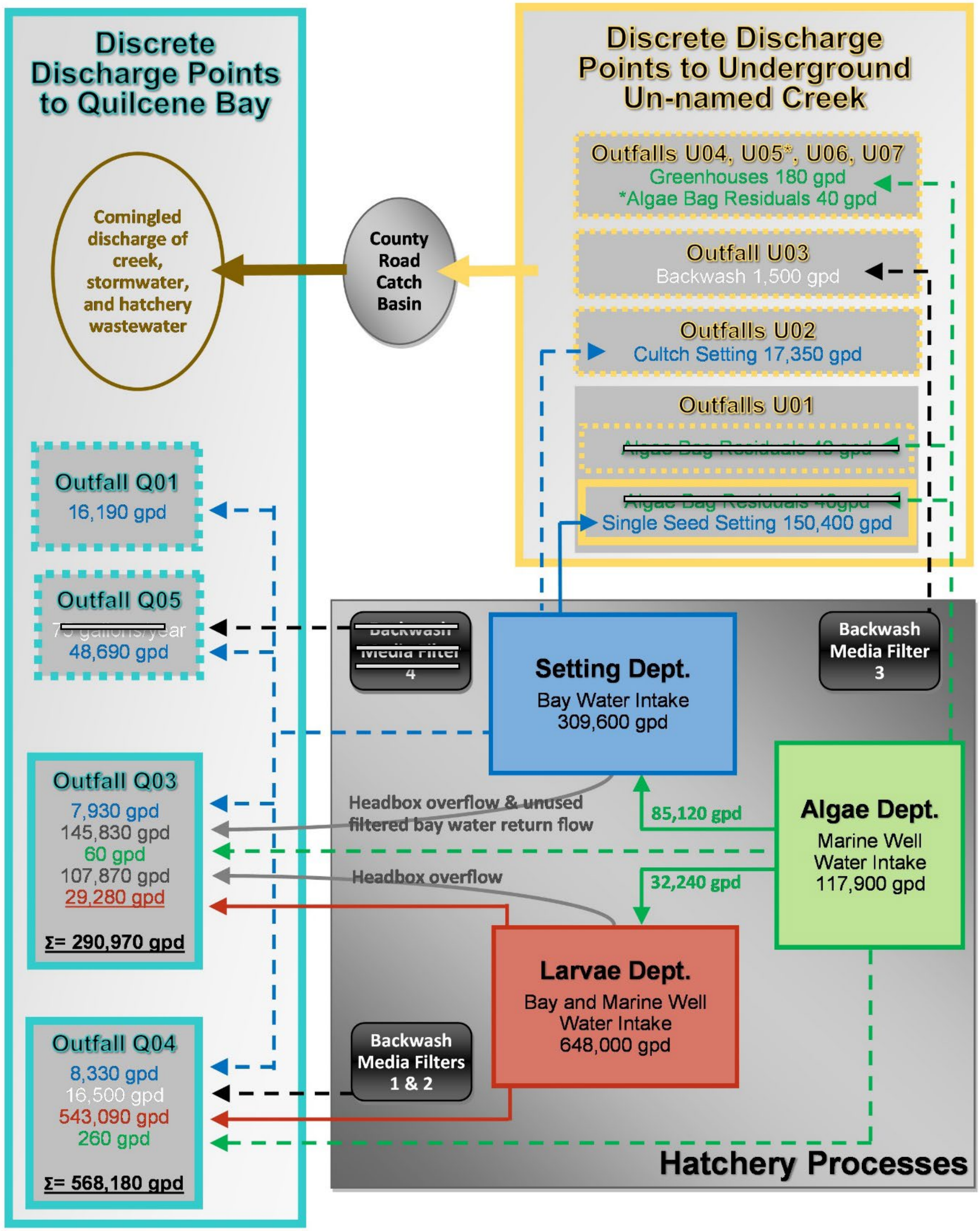
The following map provides theoretical locations for U01 through U07. The map gives latitude and longitudes for U01 through U07 along the presumed discharge pipeline route. Outfalls for U04 to U07 are discharges from the 40s, 50s, 60s, and 70s greenhouses, respectively. Outfall U01 is continuous discharge from single seed systems, U02 is discharge from cultch tanks, and U03 is discharge from media filter backwash. The precise location of the underground piping is not known, and the locations are assumed based on proximity. It is also noted that, except for U03, the upland wastewater streams are sampled from individual tanks. There no sample ports corresponding to the outfalls.

Figure 7 – Map of Proposed Permitted Outfalls Authorized to Discharge

Table 4 - List of outfalls, receiving waterbody, hatchery operation, wastewater, and parameters of concern

Outfall Name (former name)	Receiving waterbody	Hatchery Operation	Type of Wastewater	Specific Wastestream and Parameters of Concern
U01 (02A or 02B) segregation dependent on single seed production	Un-named Creek	Algae (Bag Room), Single Seed Setting, Heat Exchange	Multiple Segregated Wastestreams and Process Water	Algae Bag Residuals - residuals are no longer discharged (practice ended July 1, 2022) Tank Drainage– temperature, turbidity, and seawater discharge to freshwater creek (dissolved chloride) Cleaning Waste Residuals - TSS, total residual chlorine, and pH Process Water - temperature, turbidity, total residual chlorine, pH, and seawater discharge to freshwater creek (dissolved chloride)
U02 (02D)	Un-named Creek	Cultch Setting	Multiple Segregated Wastestreams	Cleaning Waste Residuals - TSS, ammonia, total residual chlorine, and pH Tank Drainage – temperature, turbidity, and seawater discharge to freshwater creek (dissolved chloride)
U03 (2F)	Un-named Creek	Media Filter	Segregated Wastestream	Media Filter Backwash - TSS and seawater discharge to freshwater creek (dissolved chloride)
U04 (02E-40S) U05 (02E-50S)* U06 (02E-60S) U07 (02E-70S)	Un-named Creek	Algae (40s, 50s, 60s, and 70s Greenhouses) *50s contains Bag Room	Multiple Segregated Wastestreams	Cleaning Waste Residuals - TSS, total residual chlorine, and pH Tank Drainage– temperature, turbidity, and seawater discharge to freshwater creek (dissolved chloride) *U05: Algae Bag Residuals – residuals are no longer discharged (practice ended July 1, 2022)
Q01	Quilcene Bay	Cultch Setting	Multiple Segregated Wastestreams	Cleaning Waste Residuals - TSS, ammonia, total residual chlorine, and pH) Tank Drainage - temperature and turbidity
Q03	Quilcene Bay	All processes (algae, larval, and setting)	Process Water with roof runoff	Process Water - Temperature, turbidity, total residual chlorine, and pH Roof runoff -dissolved zinc
Q04	Quilcene Bay	All processes (algae, larval, and setting)	Process Water	Process Water - Temperature, turbidity, total residual chlorine, and pH
Q05	Quilcene Bay	Cultch Setting	Multiple Segregated Wastestreams	Cleaning Waste Residuals - TSS, ammonia, total residual chlorine, and pH Tank Drainage - temperature and turbidity Media Filter Backwash - TSS

Figure 8 – Outfalls, Waterbody, Hatchery Process, and Water Balance for each Department



Outfalls show contributing process water and wastestreams (i.e., discharge type). Dotted lines indicate intermittent flow or discharge. Solid lines indicate continuous flow or discharge. Crossed out discharges were those decommissioned or ended and no longer exist at the outfalls.

B. Description of the receiving water

The Hatchery discharges to two waterbodies; Quilcene Bay, which is marine, and an un-named creek, which is freshwater. Section IIID describes the designated uses and surface water criteria. There are no other point sources that discharge to Quilcene Bay or the un-named creek. The nonpoint sources of pollution include upland forestry practices, malfunctioning septic systems, and livestock agriculture. Section IIIE of this fact sheet describes any receiving waterbody impairments.

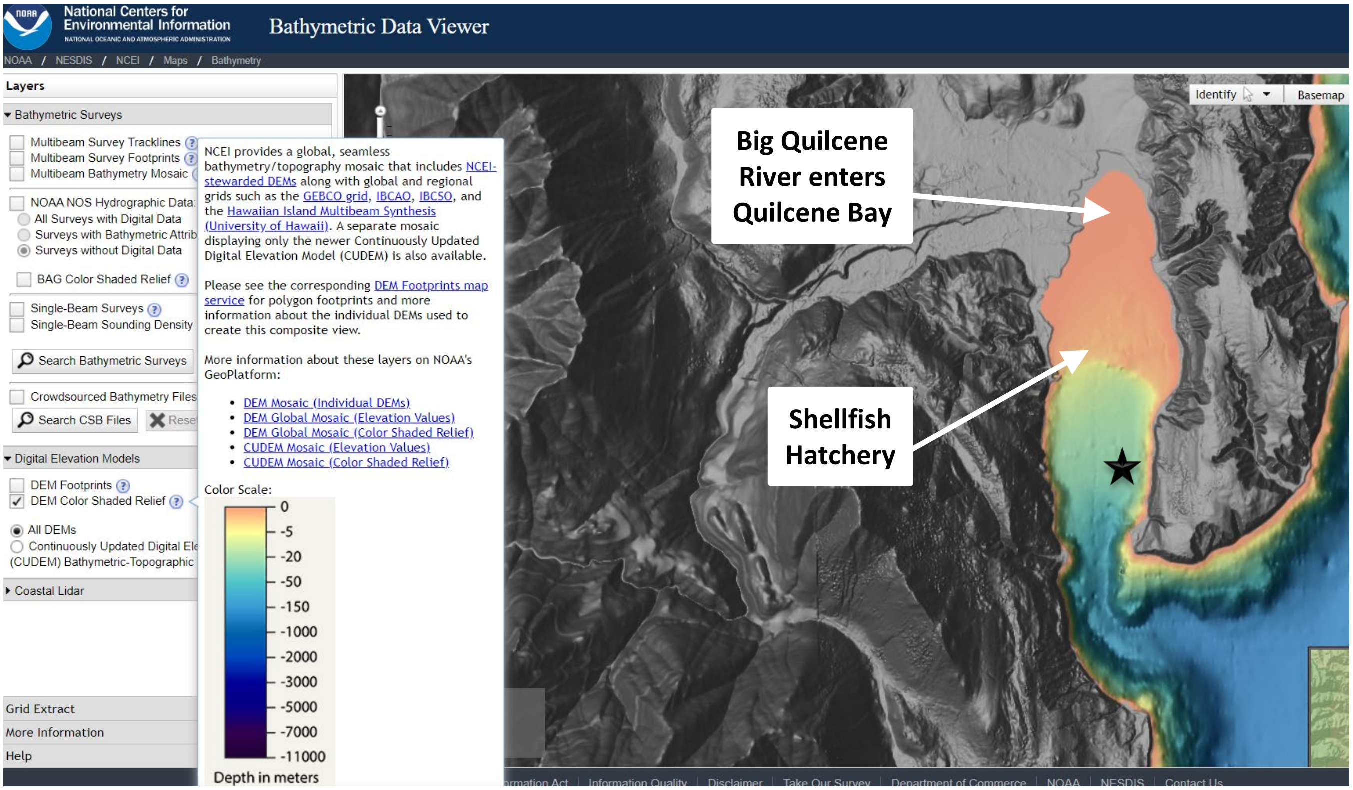
Quilcene Bay

Based on the engineering report (2021), 75% of the facility's discharge occurs to Quilcene Bay (outfalls Q01, Q03, Q04, and Q05). Quilcene Bay is a marine waterbody located on the northwestern side of Hood Canal in Jefferson County, Washington (Figure 1 - Facility Location Map). Quilcene Bay is a popular area for recreation that includes boating, fishing, and swimming (Swim float to return this summer at Quilcene beach | Port Townsend Leader (ptleader.com). The Herb Beck Marina, operated by the Port of Port Townsend, is located just next to the Hatchery on its southern side. Pacific Shellfish runs an oyster nursery in the nearshore area in front of the hatchery and Penn Cove Shellfish has floating mussel rafts near Fisherman's Point.

The shallow areas of the bay in the northern half contain eelgrass and other seagrasses (DNR Puget Sound Eelgrass Monitoring map accessed 2/22/2022 Quilcene Bay eelgrass map). The bay supports a Coho salmon fishery in the fall based on the U.S. Fish and Wildlife Service Hatchery operation on the Big Quilcene River in accordance Hood Canal Salmon Management Plan, which releases 400,000 Coho salmon smolts every year. As recently as 2020, WDFW has reported increasing local herring abundance (i.e., the Quilcene stock) as measured during spring spawning and this stock has experienced the majority of the herring population increases in Puget Sound (PSP Vital Sign, WDFW Forage Fish Unit reporting).

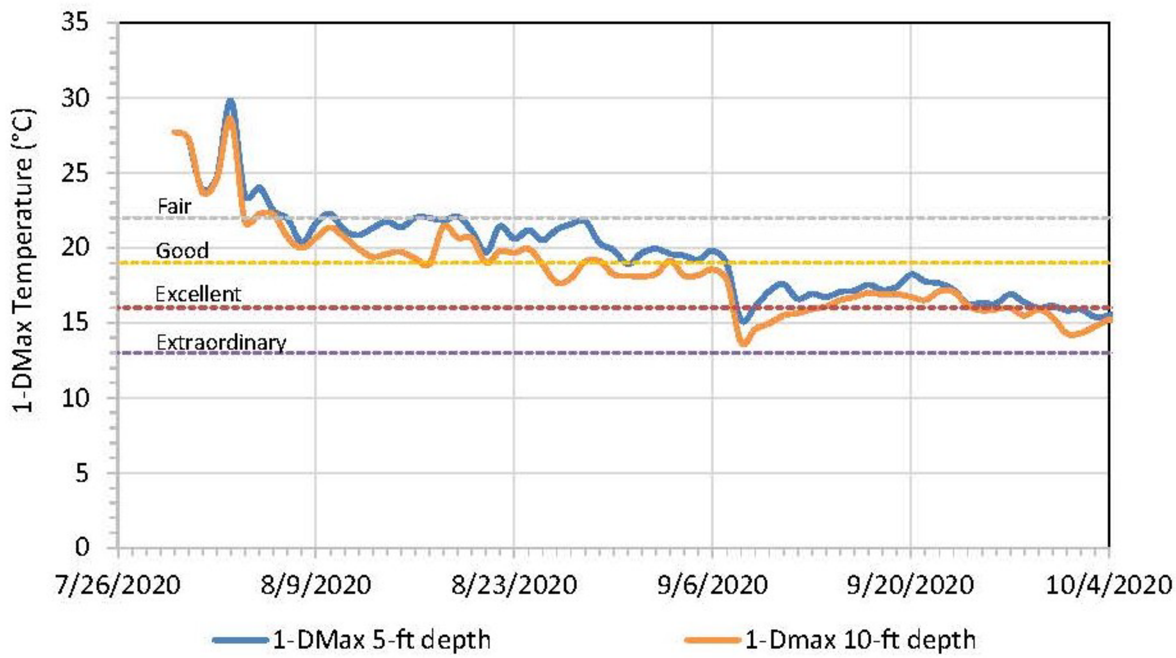
Quilcene Bay is a shallow, dynamic waterbody with a volume of approximately 40,000 million gallons of marine water at MLLW. Based on NOAA data (Figure 9) nearly half the bay is less than five meters (16.4 feet) deep with the maximum depth near the head of the bay at 50 meters deep (164 feet) near Fisherman's Point. The Big Quilcene River contributes the most freshwater to the bay with an average of 93 million gallons a day (MGD) based on data from 1995 through 2021 at USGS gage number 12052210. It enters the bay at the northwest corner. The facility's discharges occur at the riprap on the shoreline near the middle part of the bay on the west side, 1.3 miles south of the river's mouth.

Figure 9 - NOAA Digital Elevation Model Shaded Relief Map of Quilcene Bay (Bathymetric Data Viewer (noaa.gov) accessed 2/8/2022)



The primary concern for the Hatchery relative to ambient conditions is temperature and heat load in the discharges. Figure 10 is a graph from the final engineering report (SLR 2021) indicating the one-day maximum temperature (1-DMax) recorded every five minutes at five feet and ten feet below the surface at a location just over a half mile north of Fisherman's Point from August through October 2020 (see Figure 9 starred location). The monitoring location was across the bay away from the hatchery and represents background conditions without influence of the hatchery discharges. The water quality standard for aquatic life uses for temperature in Quilcene Bay is Extraordinary (13°C); however, the graph indicates the aquatic life use categories for all temperature standards relative to the 1-DMax data.

Figure 10 - Daily Maximum Temperature (1-DMax) August through October 2020 at Fisherman's Point near Penn Cove Mussel Rafts



Un-named Seasonal Underground Creek

Discharges from the upper portion of the hatchery enter an underground, culverted un-named seasonal creek (Outfalls U01, U02, U03, U04, U05, U06, and U07). The creek daylights when the pipe ends at the shoreline of Quilcene Bay adjacent to the hatchery and flows out from an 18-inch corrugated plastic pipe. The creek (when flowing), the discharges, and roadway runoff from Linger Longer Road (Jefferson County owned catch basin) collectively enters Quilcene Bay at this point, which is approximately 200 feet to the east of the outfalls.

In total, the creek is approximately 2000 feet long from headwater to bay when water is present. The creek is very short and steep. The upper reaches are surrounded by forestlands. Including where the discharges occur, the upper 1800 foot segment is classified a Type N stream-type by the Washington Department of Natural Resources (WDNR). This indicates that this section of creek does not meet the physical criteria nor does it flow during some portion of the year; the creek does not meet the criteria to be an F type waterbody (i.e., habitat conducive to maintain fish-https://geo.nwifc.org/swifd/ accessed 2/8/22). The creek is not considered salmon or trout bearing in Washington Department of Fish and Wildlife's (WDFW) database SalmonScape (accessed 2/8/22).

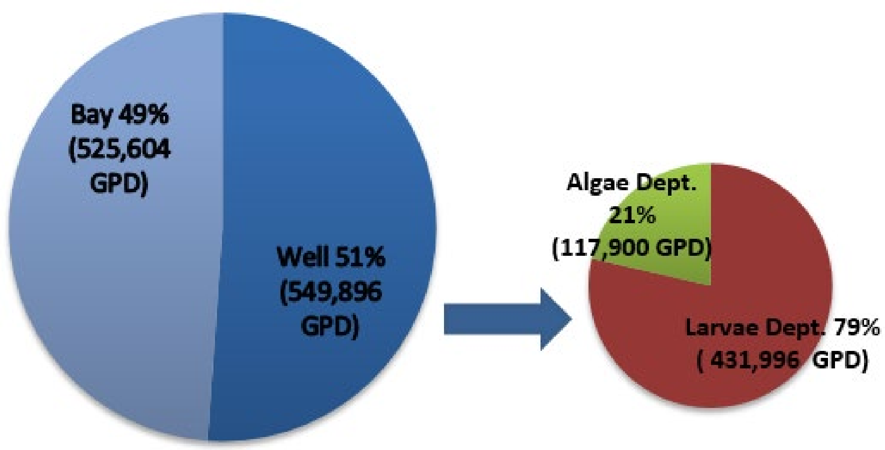
C. Source Water Characterization

The Hatchery takes in seawater from the bay and subtidal marine wells in various combinations for growing algae, growing larval shellfish, maintaining broodstock and setting oyster larvae. The Permittee characterized and reported on the two types of intake water in their final engineering report (SLR 2021).

Hydrogeologic Study of Marine Water Wells: Section 4 of the engineering report (SLR 2021) presented hydrogeologic connectivity study results. Well data demonstrated that pumping flow rate varies with tide. The paired samples collected characterized the water chemistry of well water and bay water. A preliminary analysis of the water chemistry data suggests well water and bay water are similar and demonstrates connectivity of the aquifer with bay water. Conservative constituents including chloride, bromide, and major cations calcium, sodium, and potassium all suggest that a major proportion of the well water actually comes from marine water. Some degree of the well water consists of precipitation recharge (freshwater), presumably through lateral movement from the territorial side. The well water is characterized with lower salinity, lower pH, higher calcium/sodium ratio, and higher bicarbonate concentration. At this time, no intake credits are required and no further hydrogeologic characterization will be required. Ecology does not require a water right permit under Chapter 90.03 or Chapter 90.44 for the withdrawal or diversion of seawater from a marine water body (POL-1015).

The Permittee reports that the volume of daily water taken in or pumped into the hatchery is 1,075,500 gallons per day (gpd) for all departments (Algae, Larvae, and Setting). The Permittee also reports (SLR 2021,) that 51% of the seawater pumped into the hatchery is from the wells. Those volumes pumped consist of 117,900 gpd for the Algae Department and 431,996 gpd for the Larvae Departments.

Figure 11 - Source Water Intake Volumes with Portions of Well Water used in Hatchery Processes



Total volume pumped on average each day is 1,075,500 gallons (GPD)

Data Summary: The Permittee reported the average daily flow and the concentration of constituents in the Hatchery's source water in the final engineering report (SLR 2021) submitted with their permit application in 2021. The water quantity data represents current and expected future production. The water quality data represents the quality of the wastewater effluent discharged from late July through October 2020. Below in Figure 5 and Table 6, Ecology reports the statistically summarized source water data for each source water type. Ecology used the following data to calculate net limits (i.e., effluent minus influent) for turbidity.

Table 5 - Bay Source Water (Seawater) [a] Intake Characterization Summary Statistics

	Salinity ppth	*Temperature* °C	*pH* s.u.	*DO* mg/L	*TSS* mg/L	*Turbidity* NTU	*TOC* mg/L	*Ammonia* [b] mg/L as N	*Nitrate* [bc] mg/L as N	*Nitrite* mg/L as N
mean	27.6	14.6	7.85	6.48	46	1.29	1.26	0.051	0.81	0.05
sd	2.75	1.8	0.22	1.72	12	1.02	0.24	0.032	2.0	0.2
min	21.1	9.8	7.43	3.23	23	0.30	0.84	<0.020	0.007	0.002
max	29.9	16.4	8.29	8.56	55	3.80	1.70	0.129	6.10	0.500
median	28.9	14.7	7.82	6.87	49	1.15	1.25	0.047	0.20	0.003
90th percentile	29.6	16.1	8.07	8.01	54	2.09	1.52	0.078	1.5	0.06
95th percentile	29.8	16.3	8.18	8.29	55	2.95	1.61	0.10	3.8	0.3

	Bicarbonate mg/L	*Bromide* mg/L	*Calcium* mg/L	*Chloride* mg/L	*Magnesium* mg/L	*Manganese* [bd] mg/L	*Nitrite+Nitrate* mg/L as N	*Potassium* mg/L	*Sodium* mg/L	*Sulfate* mg/L
mean	101	51	307	18170	1002	0.008	0.75	312	8622	2452
sd	14	2.7	35	978	69	0.009	1.9	20	1041	476
min	66	45	250	16700	850	<0.005	0.007	290	6370	2180
max	110	54	350	20300	1100	0.033	6.10	350	9860	3780
median	105	50	315	18000	1000	0.005	0.17	315	8835	2320
90th percentile	110	54	341	19220	1100	0.008	0.93	332	9518	2583
95th percentile	110	54	346	19760	1100	0.020	3.5	341	9689	3182

Footnotes:

[a] Ten grab samples recorded from 7/28 through 12/9/2020 (n=10)

[b] When sample data less than detection limit, used detection limit to calculate summary statistics.

[c] One sample censored that was too high of detection limit; that DL was higher (>10x) than all the other analyses recorded so removed data point. (n=9)

[d] Only one sample was detected above limit

Table 6 – Subtidal Well Source Water (Seawater) [a] Intake Characterization Summary Statistics

	Salinity ppth	Temperature °C	pH s.u.	DO mg/L	TSS mg/L	Turbidity NTU	TOC mg/L	Ammonia [b] mg/L as N	Nitrate [c] mg/L as N	Nitrite mg/L as N
mean	22.3	16.3	7.03	6.17	34	0.27	0.94	0.108	0.686	0.064
sd	2.9	1.5	0.21	1.17	7	0.12	0.37	0.066	0.209	0.153
min	14.8	12.5	6.79	4.20	25	0.12	0.51	<0.020	0.480	0.007
max	24.4	17.6	7.34	7.59	42	0.57	1.70	0.185	1.10	0.500
median	23.7	17.0	6.98	6.18	35	0.26	0.83	0.124	0.610	0.015
90th percentile	23.8	17.3	7.33	7.55	41	0.35	1.34	0.177	0.988	0.082
95th percentile	24.1	17.5	7.34	7.57	42	0.46	1.52	0.181	1.04	0.291

	Bicarbonate mg/L	Bromide mg/L	Calcium mg/L	Chloride mg/L	Magnesium mg/L	Manganese mg/L	Nitrite+Nitrate mg/L as N	Potassium mg/L	Sodium mg/L	Sulfate mg/L
mean	111	42	278	14860	834	0.022	0.68	253	7208	1893
sd	5.7	1.6	28	919	36	0.016	0.21	12	872	96
min	100	39	240	13600	760	<0.005	0.50	240	5600	1800
max	120	44	320	16500	870	0.054	1.10	270	8160	2040
median	110	43	270	14800	835	0.022	0.62	250	7435	1865
90th percentile	120	44	311	16140	870	0.040	1.01	270	7989	2022
95th percentile	120	44	316	16320	870	0.047	1.06	270	8075	2031

Footnotes:
[a] Ten grab samples recorded from 7/28 through 12/9/2020 (n=10)
[b] When sample data less than detection limit, used detection limit to calculate summary statistics.
[c] One sample censored that was too high of detection limit; that DL was higher (>10x) than all the other analyses recorded so removed data point. (n=9)

D. Wastewater characterization

The Permittee reported the average daily flow and the concentration of pollutants in the Hatchery's effluent and the individual wastestreams in the final engineering report (SLR 2021) submitted with their permit application in 2021. **The following table and data summaries are Ecology's evaluation of the discharges. Data reported by the Permittee is grouped by outfalls discharging to Quilcene Bay or the Un-named Stream, hatchery operations, and discharge type.** The water quantity data represents current and expected future production. The water quality data represents the quality of the wastewater effluent discharged from late July through October 2020.

Table 7 –Wastewater Flow and Discharge Quantity Characterization

Outfall & Receiving Waterbody	Hatchery Operation	Type of Wastewater Discharged	Type of Segregated Discharge	Discharge Flow	Estimated Total Daily Flow gallons per day (gpd)
U01 (02B) Un-named Creek	Single seed setting	Segregated wastestream & Process water	Cleaning waste residuals, and Tank drainage	98% Continuous 2% Intermittent	150,440 gpd (4 cleaning events per month)
U02 Un-named Creek	Cultch setting	Segregated wastestreams	Cleaning waste residuals and Tank drainage	100% Intermittent	17,350 gpd (4.4 cleaning events per month)
U03 Un-named Creek	Source water filtration	Segregated wastestream	Filter backwash	100% Intermittent	~12 backwash event per year
U04, U05, U06, U07 Un-named Creek	Algae greenhouses	Segregated wastestreams	Algae residues, Tank drainage and Cleaning waste residuals	100% Intermittent	180 gpd (28 cleaning events per month)
Q01 Quilcene Bay	Cultch setting	Segregated wastestreams	Cleaning waste residuals and Tank drainage	100% Intermittent	16,190 gpd (2.2 cleaning events per month) [a]
Q03 Quilcene Bay	All processes	Process water	Cleaning waste residuals, Tank drainage, and Roof drainage	87% Continuous 13% Intermittent	290,970 gpd [b] (23 cleaning events per month)
Q04 Quilcene Bay	All processes	Process water	Cleaning waste residuals, Tank drainage, and Filter backwash (MF1 & 2[b])	96% Continuous 4% Intermittent	568,180 gpd [c] (51 cleaning events per month)
Q05 Quilcene Bay	Cultch setting	Segregated wastestreams	Cleaning waste residuals, and Tank drainage.	100% Intermittent	48,690 gpd (4.4 cleaning events per month)

Footnotes:

[a] Each cleaning event creates a cleaning residual discharge of approximately ten-gallons containing a mixture of rinse water, neutralized bleach, and biosolids (i.e., left over organic matter consisting of biofilm, shellfish larvae, shell particles, and/or alga from brushing tank surfaces).

[b] This is a sum value of 37,270 gpd from all departments added to 253,700 gpd of head box overflow to represent the total discharge volume from outfall 03.

[c] Backwash of media filter groups 1 & 2 discharge to Q04 occur once per day at a rate of 75 gallons per minute (gpm) for ten minutes.

Table 8 - Wastewater Quality Characterization for Outfalls U02, Q01, and Q05 (multiple segregated wastestreams)

Discharge Characterized: Tank Drainage Wastestream from Cultch Setting Operations

	Salinity ppth	Temperature °C	pH s.u.	DO mg/L	TSS mg/L	Turbidity NTU	TOC mg/L	Ammonia mg/L as N	Nitrate [ab] mg/L as N	Nitrite [a] mg/L as N	BOD5 mg/L	Free Chlorine [c] mg/L
n	13	13	13	13	13	13	13	13	12	13	13	13
mean	26.2	20.6	7.92	5.76	39	0.66	3.0	0.26	2.40	0.41	4.4	<0.02
sd	2.2	2.0	0.22	1.62	9	0.48	2.2	0.19	2.18	0.42	2.6	0
min	21.7	16.0	7.56	3.37	22	0.24	1.5	0.05	<0.01	0.09	2.0	<0.02
max	30.0	22.5	8.36	8.03	53	2.00	9.9	0.69	7.10	1.40	12	<0.02
median	25.9	21.4	7.94	5.75	40	0.47	2.5	0.19	1.90	0.28	3.8	<0.02
90th percentile	28.4	22.2	8.18	7.82	50	1.11	4.0	0.53	5.14	1.03	5.7	<0.02
95th percentile	29.0	22.4	8.28	7.95	52	1.52	6.5	0.61	6.06	1.24	8.3	<0.02

Discharge Characterized: Cleaning Waste Residuals Wastestream for Cultch Setting Operations

	Salinity ppth	Temperature °C	pH s.u.	DO mg/L	TSS mg/L	Turbidity NTU	TOC mg/L	Ammonia mg/L as N	Nitrate [ab] mg/L as N	Nitrite [a] mg/L as N	BOD5 mg/L	Free Chlorine [c] mg/L
n	12	12	12	12	12	12	12	12	11	12	12	12
mean	7.4	16.3	8.75	7.51	276	274	35	0.51	6.8	0.1	59	<0.02
sd	6.7	2.8	0.61	0.91	279	341	48	1.1	7.2	0.3	55	0
min	1.1	13.1	7.85	5.54	31	26	3.2	0.030	1.4	<0.002	2	<0.02
max	20.7	20.6	10.05	9.03	830	1200	180	3.8	26	1	190	<0.02
median	3.5	15.4	8.69	7.45	165	125	26	0.19	4.0	0.002	34	<0.02
90th percentile	14.4	20.2	9.58	8.18	714	591	44	0.53	15	0.2	118	<0.02
95th percentile	17.3	20.4	9.84	8.56	775	876	106	2.0	20	0.6	152	<0.02

Footnotes:
[a] One sample censored that was too high of detection limit; that DL was higher (>10x) than all the other analyses recorded so removed data point.
[b] When sample data less than detection limit, used detection limit to calculate summary statistics.
[c] Free chlorine was measured in the field using the Hach CN-70 low range free chlorine color disc test kit. The kit detection range is 0 - 3.2 mg/L with a minimum detection increment of 0.02 mg/L. Free chlorine was not detected in any sample.

Table 9 - Wastewater Quality Characterization for Outfall Q03 (Process Water)

	Salinity ppth	*Temperature* °C	*pH* s.u.	*DO* mg/L	*TSS* mg/L	*Turbidity* NTU	*TOC* mg/L	*Ammonia* mg/L as N	*Nitrate* [a] mg/L as N	*Nitrite* [a] mg/L as N	*BOD5* [b] mg/L	*Free Chlorine* [c] mg/L
n	9	9	9	9	8	8	8	8	7	7	8	9
mean	25.2	16.0	7.98	6.26	35	0.97	1.3	0.21	0.60	0.12	4.2	<0.02
sd	2.3	0.8	0.15	1.46	13	0.96	0.58	0.07	0.37	0.13	2.5	0
min	21.0	14.8	7.72	3.55	17	0.25	0.80	0.07	0.27	0.033	2.0	<0.02
max	27.7	17.7	8.23	7.66	60	3.20	2.5	0.31	1.4	0.40	8.3	<0.02
median	25.9	16.0	7.95	6.43	33	0.66	1.0	0.21	0.50	0.084	3.4	<0.02
90th percentile	27.5	16.6	8.15	7.57	48	1.8	1.9	0.27	0.94	0.23	7.7	<0.02
95th percentile	27.6	17.1	8.19	7.62	54	2.5	2.2	0.29	1.2	0.32	8.0	<0.02

Footnotes:
[a] One sample censored that was too high of detection limit; that DL was higher (>10x) than all the other analyses recorded so removed data point.
[b] When sample data less than detection limit, used detection limit to calculate summary statistics.
[c] Free chlorine was measured in the field using the Hach CN-70 low range free chlorine color disc test kit. The kit detection range is 0 - 3.2 mg/L with a minimum detection increment of 0.02 mg/L. Free chlorine was not detected in any sample.

Table 10 - Wastewater Quality Characterization for Outfall Q04 (Process Water)

	Salinity ppth	Temperature °C	pH s.u.	DO mg/L	TSS mg/L	Turbidity NTU	TOC mg/L	Ammonia [b] mg/L as N	Nitrate [a] mg/L as N	Nitrite [a] mg/L as N	BOD5 [b] mg/L	Free Chlorine [c] mg/L
n	9	9	9	9	8	8	8	8	7	7	8	9
mean	24.7	18.0	8.04	6.30	39	0.80	1.2	0.088	1.00	0.07	4.3	<0.02
sd	2.0	1.3	0.18	1.43	7	0.87	0.42	0.077	0.40	0.18	1.8	0
min	21.5	15.8	7.82	3.76	26	0.18	0.60	<0.020	0.80	0.002	<2.0	<0.02
max	28.2	20.3	8.34	7.97	52	2.80	1.8	0.250	1.9	0.47	7.2	<0.02
median	25.3	18.1	8.00	6.53	40	0.42	1.2	0.060	0.85	0.01	3.7	<0.02
90th percentile	26.3	19.4	8.28	7.68	45	1.68	1.6	0.180	1.3	0.2	6.9	<0.02
95th percentile	27.2	19.9	8.31	7.83	49	2.24	1.7	0.215	1.6	0.3	7.0	<0.02

Footnotes:

[a] One sample censored that was too high of detection limit; that DL was higher (>10x) than all the other analyses recorded so removed data point.

[b] When sample data less than detection limit, used detection limit to calculate summary statistics.

[c] Free chlorine was measured in the field using the Hach CN-70 low range free chlorine color disc test kit. The kit detection range is 0 - 3.2 mg/L with a minimum detection increment of 0.02 mg/L. Free chlorine was not detected in any sample.

Table 11 - Wastewater Quality Characterization for Outfall U01 (02A - segregated)

Discharge Characterized: Wastestream - Algae Culture Bag Residue (no longer discharged as of July 2022)

	Salinity ppth	Temperature °C	pH s.u.	DO mg/L	TSS mg/L	Turbidity NTU	TOC mg/L	Ammonia mg/L as N	Nitrate mg/L as N	Nitrite mg/L as N	BOD5 mg/L	Free Chlorine [b] mg/L
n	9	9	9	9	8	8	8	8	8	8	8	9
mean	23.0	20.9	7.82	5.94	70	16	8.9	0.039	8.26	0.069	17	<0.02
sd	1.5	0.6	0.11	0.84	10	1	2.4	0.008	2.04	0.018	6	0
min	20.9	20.1	7.71	4.45	48	15	7.0	0.027	5.40	0.036	7	<0.02
max	24.7	21.8	7.98	7.12	79	17	14.0	0.047	12.0	0.094	25	<0.02
median	23.6	21.2	7.79	6.08	73	16	8.5	0.042	8.50	0.075	16	<0.02
90th percentile	24.4	21.6	7.96	6.90	78	17	11.2	0.046	10.0	0.083	24	<0.02
95th percentile	24.5	21.7	7.97	7.01	79	17	12.6	0.047	11.0	0.088	24	<0.02

Table 12 - Wastewater Quality Characterization for Outfall U01 (02B - Process Water)

Discharge Characterized: Wastestream – Single Seed Tank Drainage

	Salinity ppth	Temperature °C	pH s.u.	DO mg/L	TSS mg/L	Turbidity NTU	TOC mg/L	Ammonia mg/L as N	Nitrate [a] mg/L as N	Nitrite [a] mg/L as N	BOD5 mg/L	Free Chlorine [b] mg/L
n	5	5	5	5	5	5	5	5	4	4	5	4
mean	26.2	20.3	7.73	5.61	43	1.35	1.3	0.045	0.60	0.011	4.1	<0.02
sd	3.0	1.2	0.18	1.69	9	1.50	0.2	0.027	0.40	0.007	1.7	0
min	21.6	18.2	7.53	3.40	28	0.30	1.0	0.020	0.35	0.004	2.0	<0.02
max	28.7	21.2	8.01	8.09	50	3.90	1.6	0.089	1.20	0.018	6.2	<0.02
median	27.7	20.7	7.68	5.52	46	0.63	1.2	0.036	0.42	0.011	3.5	<0.02
90th percentile	28.5	21.2	7.92	7.22	50	2.94	1.5	0.075	0.97	0.017	5.8	<0.02
95th percentile	28.6	21.2	7.97	7.66	50	3.42	1.6	0.082	1.09	0.018	6.0	<0.02

Discharge Characterized: Wastestream – Single Seed Tank Cleaning Waste Residual

	Salinity ppth	Temperature °C	pH s.u.	DO mg/L	TSS mg/L	Turbidity NTU	TOC mg/L	Ammonia mg/L as N	Nitrate mg/L as N	Nitrite mg/L as N	BOD5 mg/L	Free Chlorine [b] mg/L
n	4	4	4	4	4	4	4	4	4	4	4	4
mean	29.0	17.8	7.71	6.19	35	0.57	377	0.039	1.02	0.002	10	<0.02
sd	0.6	1.5	0.16	1.17	8	0.37	749	0.013	1.48	0.000	14	0
min	28.2	16.8	7.50	4.85	27	0.21	1.8	0.020	0.01	0.002	2.0	<0.02
max	29.7	20.0	7.89	7.70	45	0.93	1500	0.051	3.20	0.002	31	<0.02
median	29.1	17.2	7.72	6.11	34	0.57	3.0	0.042	0.44	0.002	2.7	<0.02
90th percentile	29.5	19.3	7.85	7.24	42	0.90	1051	0.048	2.45	0.002	23	<0.02
95th percentile	29.6	19.6	7.87	7.47	44	0.92	1276	0.050	2.83	0.002	27	<0.02

Footnotes:

[a] One sample censored that was too high of detection limit; that DL was higher (>10x) than all the other analyses recorded so removed data point.

[b] Free chlorine was measured in the field using the Hach CN-70 low range free chlorine color disc test kit. The kit detection range is 0 - 3.2 mg/L with a minimum detection increment of 0.02 mg/L. Free chlorine was not detected in any sample.

Table 13 - Wastewater Quality Characterization for Outfall U05 (segregated wastestreams)

Discharge Characterized: Segregated Wastestream – Tank Drainage from Algae Dept. Greenhouse Tanks

	Salinity ppth	Temperature °C	pH s.u.	DO mg/L	TSS mg/L	Turbidity NTU	TOC mg/L	Ammonia mg/L as N	Nitrate mg/L as N	Nitrite mg/L as N	BOD5 mg/L	Free Chlorine [a] mg/L
n	5	5	5	5	5	5	5	5	5	5	5	5
mean	22.7	18.9	8.02	6.83	52	6.4	8.2	0.036	1.82	0.068	14	<0.02
sd	2.0	0.7	0.27	1.99	9.3	2.3	2.6	0.009	0.90	0.027	5.0	0
min	20.2	18.1	7.59	4.78	36	3.7	4.2	0.030	1.10	0.032	6.7	<0.02
max	24.6	19.6	8.26	9.65	59	9.1	11.0	0.050	3.30	0.090	20.0	<0.02
median	23.7	18.8	8.14	5.80	55	7.1	7.9	0.030	1.50	0.080	14.0	<0.02
90th percentile	24.4	19.6	8.23	9.03	58	8.6	10.6	0.046	2.78	0.090	18	<0.02
95th percentile	24.5	19.6	8.25	9.34	59	8.9	10.8	0.048	3.04	0.090	19	<0.02

Discharge Characterized: Segregated Wastestream – Cleaning Waste Residual from Algae Dept. Greenhouse Tanks

	Salinity ppth	Temperature °C	pH s.u.	DO mg/L	TSS mg/L	Turbidity NTU	TOC mg/L	Ammonia mg/L as N	Nitrate mg/L as N	Nitrite mg/L as N	BOD5 mg/L	Free Chlorine [a] mg/L
n	5	5	5	5	5	5	5	5	5	5	5	5
mean	6.8	15.7	8.27	7.53	38	38	6.5	0.056	20.0	0.003	16	<0.02
sd	2.5	0.8	0.90	0.83	17	29	6.6	0.017	19.8	0.002	15	0
min	2.4	14.5	7.50	6.10	17	12	1.6	0.040	0.3	0.002	2.0	<0.02
max	8.7	16.6	9.61	8.19	60	82	18.0	0.080	50.0	0.006	34.0	<0.02
median	7.9	15.6	7.95	7.85	35	27	4.1	0.060	13.0	0.002	8.7	<0.02
90th percentile	8.5	16.4	9.26	8.08	56	70	12.8	0.072	41.6	0.004	32	<0.02
95th percentile	8.6	16.5	9.44	8.14	58	76	15.4	0.076	45.8	0.005	33	<0.02

Footnotes:
[a] Free chlorine was measured in the field using the Hach CN-70 low range free chlorine color disc test kit. The kit detection range is 0 - 3.2 mg/L with a minimum detection increment of 0.02 mg/L. Free chlorine was not detected in any sample.

Solids in Tank Cleaning Waste Residuals and Media Filter Backwash

Tank cleaning waste residual created after staff clean the single seed, cultch and algae tanks is a concentrated mixture of biofilm, algae, shellfish larvae, and settled sediment and solids in a diluted solution of the disinfectant sodium hypochlorite (12.5% stock solution) with the neutralizing compound sodium thiosulfate (algae and cultch) or hydrogen peroxide (single-seed). The Permittee identifies that there is 10 gallons of residual created for each cleaning event. This cleaning and subsequent discharge occurs on average 4.4 times per month from each cultch tank outfall (Q01, Q05, and U02), 23 events per month from the algae tanks at outfalls U04, U05, U06, and U07, and from outfall U01 when single-seed is being produced.

Backwash discharge from a media filter cleaning event produces an episodic, concentrated solids discharge. When operating, the backwash of media filters occur once per day at a rate of 75 gallons per minute (gpm) for ten minutes when in operation. Two media filter groups, MF1 (n=14 filters) located on the eastside of the hatchery building and MF2 (n=8 filters) located on the south side of the hatchery building, operate continuously and as a result backflush periodically throughout a 24-hour period discharging filtrate backwash that blends with effluent that includes a large volume of continuously flowing headbox overflow and unused filtered bay water (i.e., process water) at outfall Q04. Media filter group 3 (MF3) and media filter group 4 (MF4) discharge in a segregated manner through outfalls U03 (02F) and Q05, respectively, without blending with process water. MF3 (n=2 filters) located on the upland side of the road near the office, and MF4 (n=2 filters) are located on the bulkhead. Backwash from MF3 and MF4 occur infrequently, approximately several times a year also at the rate of 75 gallons per minute (gpm) for ten minutes. At present, MF4 is decommissioned and no longer used based on comment from the Permittee during entity review.

The average and maximum total suspended solids (TSS) concentrations in the source water were 46/55 mg/L (bay) and 34/42 mg/L (well). The average TSS concentration in algae tank cleaning residual was 38 mg/L and a maximum of 60 mg/L. The average TSS concentration of the waste residual from cultch tank cleaning was 276 mg/L and a maximum of 830 mg/L. The discharge of media filter backwash was not characterized but the Permittee approximated it to be no more than the cleaning residuals maximum TSS concentration of 830 mg/L. (SLR 2021). The proposed permit requires monitoring of the media filter backwash.

The TSS concentrations in tank cleaning waste residuals from cultch tanks and the estimated TSS concentrations of media filter backwash theoretically could produce a visible plume if present in sufficient enough quantity and in a segregated manner (i.e., no mixing with the receiving water). Of note is that these discharges are five to ten times that of background (i.e., source water) TSS levels. While cultch tank cleaning waste residual discharges are small and segregated (e.g., 10 gallons), the backflushing events have not been characterized. Simultaneously, there has been no plumes reported either by the Permittee, the engineers, Ecology, or others over the course preparing for and drafting this permit. These types of discharge occur at outfalls Q01, Q05, and U02 for cultch tank cleaning events and at outfalls Q04, U03 and Q05 for backwash.

pH in Segregated Wastestream Discharge-Tank Cleaning Waste Residuals

The cleaning waste residual created after staff use the disinfectant sodium hypochlorite (i.e. bleach), which has a high pH of 13 standard units, to clean the cultch and algae tanks affects the pH of the residual. The pH of the cleaning waste residuals from cultch tank cleaning averages a pH of 8.75 with a maximum of 10.05. The average pH of the cleaning residuals from the algae tanks was 8.27 and with a maximum of 9.61. The Permittee identifies that 10 gallons of residual is created for each cleaning event and this cleaning and subsequent discharge occurs on average 4.4 times per month from each cultch tank outfall (Q01, Q05, and U02) and 23 events per month from the algae tanks in each greenhouse at outfalls U04, U05, U06, and U07.

Ammonia in Segregated Wastestream Discharge-Tank Cleaning Waste Residuals and Tank Drainage

While the data varied widely (0.030 to 3.8m/L ammonia), the maximum ammonia concentration in tank cleaning waste residual discharge from cultch tanks when discharged in a segregated manner was 3.8 mg/L surpassing the chronic aquatic life criteria for both marine and freshwater of 0 .978 mg/L and 1.217 mg/L, respectively. Tank cleaning waste residual discharges occur in a segregated manner at outfalls Q01, Q05 and U02 and as a result, has calculated reasonable potential to exceed both the ammonia chronic and acute aquatic life criteria during the critical season for both marine and fresh waters. The calculation accounts for the data set, zero mixing, and the discharge having an average pH of 8.75 s.u. The Permittee identifies that 10 gallons of residual is created for each cleaning event and this cleaning and subsequent discharge occurs on average 4.4 times per month at each outfall. (See Part III, sections A and G for the strategy on setting technology-based effluent limits in the proposed permit and possible future water quality-based effluent limits.)

Described further in Part III (section A and G), tank drainage discharge data indicated ammonia did not exceed the water quality standards for either freshwater or marine waters. There is a calculated risk potential that tank discharge could contain enough ammonia to violate the water quality criterion for just marine waters. Since the data is limited (n<20), Ecology found that when more data is collected (n>20) at similar concentrations, there would not be a reasonable potential to exceed water quality criteria. Ecology proposes more monitoring of ammonia in tank drainage discharges (see Part IV).

Total Residual Chlorine in Tank Cleaning Waste Residuals

As a standard operation procedure, the Permittee tests to ensure they neutralize free chlorine in all cleaning waste residuals using either sodium thiosulfate (cultch operations or algae department) or hydrogen peroxide (single seed operation). The cleaning waste residual is tested using a low range (method detection is 0.02 mg/L) free chlorine colorimetric DPD test kit for field use (https://www.hach.com/free-chlorine-test-kit-model-cn-70f/product?id=7640219517). The Permittee is not an accredited lab, nor is the method approved as per WAC 173-220-210 and 40 CFR 122.41. Due to holding time issues, wastewater characterization was performed using the field test and reported. Total residual chlorine was not detected above the detection limit of 0.02 mg/L or 20 µg/L in any discharge.

Process water discharge from outfalls Q03 and Q04 is a combination of continually flowing source water overflow and tank outflow (flow-through) with wastestreams such as cleaning waste residuals. A large proportion of outfall 03 and 04 discharges are continuous flowing source water at 87% and 96% respectively. Tank cleaning events that are typical of those discharging to outfalls Q03 and Q04 starts with a five-liter solution of 0.05% sodium hypochlorite that is a solution of 50 mg/L chlorine (free and combined chlorine). The end cleaning residual is a mixture of the biological material from the tank walls and rinse water creating 37.9 Liters (10 gallons) at a concentration of 6.6 mg/L chlorine prior to neutralization.

When tank cleaning waste residuals are blended into process water discharges, there is little to no potential for total residual chlorine to exceed the acute water quality criteria for aquatic life (marine 13.0 µg/L and freshwater 19.0 µg/L). If not neutralized and no chlorine was consumed in the cleaning event, one cleaning event could produce at most a concentration of total chlorine at outfall Q03 of 0.0063 mg/L or 6.3 µg/L. This is based on a cleaning residual volume of 37.9 L at a concentration of 6.6 mg/L chlorine blended with 40,014 L of continuously flowing process water discharged in one hour’s time. For outfall Q04, the discharge could be 0.0029 mg/L or 2.9 µg/L total chlorine. This is based on a cleaning residual volume of 37.9 L at a concentration of 6.6 mg/L chlorine blended with 86,260 L of continuously flowing process water discharged in one hour’s time.

Described in more detail in Part II, when tank cleaning waste residuals are discharged in a segregated manner, there is increased potential for total residual chlorine to be above the acute aquatic life criteria (marine 13.0 µg/L and freshwater 19.0 µg/L) since the minimum detection limit is greater than the aquatic life criteria. However, the amount of chemical that will completely neutralize the free chlorine must be calculated, administered, and reported by trained staff. These segregated discharges occur at outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07.

Described in more detail in Part IV, the proposed permit requires an accredited lab and approved methodology to be used for regular verification testing as a standard practice. Verification testing is necessary to verify that the field test is functioning with precision and accuracy, neutralization process is functioning correctly, and that the discharge complies with the permit’s effluent limits. Reporting that the concentration is below the lowest possible detection limit will indicate that the discharges meet permit limits. It is a requirement in the proposed permit to establish a best management practice plan and standard operating procedure that trained staff with standardized chemical solutions test every tank cleaning waste residual event. Additionally, all field and accredited verification testing must be recorded and reported.

Temperature (Heat Load)

The temperatures measured in the discharges from the wastewater characterization study in the engineering report (SLR 2021) indicate all the discharges are elevated above the criteria for aquatic life for freshwater and marine receiving waterbodies, 16°C and 13°C respectively. The Permittee does not identify any source control or treatment of its discharges to reduce temperature. The Permittee uses heat exchange to create water temperatures optimal for growing algae and shellfish. The Permittee has yet to determine AKART for the reduction of temperature or heat load for any of their discharges. An evaluation of AKART to manage, control and reduce heat load is a requirement of the proposed permit. Since AKART has yet to be determined, Ecology will not allow a mixing zone [WAC 173-201A-400(2)].

Zinc in Roof Runoff in Discharge from Outfall Q03

Galvanized roofing material is commonly known to allow zinc to enter and concentrate in stormwater runoff. Zinc can be as high as 15 mg/L and is generally in the dissolved form (Ecology 2008 and Schriewer et al. 2008). Downspouts from the Hatchery building, which is partially covered in galvanized roofing material, allow roof runoff to flow into the wastewater discharging out of outfall Q03 (SLR 2021).

Outfall Q03 discharges process water effluent at a rate of 0.7L per min. Based on Schriewer et al. (2008), a normal rainfall event can produce 20L of runoff per minute at a steady state concentration of 5 mg/L zinc. The resulting mixed discharge is 4.83 mg/L zinc, 100 times above the chronic marine water quality-based criterion of 0.081 mg/L zinc (81.0 µg/L).

Based on these calculations, when mixed with hatchery effluent, water discharging from outfall Q03 may have elevated zinc with reasonable potential to exceed the chronic aquatic life criteria of 81.0 µg/L at the point of discharge considering there is no mixing zone authorized.

Based on reporting through entity review, the Permittee indicates that it will conduct a drone survey to confirm the hatchery building roof is painted to eliminate any exposed galvanized surface. While there were no zinc data presented in the wastewater characterization report, it will be a requirement to monitor zinc at outfall Q03 during rain events in the proposed permit if the roof is found to have exposed surfaces.

E. Summary of compliance

The proposed permit is the first for the Hatchery. It is the result of a Clean Water Act citizen suit. A court decision in March 2018 held that the facility discharged in a manner that required authorization in accordance with the Clean Water Act. Ecology's position leading up to the U.S. Court of Appeals decision in 2018 was the Hatchery did not meet EPA's Concentrated Aquatic Animal Production Facility definition as a point source (40 C.F.R. § 122.24; 40 C.F.R. pt. 122, App. C) and as a result did not require an NPDES permit to authorize the discharges. Ecology reviewed the permittee's 2013 effluent study and had determined that Quilcene Bay water quality was unlikely to be altered.

F. State environmental policy act (SEPA) compliance

State law exempts the issuance, reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions that are no less stringent than federal and state rules and regulations (RCW 43.21C.0383). The exemption applies only to existing discharges, not to new discharges.

III. PROPOSED PERMIT LIMITS

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).

- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the Federal Water Quality Criteria Applicable to Washington (40 CFR 131.45).

- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

Shellfish hatcheries do not have federal effluent guidelines or standards therefore similar industry standards and best professional judgement were used to determine limits. The Permittee has reported that they do not treat any discharges other than to neutralize bleach for total residual chlorine in the cleaning waste residual wastestream. The parameters of concern include total residual chlorine from tank cleaning, the discharge of seawater to a freshwater stream (dissolved chloride), solids, pH, and ammonia in specific wastestreams and overall heat load (temperature) from all facility discharges.

The Permittee did not submit a study for all known, available, and reasonable methods of prevention, control, and treatment (AKART) in the final engineering report (SLR 2021) for any of the added or concentrated constituents. In the proposed permit, a compliance schedule requires the Permittee to evaluate options to prevent marine discharges to a freshwater creek and an AKART evaluation for pH and ammonia in tank cleaning waste discharges, removed solids of media filter backwash, and the heat load of all discharges. The evaluations will also include a comparison to the water quality based-effluent limits. The evaluations are due before the proposed permit expiration. Ecology will compare the AKART determination with water quality based-limits and implement the more stringent of these limits through a permit modification or when the permit renewed next.

Neutralization to remove total residual chlorine is a minimum treatment and best management practice for discharges to meet the water quality-based limits. Ecology has applied minimum technology-based standards [WAC 173-221a-100 (4)(b)(i)] for solids in tank cleaning waste discharges. Ecology set performance-based limits for temperature and ammonia. The permit proposes water quality-based limits for turbidity, pH, and total residual chlorine.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Ecology does not usually develop limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology if significant changes occur in any constituent [40 CFR 122.42(a)]. Until Ecology modifies the permit to reflect additional discharge of pollutants, a permitted facility could be violating its permit.

A. Technology-based effluent limits

Solids in Tank Cleaning Waste Residuals from Tanks Used to Maintain and Rear Shellfish and Culture Algae

Total suspended solids (TSS) in tank cleaning waste residual discharge must be limited based on industry standards. The minimum effluent standards in WAC 173-221A-100 for fish hatchery solids management and offline solids settling is appropriate for a shellfish hatchery since they have similar processes such as feeding animals and cleaning tanks.

The maximum discharge limit for each cleaning event cannot exceed 100 mg/L TSS. Specifically, tank cleaning waste residuals from tanks used for maintaining and rearing shellfish (i.e., broodstock, single-seed, and cultch) and culturing algae are subject to meeting the following limitation. Compliance with the effluent limit must be met prior to release from tank before blending with other wastestreams, return flow, or flow-through effluent.

Table 14 – Total Suspended Solids: Minimum Technology Based Effluent Limit for Tank Cleaning Waste Residual Discharges to the Following Outfalls:

Outfalls	**Parameter**	**Average Monthly Limit**	**Maximum Daily Limit**
Q01, Q03, Q04, Q05, U01, U02, U04, U05, U06, and U07	TSS	NA	100 mg/L

Solids in Media Filter Backwash

Ecology proposes monitoring the segregated discharges of backwash at outfall U02 for quantity, TSS, and turbidity for the permit cycle. Ecology will re-evaluate in the next permit cycle after the Permittee submits their AKART evaluation for source control and treatment of media filter backwash as per the compliance schedule and there is further effluent characterization.

Ammonia in Segregated Wastestream Discharges – Tank Cleaning Waste Residuals

The control and treatment for ammonia must meet AKART. The proposed permit requires the Permittee to evaluate AKART for ammonia. Therefore, Ecology determined performance-based limits (See Ammonia section of Appendix D: Performance Limit Calculations for Cleaning Residual Discharges) for the duration of the proposed permit for cleaning residual discharges from the three outfalls, Q01, Q05, and U02. The calculation is based on the ammonia data submitted in the engineering report (SLR 2021) from all cleaning wastes characterizations.

The ammonia in the discharge of cultch tank cleaning waste residuals has a reasonable potential to exceed water quality criteria for aquatic life (see section G. Evaluation of surface water quality-based effluent limits for numeric criteria for ammonia). If through implementation of the AKART recommendations the segregated discharge no longer exists or is discontinued, there would be less or no potential of ammonia to violate water quality standards. After the AKART evaluation, Ecology will assess for reasonable potential of ammonia to violate water quality standards in this type of discharge to determine the future need for technology or water quality-based effluent limits.

Table 15 – Ammonia: Performance Based Effluent Limits for Outfalls with Tank Cleaning Waste Residuals Discharged as Segregated Wastestreams

Outfalls Discharging to a Marine Waterbody	Parameter	Average Monthly Limit	Maximum Daily Limit
Q01 and Q05	Ammonia (Total as N)	1.5 mg/L	4.0 mg/L
Outfalls Discharging to Freshwater	**Parameter**	**Average Monthly Limit**	**Maximum Daily Limit**
U02	Ammonia (Total as N)	1.5 mg/L	4.0 mg/L

Temperature for Tank Drainage and Process Water Discharges

During the time the Permittee is working to complete the compliance schedule tasks, Ecology proposes performance-based limits for temperature. The average monthly and maximum daily limits have been calculated (see Appendix D — Technical Calculations) for the respective outfalls based on performance as reported by the Permittee in SLR 2021. A maximum daily limit of 22.0°C is proposed for outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07. The 22.0°C is based on guidelines for use protection to prevent acute lethality and a barrier to adult salmon migration.

Table 16 –Temperature: Performance-based Limits for Outfalls with Tank Drainage and Process Water Discharges

Outfalls	Parameter	Average Monthly Limit	Maximum Daily Limit
Q01, Q05, U01, U02, U04, U05, U06, and U07	Temperature	21.3°C	22.0°C
Q03	Temperature	16.2°C	17.9°C
Q04	Temperature	18.4°C	21.4°C

B. Surface water quality-based effluent limits

The Washington State surface water quality standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

Numeric criteria for the protection of aquatic life and recreation

Numeric water quality criteria are listed in the water quality standards for surface waters (chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numeric criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

Numeric criteria for the protection of human health

In 1992, U.S. EPA published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State in its National Toxics Rule 40 CFR 131.36 (EPA, 1992). Ecology submitted a standards revision for 192 new human health criteria for 97 pollutants to EPA on August 1, 2016. In accordance with requirements of CWA section 303(c) (2) (B), EPA finalized 144 new and revised Washington specific human health criteria for priority pollutants, to apply to waters under Washington's jurisdiction. EPA approved 45 human health criteria as submitted by Washington. The EPA took no action on Ecology submitted criteria for arsenic, dioxin, and thallium. The existing criteria for these three pollutants remain in effect and were included in 40 CFR 131.45, Revision of certain Federal Water quality criteria applicable to Washington.

Human health criteria (WAC 173-201A-240) are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200, 2016) and of all marine waters (WAC 173-201A-210, 2016) in the state of Washington.

Antidegradation

Description – The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2016) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three tiers of protection (described below) for surface waters of the state.

Tier I: ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions.

Tier II: ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities.

Tier III: prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

Facility Specific Requirements — This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards.

- Whenever the natural conditions of a water body are of a lower quality than the assigned criteria, the natural conditions constitute the water quality criteria. Where water quality criteria are not met because of natural conditions, human actions are not allowed to further lower the water quality, except where explicitly allowed in chapter 173-201A WAC.

Ecology's analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water.

Mixing zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the discharge doesn't interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for a facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25% of the available width of the water body for dilution [WAC 173-201A-400 (7)(a)(ii-iii)].

Ecology uses modeling to estimate the amount of mixing within the mixing zone. Through modeling Ecology determines the potential for violating the water quality standards at the edge of the mixing zone and derives any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's Permit Writer's Manual). Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 4 means the effluent is 25% and the receiving water is 75% of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numeric criteria for that zone.

Each aquatic life *acute* criterion is based on the assumption that organisms are not exposed to that concentration for more than one hour and more often than one exposure in three years. Each aquatic life *chronic* criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two and four tenths (2.4) liters/day for drinking water (increased from two liters/day in the 2016 Water Quality Standards update).
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit does not authorize a mixing zone. The Permittee may be required to submit a Mixing Study, for Ecology's consideration, to evaluate whether or not a mixing zone is warranted for discharges related to heat load or other parameters of concern from the Hatchery. If conducting and submitting a study, the Permittee should discuss the applicable requirements with Ecology and the study must be done in accordance with WAC 173-201A-400. Additionally, for a mixing zone to be considered, the study must include the relocation of the outfall(s) further into the bay and effluent diffusion must be identified.

D. Designated uses and surface water quality criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 1992).

The Hatchery discharges to both marine and freshwater waterbodies. The discharge characterization did not indicate concerns for any bacteria. Aquatic Life Uses are designated based on the presence of, or the intent to provide protection for the key uses. All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species. The table included below lists the criteria applicable to this facility's discharges.

Table 17 - Designated uses and surface water quality criteria for each type of receiving waterbody.

Marine (Quilcene Bay - Outfalls 01, 03, 04, 05)	**Freshwater (Un-named Stream Outfalls 02ABC, 02D, 02E, 02F)**
Aquatic Life Use Extraordinary Quality Category: Protection for salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning. *Criteria* Temperature: 1-DMax 13°C Dissolved Oxygen: 7.0 mg/L Turbidity: Not to exceed either •5 NTU over background when the background is 50 NTU or less; or •A 10 percent increase in turbidity when the background turbidity is more than 50 NTU. pH: must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.2 units.	**Aquatic Life Use** Core Summer Salmonid Habitat Category: The key identifying characteristics of this use are summer (June 15 - September 15) salmonid spawning or emergence, or adult holding; use as important summer rearing habitat by one or more salmonids; or foraging by adult and subadult native char. Other common characteristic aquatic life uses for waters in this category include spawning outside of the summer season, rearing, and migration by salmonids. *Criteria* Temperature: 7-DAD Max 16°C Dissolved Oxygen: 9.5 mg/L Total dissolved gas: Must not exceed 110 percent of saturation at any point of sample collection. Turbidity: Must not exceed either •5 NTU over background when the background is 50 NTU or less; or •a 10 percent increase in turbidity when the background turbidity is more than 50 NTU. pH: must measure within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units.
Recreational Use The recreational use is primary contact recreation. *Criteria*: *Enterococci* organism levels within an averaging period must not exceed a geometric mean of 30 CFR or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample values exist) obtained within the averaging period exceeding 110 CFU or MPN per 100 mL.	**Recreational Use** The recreational use is primary contact recreation. *Criteria*: *E.coli* organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL.

Marine (Quilcene Bay - Outfalls 01, 03, 04, 05)	Freshwater (Un-named Stream Outfalls 02ABC, 02D, 02E, 02F)
Shellfish harvesting: To protect shellfish harvesting, fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, and not have more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies/100 mL.	
Miscellaneous uses: The miscellaneous marine water uses are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.	**Miscellaneous uses:** The miscellaneous fresh water uses are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.
	Water supply uses: The water supply uses are domestic, agricultural, industrial, and stock watering.

E. Water quality impairments

Ecology has not documented water quality impairments in the receiving waters near the outfalls. There are only Category 2 listings for bacteria in the bay and phenol in the sediment. Neither of these parameters are found in, nor are results, of the discharges from the hatchery.

F. Evaluation of surface water quality-based effluent limits for narrative criteria

Ecology must consider the narrative criteria described in WAC 173-201A-260 when it determines permit limits and conditions. Narrative water quality criteria limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge which have the potential to adversely affect designated uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health.

Ecology considers narrative criteria when it evaluates the characteristics of the wastewater and when it implements AKART as described above in the technology-based limits section. When Ecology determines if a facility is meeting AKART, it considers the pollutants in the wastewater and the adequacy of the treatment to prevent the violation of narrative criteria.

In addition, Ecology considers the toxicity of the wastewater discharge by requiring whole effluent toxicity (WET) testing when there is a reasonable potential for the discharge to contain toxics. Ecology's analysis of the need for WET testing for this discharge is described later in the fact sheet.

G. Evaluation of surface water quality-based effluent limits for numeric criteria

Ecology evaluated the discharges and determined the nature of and the impacts of turbidity, pH, bacteria, ammonia, total residual chlorine, dissolved zinc from roof drainage, seawater discharges (dissolved chloride) to a freshwater creek, and temperature/heat load. The evaluation used the discrete discharge points to the creek and the bay for compliance meaning there were no dilution or mixing factors applied after discharge left the outfall location. Also considered was the type of discharge (i.e., segregated wastestream or process water). The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water. The determinations and limits are described below.

The proposed permit contains a compliance schedule (see S8) for the need to evaluated AKART and compare to the water quality-based limits for solids, pH, ammonia, dissolved chloride, and temperature.

Turbidity

Ecology evaluated the impact of turbidity based on the range of turbidity measurements in the effluent and source water. Water quality-based limits have been set as a net limit based on the 95th percentile of the incoming bay water, which measured 2.95 NTU (see Table 5), plus 5 NTUs since the average turbidity was less than 5 NTU. The limit is an average monthly limit of 8 NTUs in the segregated discharge of tank drainage at outfalls Q01, Q05, U01, U02, U02, U04, U05, U06, and U07 and process water from outfalls Q03, Q04, U01.

pH

Cleaning waste residuals after using sodium hypochlorite has elevated pH and when discharged in a segregated manner meaning that it does not blend with process water, the direct discharge pH level is above surface water quality-based criteria. Specifically, there are excursions above the pH of 8.5 standard units, which is the freshwater and marine aquatic life designated use criteria upper limit. It is necessary to set pH limits to the surface water quality-based criteria for the protection of aquatic life. The limits for pH are set for these wastestreams discharging to the creek in a segregated manner to a minimum of 6.5 and a maximum of 8.5 standard units (outfalls U02, U04, U05, U06, and U07) and a minimum of 7.0 and maximum of 8.5 standard units for marine discharges at outfalls Q01 and Q05.

Process water discharges at outfalls U01, Q03, and Q04 will have a pH limit of 6.0 to 9.0 based on best professional judgement. Ecology does not expect pH to exceed the water quality criteria since the constant flow of several hundreds of thousands of gallons per minute of seawater overflow and flow-through blends with each 10 gallons of cleaning residuals. The high buffering capacity of primarily seawater in this wastestream prevents pH from being altered in a deleterious manner that would exceed water quality criteria at the compliance point (i.e., end of pipe). The proposed process water limits will be implemented through continuous monitoring after the Permittee meets this milestone in the compliance schedule. The overall purpose for pH limitations and monitoring in process water is to prevent human error in the manual tank cleaning process.

Bacteria

The discharges do not contain any fecal coliform, *E. coli*, or enterococci as there is no septic system or municipal sewer wastewater connected to the Hatchery's outfalls. There is no risk of these bacteria being produced either from the rearing of shellfish or culturing of algae.

Toxic Pollutants

Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutants are present in the some of the discharges (i.e., specific wastestreams): ammonia, total residual chlorine, dissolved chloride, and zinc. Ecology conducted a reasonable potential analysis to determine whether certain wastestreams would require effluent limits in this permit or the next as in the case with ammonia.

- Ammonia in segregated wastestream discharge of cleaning waste residuals and tank drainage

  Ecology determined the Permittee must first meet AKART, and that will be done through a compliance schedule in the proposed permit. Discharges of ammonia in the tank cleaning waste will be limited through performance-based limits (see Section IIIA-ammonia) and tank drainage discharges will be monitored to collect more data. After completion of the AKART evaluation, Ecology will reassess the reasonable potential for ammonia to violate water quality standards in these types of discharge. The following water quality-based effluent limits have been calculated in the event the discharges continue in the same segregated manner after implementation of source controls or treatment based on the AKART evaluations' recommendations.

Reasonable Potential: Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards. Ammonia's toxicity depends on that portion which is available in the unionized form. For toxicity in the marine environment, the amount of unionized ammonia depends on the temperature, pH, and salinity of the receiving marine water. To evaluate ammonia toxicity, Ecology used the available receiving water information based on the average influent from the bay intake water (see Table 5) and Ecology spreadsheet tools.

Similarly, the amount of unionized ammonia for freshwater toxicity depends on the temperature and pH in the receiving freshwater. To evaluate ammonia toxicity for freshwater receiving waterbody, Ecology used the core salmonid temperature standard for freshwater (16°C), data from NOAA to determine typical creek pH of a creek on the Olympia Peninsula, and Ecology spreadsheet tools.

Tank Cleaning Waste Residuals: Ecology found that discharges of cleaning waste residuals from cultch tank cleaning discharging from outfalls Q01, Q05, and U02 had a maximum measured value of 3.8 mg/L ammonia that was above the chronic criteria. Ecology conducted a reasonable potential analysis (See Ammonia section of Appendix D: Reasonable potential analysis for freshwater and marine receiving waterbodies). The calculated reasonable potential to exceed both the ammonia chronic and acute aquatic life criteria during the critical season for both marine and fresh waters. Calculations accounted for the small (n<20) data set. The potential also considered no mixing and the discharge having an average pH of 8.75 s.u.

Ecology determined that the segregated wastestream discharge of cleaning waste residuals has reasonable potential to cause a violation of the water quality standards for both marine and freshwater discharges. The following are the calculated water quality-based effluent limits for use after the AKART evaluation (see Table 18).

Table 18 – Water Quality Based Ammonia Effluent Limits for Cleaning Waste Residuals Discharged as Segregated Wastestreams

WQ-based Limits	Parameter	Average Monthly Limit	Maximum Daily Limit
Marine	Ammonia (Total as N)	1.1 mg/L	1.6 mg/L
Freshwater	Ammonia (Total as N)	1.4 mg/L	2.0 mg/L

Tank Drainage: Ecology determined that water quality-based effluent limits were not warranted for tank drainage since the reported data indicated ammonia in the discharges monitored did not exceed the water quality limits for either freshwater or marine waters. There is a calculated risk potential that tank discharge could contain enough ammonia to violate the water quality criterion for marine waters. Since the data is limited (n<20), Ecology found that when more data is collected (n>20) at similar concentrations, there would not be a reasonable potential to exceed water quality criteria. The proposed permit requires the Permittee to monitor ammonia during the permit cycle and reasonable potential will be reassessed in the next permit.

- Total residual chlorine in tank cleaning waste residuals

As a standard operation procedure, the Permittee treats for and neutralizes free chlorine in all tank cleaning residuals using either sodium thiosulfate (cultch operations and algae department) or hydrogen peroxide (single seed operation). The Permittee reported that no cleaning waste residual discharge had detectable free chlorine above the method detection limit of 0.02mg/L or 20 µg/L.

As reported in Section IID. Wastewater Characterization, there is little potential to violate the water quality standard for the acute aquatic life criteria if neutralization occurs. The tank cleaning and neutralization process for each operation and department will become a standard operating procedure that will be described in a permit required Best Management Practices Plan (S5). Practices to be followed include that every tank cleaning event is neutralized, tested, recorded, regular verification is performed using accredited lab and method with the lowest possible detection limit, and total residual chlorine levels reported are at or below the method detection limit of the field and accredited verification tests. There are several cleaning events every day, and each cleaning event is subjected to the BMPs and must be field tested. Compliance with the limit will be performed through monthly verification testing using an accredited lab and methodology, and reported.

The maximum daily effluent limit is set to the acute aquatic life criteria. This water quality-based effluent limit will be effective at permit issuance and compliance must be met at the point of discharge for the respective waterbodies.

Table 19 – Total Residual Chlorine Effluent Limits for Cleaning Residuals Discharged as Segregated Wastestreams and Process Water Discharges

Outfalls Discharging to a Marine Waterbody	**Parameter**	**Average Monthly Limit**	**Maximum Daily Limit**
Q01, Q03, Q04 and Q05	Total Residual Chlorine	NA	13.0 µg/L
Outfalls Discharging to Freshwater	**Parameter**	**Average Monthly Limit**	**Maximum Daily Limit**
U01, U02, U04, U05, U06, and U07	Total Residual Chlorine	NA	19.0 µg/L

- Dissolved Chloride in Marine Water Discharge to Freshwater Creek

  The Permittee pumps seawater from several Quilcene Bay and saltwater well sources. The outfalls to the underground un-named creek, U01, U02, U03, U04, U05, U06, and U07, each discharge the same marine water that has an average salinity ranging between 22-29 parts per thousand (ppt). Using a conversion equation (salinity in ppt = 0.018066 × Cl^- mg/L), the likely dissolved chloride in the wastestreams could be as high as 16,052 mg/L dissolved chloride and the aquatic life criteria is 230 mg/L.

  The proposed permit sets a compliance schedule milestone for the prevention of marine water discharges to the un-named creek to meet the water quality-based limits for aquatic life. No monitoring is proposed. Task 3.1 and Task 4.2 of the compliance schedule describes the evaluation required and implementation necessary to meet the water quality-based limits.

- Total recoverable zinc in stormwater from roof drains to outfall Q03

  The reasonable potential based on values found in the literature and typical discharge from stormwater industrial permitted facilities indicates that discharge should be characterized for total recoverable zinc (see Wastewater Characterization: Zinc in Roof Runoff in Discharge from Outfall Q03). The Permittee did not report stormwater runoff characterization from the Hatchery building in the engineering report (SLR 2021). The Permittee only reported that the downspouts direct roof runoff to Outfall Q03. The Permittee reports as of October 2022 that the Hatchery building roof is not galvanized or is painted where there is galvanized material. The permittee shall report documentation before issuance and the proposed permit will not include monitoring for zinc.

  Ecology has also placed in the proposed permit a special condition as part of the Best Management Plan that the Permittee identify practices to manage or prevent contamination of stormwater. BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent stormwater contamination. Stormwater management practices must comply with all applicable Operational, Structural, and Source Control BMPs in the Department of Ecology's Stormwater Management Manual for Western Washington; Volume IV (2019). Find the Western Wastewater Stormwater Management Manual at this link: https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/2019SWMMWW.htm.

Temperature

The temperatures of tank drainage and process water discharges is elevated above the criteria for aquatic life for freshwater and marine receiving waterbodies, 16°C and 13°C respectively.

Temperature—Discharges to Freshwater:

The state temperature standards (WAC 173-201A, WAC 173-201A-200, WAC 173-201A-600, and WAC 173-201A-602) include multiple elements:

- Annual summer maximum threshold criteria (June 15 to September 15)
- Supplemental spawning and rearing season criteria (September 15 to June 15)
- Incremental warming restrictions
- Guidelines on preventing acute lethality and barriers to migration of salmonids

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.

- Annual summer maximum and supplementary spawning/rearing criteria

  Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), and WAC 173-201A-602, Table 602]. These threshold criteria (e.g., 12, 16, 17.5, 20°C) protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures.

  Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

  Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum temperature (7-DADMax). The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures. Criteria for some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

- Incremental warming criteria

  The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii).

  At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment. These increments are permitted only to the extent doing so does not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

- Guidelines to prevent acute lethality or barriers to migration of salmonids. These site-level considerations do not override the temperature criteria listed above.

  1. Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C, unless a dilution analysis indicates ambient temperatures will not exceed 33°C two seconds after discharge.

  2. General lethality and migration blockage: The temperature at the edge of a chronic mixing zone must not exceed either a 1DMax of 23°C or a 7DADMax of

22°C. When adjacent downstream temperatures are 3°C or more cooler, the 1DMax at the edge of the chronic mixing zone must not exceed 22°C.

3. Lethality to incubating fish: The temperature must not exceed 17.5°C at locations where eggs are incubating.

Temperature-Discharges to Marine Waters:

The state temperature standards for marine waters (WAC 173-201A-210) include multiple elements:

- Annual 1-Day maximum criteria
- Incremental warming restrictions
- Guidelines on preventing acute lethality and barriers to migration of salmonids

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.

- Annual 1-Day maximum criteria

  Each marine water body has an annual maximum temperature criterion [WAC 173-201A-210(1)(c)(i)-(ii) and WAC 173-201A-612]. These threshold criteria (e.g., 13, 16, 19, 22°C) protect specific categories of aquatic life by controlling the effect of human actions on water column temperatures. Criteria for marine waters and some fresh waters are expressed at the highest 1-Day annual maximum temperature (1-DMax).

- Incremental warming criteria

  The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-210(1)(c)(i)-(ii)]. At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment (Ti), calculated as:

  This increment is permitted only to the extent doing so does not cause temperatures to exceed the annual maximum criteria.

- Guidelines to prevent acute mortality or barriers to migration of salmonids. These site-level considerations do not override the temperature criteria listed above.

  1. Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C; unless a dilution analysis indicates ambient temperatures will not exceed 33°C 2-seconds after discharge.

  2. General lethality and migration blockage: Measurable (0.3°C) increases in temperature are not allowed when the receiving water temperature exceeds

either a 1DMax of 23°C or a 7DADMax of 22°C. When adjacent downstream temperatures are 3°C or more cooler, the 1DMax must not exceed 22°C.

3. Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating.

Reasonable Potential Analysis and Data Collection Required

Process water and tank drainage discharges have reasonable potential to exceed water quality criteria for both freshwater and marine waters since the temperatures are above criteria. The intake water, however, is also above the criteria. Ecology does not have sufficient information on the temperature of the receiving water to determine compliance with water quality criteria since there is historic data that seasonally, ambient conditions for Quilcene Bay is above the marine criterion, however, not for all year-long. The permit proposes a compliance schedule milestone for the completion of a receiving waterbody study for temperature of Quilcene Bay. The proposed permit requirement to conduct a receiving waterbody study for temperature will assess the ambient conditions during all seasons over a two-year period and include characterization of intake water temperatures yearlong.

Temperature Limits

The proposed permit has performance-based limits for the duration of the permit (see Part III Section A Technology-based limits - Temperature). Over the course of the permit cycle, the proposed compliance schedule requires the Permittee to conduct an AKART study to evaluate the technological and source control methods to reduce the heat load of all the discharges. After the AKART evaluation recommendation(s) is approved, a mixing zone for temperature may be considered depending on the results of the receiving waterbody study, extensions of outfalls into the bay, and a mixing zone study. For the next permit, Ecology will assess water quality-based effluent limits with the information from the receiving water body study submitted and the technological improvements made to the facility from the AKART evaluation proposed this permit cycle.

H. Human health

Washington's water quality standards include numeric human health-based criteria for 97 priority pollutants that Ecology must consider when writing NPDES permits.

Ecology determined the applicant's discharges are unlikely to contain chemicals regulated to protect human health. The discharges do not contain chemicals of concern based on existing effluent data or knowledge of discharges to the system. Ecology will reevaluate this discharge for impacts to human health at the next permit reissuance.

I. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards, Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit available at: https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Sediment-cleanups.

Through a review of the discharger characteristics and of the effluent characteristics, Ecology determined that this discharge has no reasonable potential to violate the sediment management standards.

J. Groundwater quality limits

The groundwater quality standards (chapter 173-200 WAC) protect beneficial uses of groundwater. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

The Hatchery, Pacific Shellfish – Quilcene, LLC, does not discharge wastewater to the ground. No permit limits are required to protect groundwater.

K. Whole effluent toxicity

The water quality standards for surface waters forbid discharge of effluent that has the potential to cause toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Using the screening criteria in chapter 173-205-040 WAC, Ecology determined that toxic effects caused by unidentified pollutants in the effluent are unlikely. Therefore, this permit does not require WET testing. Ecology may require WET testing in the future if it receives information indicating that toxicity may be present in this effluent.

IV. MONITORING REQUIREMENTS

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, detection level (DL), and quantitation level (QL) on the discharge monitoring report or in the required report.

A. Wastewater monitoring

Pacific Shellfish – Quilcene LLC, the hatchery, must monitor the following parameters in their wastewaters:

- Source Water: Marine well water and bay water must be monitored for flow, temperature, turbidity, BOD_5, TSS, TOC, and salinity. Flow and temperature will eventually be monitored in a continuous manner based on the milestone in the compliance schedule under task 1.

- Effluent from Outfalls U01, Q03, and Q04 that discharge process water must be monitored for flow, temperature, turbidity, pH, BOD_5, TSS, TOC, salinity and total residual chlorine. Continuous monitoring for flow, temperature, turbidity, and pH is to become effective with completion of compliance schedule, task 1.

- Additionally, effluent from Outfall Q03, which is connected to the hatchery roof drains system, must be monitored for total recoverable zinc during rain events at frequency of three events per year.

- Each tank cleaning event for every affected outfall (Q01, Q03, Q04, Q05, U01, U02, U04, U05, U06, and U07) must be monitored for volume and TSS.

- Tank cleaning event producing a segregated wastestream discharge of Cleaning Waste Residuals (Outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07) must be monitored for volume, pH, ammonia, and total residual chlorine.

- Tank drainage discharged as a segregated wastestream (Outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07) must be monitored for volume, temperature, turbidity, and ammonia.

- Outfall U03 discharging Media Filter Backflush as a segregated wastestream must be monitored for volume, turbidity, and TSS.

- Total residual chlorine must be monitored in the facility's wastewater using both field and verification testing. This means every tank cleaning event must be tested for total residual chlorine regardless of being discharged as a segregated wastestream or blended with process water. Monitoring using field testing consists of in field, real-time testing performed on each discharge using kit methodology that may not be EPA approved and that does not require facility to have lab accreditation but must follow the approved best management practices standard operation procedure (SOP) described in condition S5. The periodic, regular verification testing must be conducted using approved methodology (40 CFR Part 136) and an accredited laboratory (chapter 173-50 WAC). All field monitoring data must be recorded and reported in the appropriate manner in the testing log specified in the approved SOP. Verification monitoring is done in accordance with the monitoring schedule in condition S2 and must be reported for compliance on the discharge monitoring reports (DMRs).

The monitoring schedule is described in the proposed permit under Special Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

B. Lab accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data.

Total Residual Chlorine

There are two types of testing that must be conducted; field and verification. The use of a field test kit such as that used currently by the Permittee can be used for each cleaning event discharge if the approved best management practices SOP is followed (S5). Periodic verification tests must be conducted in accordance with the monitoring schedule. Verification testing uses EPA approved methodology (40 CFR Part 136) and must be conducted using an accredited laboratory (chapter 173-50 WAC) for compliance.

Verification testing is necessary to verify that the field test is functioning with precision and accuracy, ensuring neutralization process is functioning correctly, and that the discharge complies with the permit's effluent limits. If holding time is a concern for verification testing, the Permittee may seek lab accreditation to perform this testing on site at the Hatchery. Lab accreditation can be sought out through the website https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation/Applying-for-laboratory-accreditation.

C. Effluent limits which are near detection or quantitation levels

The method detection level (MDL) also known as detection level (DL) is the minimum concentration of a pollutant that a laboratory can measure and report with a 99 percent confidence that its concentration is greater than zero (as determined by a specific laboratory method). The quantitation level (QL) is the level at which a laboratory can reliably report concentrations with a specified level of error. Estimated concentrations are the values between the DL and the QL. Ecology requires permitted facilities to report estimated concentrations. When reporting maximum daily effluent concentrations, Ecology requires the facility to report "less than X" where X is the required detection level if the measured effluent concentration falls below the detection level.

Total Residual Chlorine

The water quality-based effluent concentration limits for total residual chlorine are near or below the limits of current analytical methods to detect or accurately quantify. Both field and verification monitoring must use the appropriately sensitive method to report compliance with the water quality-based effluent limits. Reporting that the concentration is below the lowest possible detection limit using the appropriately sensitive test can indicate that the discharges meet permit limits.

Permittee complies with effluent limit if reported results are non-detectable and below the lowest possible method detection limit if using the sufficiently sensitive and approved SOP method for field testing and EPA approved method for verification testing.

V. OTHER PERMIT CONDITIONS

A. Reporting and Record Keeping

Ecology based Special Condition S3 on its authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

B. Operation and Maintenance

Under Special Condition S4, Ecology requires industries to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state and federal regulations [40 CFR 122.41(e) and WAC 173-220-150 (1)(g)]. The facility will prepare and submit an operation and maintenance (O&M) manual as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-150). Implementation of the procedures in the operation and maintenance manual ensures the facility's compliance with the terms and limits in the permit.

O&M Manual

This proposed permit requires Pacific Shellfish – Quilcene LLC, the hatchery, to submit an O&M manual for Ecology approval on January 1, 2027. Manual must address the approved treatment recommendations that will be implemented and their operations identified in the Permittee's AKART analyses from the compliance schedule, tasks 3 and 4.

C. Best Management Practices Plan

Best Management Practices (BMPs) include standard operating procedures, schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. The practices can include treatment systems, operating procedures, and practices used to control plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage. In addition, BMPs are the actions identified to manage, prevent contamination of, and provide source control for stormwater.

The Permittee must develop a BMP plan to include:

- SOP for Tank Cleaning and Management of Waste Residuals. This SOP must be approved and shall include:
  a. Procedure for Tank Cleaning that contain descriptions of chemical use for complete neutralization of free chlorine with indication of how to calculate, administer, and report by trained staff.
  b. Field and verification testing procedures that contain descriptions to conduct each to ensure reporting in compliance with permit.
  c. Chemical Use and Testing Logs to record the use of chemicals to clean and neutralize and record of the corresponding field and verification testing.
- Management of Media Filter Backwash Wastestreams
- Algae Department Lab equipment and surface cleaning procedures
- Aquatic Invasive Species Prevention and Reporting Procedures
- Stormwater Management BMPs

D. Spill Control Plan

This facility stores a quantity of chemicals on-site that have the potential to cause water pollution if accidentally released. Ecology can require a facility to develop best management plans to prevent this accidental release [Section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080].

This proposed permit requires this facility to develop and implement a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs.

E. Compliance Schedule

In accordance with WAC 173-201A-510 (4), the proposed permit includes a Compliance Schedule (condition S8) with due dates. Appendix E contains a project management chart for tracking the compliance schedule reporting with the proposed due dates. The schedule includes the following:

1. Establish continuous monitoring (see condition S2. Monitoring Requirements)

2. Quilcene Bay Receiving Waterbody Study for Temperature (see condition S10.)

3. Submit Engineering Report(s) that include recommendations, basic plan drawings, and preliminary specifications for the following tasks. Specifically the report must provide an AKART evaluation with recommendations and an assessment of whether discharges will meet water quality-based effluent limits.

    - Evaluate options and specify recommendations to prevent marine water discharge from outfalls U01, U02, U03, U04, U05, U06, and U07 to the freshwater creek and roadway stormwater catch basin.

    - Perform an AKART analysis and report recommendations for the treatment or source control of the segregated discharges of tank cleaning waste residuals from outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07 for pH and ammonia. Include whether the technology based limits derived from implementation of AKART will meet the water quality-based effluent limits.

    - Perform an AKART analysis and report recommendations for the treatment or source control of removed solids from media filtration of source water. Include whether the technology based limits can be derived from implementation of AKART.

    - Perform an AKART analysis and report recommendations for the minimum treatment and source control for heat load reduction in all process and wastestream discharges to the meet the water quality criterion **year-round**.

4. Implementation of AKART and Other Recommendations. Ecology will assess and approve source control and treatment recommendations that eliminate reasonable potential of any discharges to violate water quality standards. Ecology will assess what water quality-based effluent limits will be necessary during our approval process through a permit modification or at permit renewal.

G. Engineering Documents

The Permittee must prepare an Engineering Report and documents in accordance with Chapter 173-240 WAC to address all items in **Task 3** of the Compliance Schedule (S8).

H. Receiving Waterbody Study for Temperature

The permittee will conduct a Receiving Waterbody Study to determine the seasonal background temperature conditions of Quilcene Bay at the hatchery location in accordance with **Task 2** of the Compliance Schedule (condition S8).

I. Intake Structure Inspection and Report

The Permittee will conduct an inspection of all intakes, determine the presence of and report screen size (i.e., mesh size and construction), install screens if determined they are not present, and provide engineering drawings (as-built drawings) of all intakes with respective screens. The reporting shall follow "Cooling water intake structure data" reporting under 40 CFR 122.21(r)(3).

J. General Conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual industrial NPDES permits issued by Ecology.

VI. PERMIT ISSUANCE PROCEDURES

A. Permit modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for groundwaters, after obtaining new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed permit Issuance

This proposed permit includes all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 5 years.

VII. REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

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1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.

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1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water*. EPA/600/6-85/002a.

1983. *Water Quality Standards Handbook*. USEPA Office of Water, Washington, D.C. Tsivoglou, E.C., and J.R. Wallace.

1972. *Characterization of Stream Reaeration Capacity*. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

1979. *In-stream Deoxygenation Rate Prediction*. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

Pacific Seafood Group

May 6, 2022. Email response with attachment from Miranda Ries of the Pacific Seafood Group to Laurie Niewolny. *Responses for Pac Shellfish 042122 LAN.*

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May 22, 2022. Email response with attachment from Miranda Ries of the Pacific Seafood Group to Laurie Niewolny. *Question 4 follow up for Pac Shellfish 05062022 LAN*.

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SLR International Corporation

February 2021. SLR International Corporation. **Engineering Report, Water Balance, Effluent Characterization, & Hydrogeologic Connectivity Study**, Client Ref: 108.01995.00001. Pacific Seafood Group, Coast Seafoods Company-Quilcene Hatchery. Quilcene, WA.

Washington State Department of Ecology

July 2018. *Permit Writer's Manual*. Publication Number 92-109 (https://fortress.wa.gov/ecy/publications/documents/92109.pdf)

September 2011. *Water Quality Program Guidance Manual – Supplemental Guidance on Implementing Tier II Antidegradation*. Publication Number 11-10-073 (https://fortress.wa.gov/ecy/publications/summarypages/1110073.html)

October 2010 (revised). *Water Quality Program Guidance Manual – Procedures to Implement the State's Temperature Standards through NPDES Permits*. Publication Number 06-10-100 (https://fortress.wa.gov/ecy/publications/summarypages/0610100.html)

July 2008. *Suggested Practices to Reduce Zinc Concentrations in Industrial Stormwater Discharges, Publication Number 08-10-025*.

February 2007. *Focus Sheet on Solid Waste Control Plan, Developing a Solid Waste Control Plan for Industrial Wastewater Discharge Permittees*, Publication Number 07-10-024. (https://fortress.wa.gov/ecy/publications/documents/0710024.pdf) Wright, R.M., and A.J. McDonnell.

Laws and Regulations (http://leg.wa.gov/LawsAndAgencyRules/Pages/default.aspx)

Permit and Wastewater Related Information (https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Water-quality-permits-guidance)

Professional Journal Articles

Schriewer, A., H. Horn, B. Helmreich, Time focused measurements of roof runoff quality, Corrosion Science, Volume 50, Issue 2, 2008, Pages 384-391, ISSN 0010-938X, https://doi.org/10.1016/j.corsci.2007.08.011. (https://www.sciencedirect.com/science/article/pii/S0010938X07002375)

APPENDIX A — PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to issue a permit to Pacific Shellfish – Quilcene LLC for their shellfish hatchery operation at 1601 Linger Longer Road, Quilcene, WA. The permit includes effluent discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice of Application on June 16, 2021; and June 23, 2021, in the Port Townsend Leader to inform the public about the submitted application and to invite comment on the issuance of this permit.

Ecology will place a Public Notice of Draft on _________ in the Port Townsend Leader to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

- Tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the closest Regional or Field Office, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Urges people to submit their comments, in writing, before the end of the Comment Period
- Tells how to request a public hearing of comments about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

Ecology has published a document entitled *Frequently Asked Questions about Effective Public Commenting,* which is available on our website at https://fortress.wa.gov/ecy/publications/SummaryPages/0307023.html

You may obtain further information from Ecology by email at jessica.christensen@ecy.wa.gov or by writing to the address listed below.

Water Quality Permit Administrator
Department of Ecology
Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775

The primary author of this permit and fact sheet is Laurie Niewolny, Aquaculture Permit Specialist, with assistance from John Diamant, Senior Permit Engineer.

APPENDIX B — YOUR RIGHT TO APPEAL

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2) (see glossary).

To appeal you must do the following within 30 days of the date of receipt of this permit:

File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

Serve a copy of your appeal and this permit on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

Table 20 - Address and Location Information

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive Southwest Lacey, WA 98503 **Pollution Control Hearings Board** 1111 Israel Road Southwest, Suite 301 Tumwater, WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

APPENDIX C — GLOSSARY

1-DMax or 1-day maximum temperature – The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or 7-day average of the daily maximum temperatures – The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute toxicity – The lethal effect of a compound on an organism that occurs in a short time period, usually 48 to 96 hours.

AKART – The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and RCW 90.48.520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Alternate point of compliance – An alternative location in the groundwater from the point of compliance where compliance with the groundwater standards is measured. It may be established in the groundwater at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site specific basis following an AKART analysis. An "early warning value" must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

Ambient water quality – The existing environmental condition of the water in a receiving water body.

Ammonia – Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual average design flow (AADF – average of the daily flow volumes anticipated to occur over a calendar year.

Average monthly (intermittent) discharge limit – The average of the measured values obtained over a calendar months' time taking into account zero discharge days.

Average monthly discharge limit – The average of the measured values obtained over a calendar months' time.

Background water quality – The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular point in time upgradient of an activity that has not been affected by that activity, [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

Best management practices (BMPs) – Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD5 – Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD_5 is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass – The intentional diversion of waste streams from any portion of a treatment facility.

Categorical pretreatment standards – National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties, which may be discharged to a POTW by existing or new industrial users in specific industrial subcategories.

Chlorine – A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic toxicity – The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA – The federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance inspection-without sampling – A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance inspection-with sampling – A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite sample – A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction activity – Clearing, grading, excavation, and any other activity, which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous monitoring – Uninterrupted, unless otherwise noted in the permit.

Critical condition – The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Date of receipt – This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

Detection limit – The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Dilution factor (DF) – A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Distribution uniformity – The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Early warning value – The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, groundwater, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

Enforcement limit – The concentration assigned to a contaminant in the groundwater at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a groundwater criterion will not be exceeded and that background water quality will be protected.

Engineering report – A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or WAC 173-240-130.

Enterococci – A subgroup of fecal streptococci that includes *S. faecalis, S. faecium, S. gallinarum,* and *S. avium.* The enterococci are differentiated from other streptococci by their ability to grow in 6.5% sodium chloride, at pH 9.6, and at 10°C and 45°C.

E. coli – A bacterium in the family Enterobacteriaceae named Escherichia coli and is a common inhabitant of the intestinal tract of warm-blooded animals, and its presence in water samples is an indication of fecal pollution and the possible presence of enteric pathogens.

Fecal coliform bacteria – Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab sample – A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Groundwater – Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

Industrial user – A discharger of wastewater to the sanitary sewer that is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial wastewater – Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated stormwater and, also, leachate from solid waste facilities.

Interference – A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and
- Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Local limits – Specific prohibitions or limits on pollutants or pollutant parameters developed by a POTW.

Major facility – A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum daily discharge limit – The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum day design flow (MDDF) – The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum month design flow (MMDF) – The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum week design flow (MWDF) – The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method detection level (MDL) – See Detection Limit.

Minor facility -- A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing zone – An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The permit specifies the area of the authorized mixing zone that Ecology defines following procedures outlined in state regulations (chapter 173-201A WAC).

National pollutant discharge elimination system (NPDES) – The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

pH – The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

Pass-through – A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

Peak hour design flow (PHDF) – The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak instantaneous design flow (PIDF) – The maximum anticipated instantaneous flow.

Point of compliance – The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

Potential significant industrial user (PSIU) – A potential significant industrial user is defined as an Industrial User that does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation level (QL) – Also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x 10^n, where n is an integer. (64 FR 30417).
ALSO GIVEN AS:
The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

Reasonable potential – A reasonable potential to cause or contribute to a water quality violation, or loss of sensitive and/or important habitat.

Responsible corporate officer – A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Sample Maximum – No sample may exceed this value.

Significant industrial user (SIU) –

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

Slug discharge – Any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge to the POTW. This may include any pollutant released at a flow rate that may cause interference or pass through with the POTW or in any way violate the permit conditions or the POTW's regulations and local limits.

Soil scientist – An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5,3,or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

Solid waste – All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

Soluble BOD_5 – Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD_5 test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard BOD_5 test is sufficient to remove the particulate organic fraction.

State waters – Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater – That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based effluent limit – A permit limit based on the ability of a treatment method to reduce the pollutant.

Total coliform bacteria – A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

Total dissolved solids – That portion of total solids in water or wastewater that passes through a specific filter.

Total maximum daily load (TMDL) – A determination of the amount of pollutant that a water body can receive and still meet water quality standards.

Total suspended solids (TSS) – Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset – An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water quality-based effluent limit – A limit imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

APPENDIX D — TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on Ecology's webpage at: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Water-quality-permits-guidance. Specifically the PermitCalc Workbook contains a complete list of useful spreadsheets and instructions for NPDES permit writers in the "intro" tab. Please contact your permit manager for a current copy of the Excel workbook. Below are the calculations and assumptions that support the water quality-based effluent limits, reasonable potential analyses, and performance limits for each of the following parameters of concern using the PermitCalc Workbook.

Ammonia

Reasonable potential analysis for freshwater and marine receiving waterbodies

The spreadsheets "Input 2 – Reasonable Potential", and "NH3-fresh" or "NH3-marine" in Ecology's PermitCalc Workbook determine reasonable potential to violate the aquatic life water quality standards and calculate effluent limits for freshwater and marine waters respectively. The process and formulas for determining reasonable potential and effluent limits in these spreadsheets are taken directly from the *Technical Support Document for Water Quality-based Toxics Control*, (EPA 505/2-90-001). The adjustment for autocorrelation is from EPA (1996a), and EPA (1996b). Below are tables indicating when a discharge from the Hatchery operation has a reasonable potential to violate these water quality standards.

Table 21 - Reasonable potential calculation for ammonia in freshwaters

Dilution Factors:

Only Aquatic Life (no mixing zone); no human health criteria for ammonia.	Acute	1.0	Chronic	1.0

Discharges:	**Hatchery Operation:**		**Cultch Setting**	**Cultch Setting**	**Algae Bag Room**	**Single Seed Setting**	**Single Seed Setting**	**Algae Greenhouses**	**Algae Greenhouses**
	Type of Wastewater Discharged:		**Cleaning Residuals - Segregated wastestream**	**Tank drainage - Segregated wastestream**	**Bag Leftovers -Segregated wastestream**	**Cleaning Residuals - Segregated wastestream**	**Tank drainage - Segregated wastestream**	**Cleaning Residuals - Segregated wastestream**	**Tank drainage - Segregated wastestream**
	Flow:		**Intermittent**	**Intermittent**	**Intermittent**	**Intermittent**	**Intermittent**	**Intermittent**	**Intermittent**
	Outfall(s):		**01, 2D, 05**	**01, 2D, 05**	**02A**	**02B**	**02B**	**02E**	**02E**
	Pollutant		**AMMONIA, Criteria as Total NH3**						
Effluent Data	# of Samples (n)		12	13	8	4	5	5	5
	Coeff of Variation (Cv) Use default CV of 0.6 when sample size is <20.		0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Use maximum when n<20)		3,840	690	47	51	89	80	50
Receiving Water Data	90th Percentile Conc., ug/L		0	0	0	0	0	0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L (based on NH3-fresh criteria calc)	Acute	5,615	5,615	5,615	5,615	5,615	5,615	5,615
		Chronic	1,217	1,217	1,217	1,217	1,217	1,217	1,217
	WQ Criteria for Protection of Human Health, ug/L == None for Ammonia		-	-	-	-	-	-	-
	Metal Criteria Translator, decimal == None for Ammonia	Acute	-	-	-	-	-	-	-
		Chronic	-	-	-	-	-	-	-
	Carcinogen?		N	N	N	N	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950	0.950	0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$	0.555	0.555	0.555	0.555	0.555	0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.779	0.794	0.688	0.473	0.549	0.549	0.549
Multiplier		1.63	1.58	1.90	2.59	2.32	2.32	2.32
Max concentration (ug/L) at edge of...	Acute	6,241	1,090	89	132	207	186	116
	Chronic	6,241	1,090	89	132	207	186	116
Reasonable Potential? Limit Required?		**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		1						
LTA Coeff. Var. (CV), decimal		0.6						
Permit Limit Coeff. Var. (CV), decimal		0.6						
Waste Load Allocations, ug/L	Acute	5615						
	Chronic	1217						
Long Term Averages, ug/L	Acute	1803						
	Chronic	642						
Limiting LTA, ug/L		642						
Metal Translator or 1?		1.00						
Average Monthly Limit (AML), ug/L		**1370**						
Maximum Daily Limit (MDL), ug/L		**1999**						
Average Monthly Limit (AML), mg/L		**1.4**						
Maximum Daily Limit (MDL), mg/L		**2.0**						

Table 22 - Reasonable potential calculation for ammonia in marine waters

Dilution Factors:

Only Aquatic Life (no mixing zone); no human health criteria for ammonia.	Acute	1.0	Chronic	1.0

			Outfall 01, 2D, 05	Outfall 01, 2D, 05	Outfall 03	Outfall 04
Discharges:	**Hatchery Operation:**		**Cultch Setting**	**Cultch Setting**	**All Processes**	**All Processes**
	Type of Wastewater Discharged:		**Cleaning Residuals -Segregated wastestream**	**Tank drainage - Segregated wastestream**	**Process Water and Wastestreams**	**Process Water and Wastestreams**
	Flow:		**Intermittent**	**Intermittent**	**Continuous**	**Continuous**
	Outfall(s):		**01, 2D, 05**	**01, 2D, 05**	**03**	**04**
	Pollutant		**AMMONIA, Criteria as Total NH3**			
Effluent Data	# of Samples (n)		12	13	8	8
	Coeff of Variation (Cv) Use default CV of 0.6 when sample size is <20.		0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Use maximum when n<20)		3,840	690	310	250
Receiving Water Data	90th Percentile Conc., ug/L		78	78	78	78
Water Quality Criteria	Aquatic Life Criteria, ug/L (based on NH3-marine criteria calc)	Acute	6,510	6,510	6,510	6,510
		Chronic	978	978	978	978
	WQ Criteria for Protection of Human Health, ug/L == None for Ammonia		-	-	-	-
	Metal Criteria Translator, decimal == None for Ammonia	Acute	-	-	-	-
		Chronic	-	-	-	-
	Carcinogen?		N	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.555	0.555	0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.779	0.794	0.688	0.688
Multiplier			1.63	1.58	1.90	1.90
Max concentration (ug/L) at edge of...		Acute	6,241	1,090	588	475
		Chronic	6,241	1,090	588	475
Reasonable Potential? Limit Required? *			**YES**	**YES**	**NO**	**NO**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		1	1		
LTA Coeff. Var. (CV), decimal		0.6	0.6		
Permit Limit Coeff. Var. (CV), decimal		0.6	0.6		
Waste Load Allocations, ug/L	Acute	6510	6510		
	Chronic	978	978		
Long Term Averages, ug/L	Acute	2090	2090		
	Chronic	516	516		
Limiting LTA, ug/L		516	516		
Metal Translator or 1?		1.00	1.00		
Average Monthly Limit (AML), ug/L		**1101**	**1101**		
Maximum Daily Limit (MDL), ug/L		**1606**	**1606**		
Average Monthly Limit (AML), mg/L		**1.1**	**1.1**		
Maximum Daily Limit (MDL), mg/L		**1.6**	**1.6**		

Calculation of Water Quality-Based Effluent Limits for Freshwater Receiving Waterbody

Effluent limits were calculated following these steps in the NH3-Fresh (revised 2012) tab of the PermitCalc Workbook. This spreadsheet contains the formulas modified by EPA that were adopted in the 1995 revision of the state water quality standards. The data used for input is noted in the table below that represent critical conditions.

- Step 1: Specify the temperature (design condition at the mixing zone boundary) for which un-ionized ammonia criteria or concentrations are to be estimated. If the spreadsheet is being used to calculate criteria for a NPDES permit limit, the 90th percentile temperature during the critical season is recommended for a reasonable worst-case condition. If no data are available it may be desirable to collect data during the critical season to describe temperature at the mixing zone boundary. The spreadsheet estimates criteria for background conditions, mixed conditions at the acute and chronic boundaries, and for the whole river after complete mix. The spreadsheet autofills these cells with values from the Input 1 tab but user can override the autofill by entering values directly on this spreadsheet.

- Step 2: Specify the pH (design condition at the mixing zone boundary) for which un-ionized ammonia criteria or concentrations are to be estimated. If the spreadsheet is being used to calculate criteria for a NPDES permit limit, the 90th percentile pH during the critical season is recommended for a reasonable worst-case condition. If no data are available it may be desirable to collect data during the critical season to describe pH at the mixing zone boundary. The spreadsheet autofills these cells with values from the Input 1 tab but user can override the autofill by entering values directly on this spreadsheet.

- Step 3: Specify if the salmonid habitat is an existing or designated use.

- Step 4: Specify if non-salmonid early life stages are present or absent.

Output/Results: The user should not enter or change any values or formulas in the Output or Results sections. Output provides the acute and chronic criteria for un-ionized ammonia expressed in mg/L as NH3-N. The Results section provides the acute and chronic criteria for total ammonia expressed in mg/L as NH3-N.

Table 23 - Freshwater Ammonia Criteria Calculation

INPUT		Data Source:
1. Receiving Water Temperature (deg C):	16.0	Designated use for aquatic life criterion (highest temperature allowable-critical condition)
2. Receiving Water pH:	8.00	95th percentile of Quilcene Bay small stream data collected 2015 from Water Quality Atlas.
3. Is salmonid habitat an existing or designated use?	Yes	Ecology has categorized the stream to be core summer salmonid habitat, which is default.
4. Are non-salmonid early life stages present or absent?	Present	
OUTPUT		**Comments:**
Using mixed temp and pH at mixing zone boundaries?	no	No mixing zone is authorized.
Ratio	13.500	
FT	1.400	
FPH	1.001	
pKa	9.531	
Unionized Fraction	0.029	
Unionized ammonia NH3 criteria (mg/L as NH_3)		
Acute:	0.195	
Chronic:	0.042	
RESULTS		
Total Ammonia Criteria (mg/L as N):		
Acute:	**5.62**	
Chronic:	**1.22**	

Calculation of Water Quality-Based Effluent Limits-Marine Receiving Waterbody

The effluent limits were calculated following these steps in the NH3-Marine tab of the PermitCalc Workbook. The data used for input is noted in the table below. This spreadsheet calculates water quality criteria for ammonia in saltwater using the method specified in EPA 440/5-88-004, Ambient Water Quality Criteria for Ammonia (Saltwater)-1989.

- Step 1: Specify the temperature (design condition at the mixing zone boundary) for which un-ionized ammonia criteria are to be estimated. If the spreadsheet is being used to calculate criteria for a NPDES permit limit, the 90th percentile temperature during the critical season is recommended for a reasonable worst-case condition. If no data are available it may be desirable to collect data during the critical season to describe temperature at the mixing zone boundary.

- Step 2: Specify the pH (design condition at the mixing zone boundary) for which un-ionized ammonia criteria to be estimated. If the spreadsheet is being used to calculate criteria for a NPDES permit limit, the 90th percentile pH during the critical season is recommended for a reasonable worst-case condition. If no data are available it may be desirable to collect data during the critical season to describe pH at the mixing zone boundary.

- Step 3: Specify the salinity (design condition at the mixing zone boundary) for which un-ionized ammonia criteria are to be estimated. If the spreadsheet is being used to calculate criteria for a NPDES permit limit, the 10th percentile salinity during the critical season is recommended for a reasonable worst-case condition. If no data are available it may be desirable to collect data during the critical season to describe salinity at the mixing zone boundary.

- Steps 4 and 5: Enter pressure and unionized ammonia criteria.

Output: The user should not enter or change any values or formulas in the output section. The acute and chronic criteria are expressed two ways: 1) as total ammonia in mg/L as NH3 at Output Step 4; and 2) as total ammonia in mg/L as NH3-N under Results.

Table 24 - Marine Ammonia Criteria Calculation

INPUT		**Data Source:**
1. Receiving Water Temperature, deg C (90th percentile):	16.1	Bay water influent data
2. Receiving Water pH, (90th percentile):	8.07	Bay water influent data
3. Receiving Water Salinity, g/kg (10th percentile):	25.1	Bay water influent data
4. Pressure, atm (EPA criteria assumes 1 atm):	1.0	
5. Unionized ammonia criteria (mg un-ionized NH_3 per liter) from EPA 440/5-88-004:		
Acute:	0.233	
Chronic:	0.035	
OUTPUT		**Comments:**
Using mixed temp and pH at mixing zone boundaries?	no	No mixing zone is authorized
Molal Ionic Strength (not valid if >0.85):	0.513	
pKa8 at 25 deg C (Whitfield model "B"):	9.305	
Percent of Total Ammonia Present as Unionized:	2.9%	
Total Ammonia Criteria (mg/L as NH_3):		
Acute:	7.92	
Chronic:	1.19	
RESULTS		
Total Ammonia Criteria (mg/L as N)		
Acute:	**6.51**	
Chronic:	**0.98**	

Performance Limit Calculations for Cleaning Residual Discharges

The spreadsheet "Perform. Limit" in Ecology's PermitCalc Workbook determined the interim performance-based effluent limits of ammonia for the cultch cleaning residuals discharged as a segregated wastestream at outfalls 01, 02D, and 05. The limit is for discharges to both freshwater and marine receiving waterbodies until the compliance schedule is implemented and water quality-based effluents limits become effective.

Table 25 - Performance Based Effluent Limit Calculations for Ammonia in Cultch Cleaning Residuals Discharged as a Segregated Wastestream

Performance-based Effluent Limits

Enter data in yellow cells.

INPUT	
LogNormal Transformed Mean:	-1.63
LogNormal Transformed Variance:	1.67
# samples per month for compliance monitoring:	2
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	0.45
V(X) =	0.89
VARn	1.15
MEANn=	-1.37
VAR(Xn)=	0.44
RESULTS	
Maximum Daily Effluent Limit (mg/L):	**4.0**
Average Monthly Effluent Limit (mg/L):	**1.5**

LogNormal Transformed Mean and Variance of Cultch Cleaning Residual Ammonia Data

Outfall	Process	Date	Ammonia (mg/L N)	Ln()
01	Cultch	10/19/20	0.03	-3.51
05	Cultch	10/06/20	0.48	-0.73
05	Cultch	10/07/20	0.3	-1.20
05	Cultch	10/13/20	0.13	-2.04
05	Cultch	10/01/20	0.54	-0.62
05	Cultch	09/30/20	0.08	-2.53
02D	Cultch	10/06/20	0.24	-1.43
02D	Cultch	10/13/20	0.24	-1.43
02D	Cultch	09/02/20	3.84	1.35
02D	Cultch	10/07/20	0.13	-2.04
02D	Cultch	09/28/20	0.04	-3.22
02D	Cultch	09/30/20	0.12	-2.12
			Mean	**-1.63**
			Variance	**1.67**

Temperature

Performance Limit Calculations for intermittent tank drainages and continuous flow discharges

The spreadsheet "Perform. Limit" in Ecology's PermitCalc Workbook determined the interim performance-based effluent limits of ammonia for the cultch cleaning residuals discharged as a segregated wastestream at outfalls 01, 02D, and 05. The limit is for discharges to both freshwater and marine receiving waterbodies until the compliance schedule is implemented and water quality-based effluents limits become effective.

Table 26 - Performance Based Effluent Limit Calculations for Temperature in Intermittent Tank Discharges for Outfalls Q01, U01, U02, U04, U05, U06, U07, and Q05.

Performance-based Effluent Limits

Enter data in yellow cells.

INPUT	
LogNormal Transformed Mean:	2.95
LogNormal Transformed Variance:	0.02
# samples per month for compliance monitoring:	5
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	19.3
V(X) =	7.07
VARn	0.00
MEANn=	2.96
VAR(Xn)=	1.41
RESULTS	
Maximum Daily Effluent Limit (°C):	**26.3**
Average Monthly Effluent Limit (°C):	**21.3**

LogNormal Transformed Mean and Variance of Intermittent Tank Drainage Wastestreams

Outfall	Process	Sample Date	Temperature Data(°C)	Ln()
01	Cultch	08/26/20	21.3	3.06
01	Cultch	10/12/20	16.0	2.77
01	Cultch	10/13/20	16.7	2.82
01	Cultch	10/14/20	21.4	3.06
05	Cultch	07/28/20	22.5	3.11
05	Cultch	09/08/20	22.3	3.10
05	Cultch	09/09/20	21.3	3.06
05	Cultch	09/10/20	19.6	2.98
05	Cultch	09/20/20	21.4	3.06
02B	Single-Seed	07/28/20	18.2	2.90
02B	Single-Seed	09/08/20	20.3	3.01
02B	Single-Seed	09/09/20	20.7	3.03
02B	Single-Seed	09/20/20	21.1	3.05
02B	Single-Seed	10/13/20	21.2	3.05
02D	Cultch	09/02/20	19.9	2.99
02D	Cultch	09/28/20	20.2	3.01
02D	Cultch	09/30/20	18.7	2.93
02D	Cultch	10/06/20	15.6	2.75
02D	Cultch	10/07/20	14.6	2.68
02D	Cultch	10/13/20	13.1	2.57
02E	Algae	08/27/20	18.8	2.93
02E	Algae	09/08/20	19.5	2.97
02E	Algae	09/10/20	18.1	2.90
02E	Algae	09/16/20	18.4	2.91
02E	Algae	09/20/20	19.6	2.98
			Mean	2.95
			Variance	0.02

Table 27 - Performance Based Effluent Limit Calculations for Temperature in Intermittent Tank Discharges for Outfalls Q03.

Performance-based Effluent Limits
Enter data in yellow cells.

INPUT	
LogNormal Transformed Mean:	2.77
LogNormal Transformed Variance:	0.00231
# samples per month for compliance monitorir	30
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	16.0
V(X) =	0.59
VARn	0.00
MEANn=	2.77
VAR(Xn)=	0.0197
RESULTS	
Maximum Daily Effluent Limit (°C):	**17.9**
Average Monthly Effluent Limit (°C):	**16.2**

LogNormal Transformed Mean and Variance of Intermittent Tank Drainage Wastestreams

Outfall	Sample Date	Temperature Data(°C)	Ln()
03	07/28/20	16.1	2.78
03	09/01/20	16.1	2.78
03	09/08/20	17.7	2.87
03	09/15/20	16.3	2.79
03	09/20/20	15.8	2.76
03	09/30/20	15.5	2.74
03	10/05/20	15.6	2.75
03	10/07/20	16.0	2.77
03	10/14/20	14.8	2.69
		Mean	2.77
		Variance	0.00231

Table 28 - Performance Based Effluent Limit Calculations for Temperature in Intermittent Tank Discharges for Outfalls Q04.

Performance-based Effluent Limits
Enter data in yellow cells.

INPUT	
LogNormal Transformed Mean:	2.89
LogNormal Transformed Variance:	0.00562
# samples per month for compliance monitorir	30
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	18.0
V(X) =	1.83
VARn	0.00
MEANn=	2.89
VAR(Xn)=	0.0610
RESULTS	
Maximum Daily Effluent Limit (°C):	**21.4**
Average Monthly Effluent Limit (°C):	**18.4**

LogNormal Transformed Mean and Variance of Intermittent Tank Drainage Wastestreams

Outfall	Sample Date	Temperature Data(°C)	Ln()
04	07/28/20	20.3	3.01
04	09/01/20	18.1	2.90
04	09/08/20	19.2	2.95
04	09/15/20	18.5	2.92
04	09/20/20	18.6	2.92
04	09/29/20	17.7	2.87
04	10/05/20	16.9	2.83
04	10/07/20	15.8	2.76
04	10/14/20	17.0	2.83
		Mean	2.89
		Variance	0.00562

APPENDIX E — Compliance Schedule: Project Management and Milestone Timeline

Pacific Shellfish-Quilcene LLC NPDES Permit WA0041114 Compliance Schedule (S8)

Permit Duration (months): Permit Active (month 1) – Permit Expires (month 60)

Task / Activity		Month to start (Planned)	Duration (Planned)
1	**Establish monitoring (see condition S2. Monitoring Requirements)**		
1.1	a. Continuous Monitoring: Submit SAP, which includes implementation details, for ECY approval	1	6
	b. Continuous Monitoring: Implementation complete-equipment installed, monitoring operational, and data collection active	7	6
1.2	a. TRC Verification-Work to receive method approval and lab accreditation	1	12
	b. TRC Verification-Commence TRC verification monitoring and reporting	13	1
2	**Quilcene Bay Receiving Waterbody Study For Temperature (see special condition S10)**		
2.1	Prepare and submit QAPP for ECY approval	1	12
2.2	Monitoring commences and data collection active	25	24
2.3	Prepare and submit preliminary data report for year one data with raw data	37	3
2.4	Final Report with raw data	49	3
3	**Submit Engineering Report(s)* that include recommendations, basic plan drawings, and preliminary specifications for the following tasks.**		
3.1	Evaluate options and specify recommendations to prevent marine water discharge from outfalls U01, U02, U03, U04, U05, U06, and U07 to the freshwater creek and roadway stormwater catch basin.	1	36
3.2	Perform an AKART analysis and report recommendations for the treatment or source control of the segregated discharges of tank cleaning waste residuals from outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07 for pH and ammonia.	1	36
3.3	Perform an AKART analysis and report recommendations for the treatment or source control of removed solids from media filtration of source water.	1	36
3.4	Perform an AKART analysis and report recommendations for the treatment and source control to reduce heat load in all process water and wastestream discharges.	1	36
4	**Implementation of AKART and other Recommendations**		
4.1	Based on task 3.1, implement the approved recommendations to prevent marine water discharge to Un-named Creek and roadway catch basin.	37	18
4.2	Based on task 3.2, implement the approved AKART determined for treatment and source control of discharges of cleaning residuals at outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07.	37	18
4.3	Based on task 3.3, implement the approved AKART determined for treatment and source control of removed solids from media filtration of source water.	37	18
4.4	Based on task 3.4, implement the approved AKART determined for treatment and source control to reduce the heat load of all process water and wastestreams discharged from the hatchery.	37	18

APPENDIX F —Responsiveness Summary for Entity Review Comments

Entity review is a process for the permittee to review the draft permit and fact sheet to correct details or concepts that are factual in nature, which is before the documents are accessible for public review and comment. The following comments are from Pacific Shellfish, submitted by the engineering firm SLR dated September 20, 2022. The original comment submittal is attached to the end of the Responsiveness Summary. Also attached is a letter dated October 24, 2022 with the Permittee's specific responses to modifications of practices and changes to the Hatchery's discharges that reflect work towards meeting the compliance schedule put forth in the draft permit. Comments made on the merits or derivation of permit requirements have been categorized for Ecology to consider later after the end of the comment period.

Typically, entity review comments are not responded to in a formal manner, however, since this is the first permit for this facility, there were process improvements and clarifications needed. Based on the substantial review performed by the Permittee, Ecology determined that the following responsive summary provides transparency for any decision to edit or not at this stage, or any other decisions that were necessary. Ecology has requested the Permittee review the responsiveness summary and resubmit any relevant comment during the public comment period for our continued consideration.

Ecology organized the Permittee's comments into the following five categories to provide the appropriate response:

1. Comments Related to Corrections, Clarity, And Updates Requiring Edits to The Draft Permit or Fact Sheet

Comment: Fact Sheet Page 1, paragraph 6

"The proposed permit is the first NPDES permit for the facility after a court decision in 2018 determined the hatchery discharged in a manner that required authorization in accordance with the Clean Water Act."

This statement does not refer to Ecology's previous determination that an NPDES permit was not needed for the facility's discharges. Ecology previously determined that the facility did not meet its regulatory criteria for NPDES permits and that the facility was not otherwise a significant contributor of pollutants. A citizens group disagreed with that regulatory determination and commenced a citizen suit under the Clean Water Act to require the facility to obtain a permit. The Western District of Washington found that a permit was required, and that decision was appealed to the Ninth Circuit. Ecology filed an amicus brief with the Ninth Circuit urging it to reverse Judge Leighton's decision that the facility required a permit because the facility did not meet its threshold standard for an NPDES permit, and because Ecology had made an independent judgment that the facility was not a significant contributor of pollutants to Quilcene Bay. In urging the Ninth Circuit to reject the premise of the citizen suit and to dismiss the case, Ecology emphasized that any other decision "would force

Ecology to divert its scarce resources for a facility that is not a threat to the waters of the State." Pacific Shellfish requests Ecology to include this important history in the Fact Sheet, in efforts to more fully clarify why this is the first time Ecology is permitting this facility.

Response:

Ecology recognizes the iterative decision and learning process leading to this draft permit and will amend in other locations of the fact sheet adding more details about what led to the resulting permit. The summary is not an appropriate location for these details.
Edited Page 9 under History. See edits in *blue* below:
Added to Paragraph 3: Ecology's position leading up to the U.S. Court of Appeals decision in 2018 was the hatchery did not meet EPA's Concentrated Aquatic Animal Production Facility definition as a point source (40 C.F.R. § 122.24; 40 C.F.R. pt. 122, App. C) and as a result did not require an NPDES permit to authorize the discharges. Furthermore, Ecology reviewed the permittee's 2013 effluent study by Rensel Associates and determined that Quilcene Bay water quality was unlikely to be altered.
Added to Paragraph 4: In March 2018, the U.S. Court of Appeals for the Ninth Circuit held in Olympic Forest Coalition v. Coast Seafoods Co., 884 F.3d 901, that pipes, ditches, and channels that discharge pollutants, *specifically chlorine*, from non-concentrated aquatic animal production facilities are point sources within the meaning of the Clean Water Act (CWA 33 U.S.C. § 1362(14)).

Comment: Fact Sheet Page 3 List of Figure

The list is incomplete. Missing Figures 7, 9, and 10, which are also misnumbered in the body of the fact sheet.

Response:

Edited the fact sheet for these corrections.

Comment: Fact Sheet Page 9, paragraph 4

"Ecology received a draft engineering report in June 2019. The report was insufficient in that it did not adequately characterize source water and discharges. Ecology discussed with the Permittee our findings and planned a site visit."

The characterization of the draft engineering report as "insufficient" is misleading and unnecessary to present the facts pertinent to the permit. The facility is complex, was unfamiliar to Ecology, and had never been issued an NPDES permit. Because this was the first time that Ecology has drafted a permit for this industry, Ecology itself was uncertain regarding precisely what information the report should include. Because there was no permitting template that Ecology could use for this permit, Ecology engaged in more of an iterative process to gather information about the industry and worked with Pacific Shellfish and its consultants to determine what information was necessary for it to first gather and then evaluate in order to eventually regulate this facility's discharge. Pacific Shellfish submitted the engineering report to assist Ecology in identifying the pertinent information necessary to begin the permitting process. Pacific Shellfish suggests removing the sentence, "The report was insufficient in that it did not adequately characterize source water and discharges"; revising the next-to-last sentence of the same paragraph to replace "completing a sufficient engineering report" with "completing the engineering report"; and revising the last sentence of the following paragraph to replace "Ecology accepted the final application package that contained an engineering report with sufficient information of the source water and the discharges to begin drafting a permit in September 2021" with "Ecology accepted the final application package and began drafting a permit in September 2021.

Response:

See Page 9, the previously fourth, now fifth paragraph is edited to better indicate the iterative process to develop a final Engineering Report. The fact sheet previous language is in black and edited language is indicated below in *blue*:

Previous paragraph 4: In November 2018, the Permittee submitted their first permit application package. Ecology met with the Permittee in the spring of 2019 to discuss the application materials and the necessity of an engineering report that meets WAC 173-240-130(2). Ecology received a draft engineering report in June 2019. The report was insufficient in that it did not adequately characterize source water and discharges. Ecology discussed with the Permittee our findings and planned a site visit. Ecology performed a reconnaissance site visit to observe and review their processes and discharges. Afterwards, Ecology provided technical assistance regarding site improvements and next steps for completing a sufficient engineering report. The purpose of the engineering report was to provide source water and wastewater characterization that included all the processes to pump and precondition the source water and identify added constituents to the wastewater to begin writing a permit.

Edited Paragraph 5: In November 2018, the Permittee submitted their first permit application package. Ecology met with the Permittee in the spring of 2019 to discuss what shellfish hatchery operations entail, the application materials and the necessity of an engineering report that meets WAC 173-240-130(2). Ecology received a draft engineering report in June 2019. While this first draft engineering report lacked sufficient information to characterize all the processes and discharges, the report was the first for this industry and laid the groundwork for Ecology, the Permittee, the engineering consultant, SLR International, to determine how best to proceed next. Ecology performed a joint site visit to observe and review the hatchery processes, seawater intakes, and wastewater discharges. Afterwards, Ecology provided technical assistance regarding site improvements and next steps to submit a more complete engineering report. The goal for the final engineering report was to provide source water and wastewater characterization that included all the processes to pump and precondition the source water and identify added constituents to the wastewater to begin writing a permit.

Comment: Fact Sheet Page 13, paragraph 1

The number of media filters is identified in the fact sheet as 22. The correct number is 26: 14 in grouping MF1 on the east side of the main hatchery building, 8 in MF2 on the south side of the hatchery building, 2 in MF3 on the upland side of the road near the office, and 2 in MF4 on the end of the bulkhead.

Response:

Edited the fact sheet for these corrections.

Comment: Fact Sheet Page 17, paragraph 1

"Setting up to grow new bags of algae produces a discharge of concentrated residual of dead algae that is discarded to make space for a new culture."

It is not technically correct to claim there is "discharge" from the algae bags. When the bags are retired, approximately every 10 weeks, the bags will be removed and thrown away. There will be no discharge from this process. (This is a change to the process. Previously, a small amount of liquid may have gone to floor drains as the bags were removed, but the change-out process is being changed to eliminate this discharge.)

Response:

Edited last paragraph on page 16, first and last paragraph of page 17, and second paragraph on page 18 for the updated practice and corrections. Based on the entity review follow-up letter dated October 24, 2022, the algae bags will no longer be emptied to the floor drains but removed with the bags to the trash and hauled off-stie.

Comment: Fact Sheet Page 17, paragraph 1

"There are 22 total media filters that operate to filter intake water of the suspended solids to precondition the source water for culturing algae and shellfish."

There are 26 total media filters. Of these, 24 media filters are used to precondition the source water for culturing algae and shellfish, including the filters in MF1 (14) MF2 (8) and MF3 (2). The remaining two filters in MF4 on the end of the bulkhead are used to filter bay water for the sprinklers that water the bag nursery on the beach when water is low and temperatures are hot.

Response:

Edited paragraph 1 of page 17 for the corrections.

Comment: Fact Sheet Page 17, paragraph 3

"The cleaning residuals contain high concentrations of solids, ammonia, and pH when discharged as a segregated wastestream."

It is not appropriate to describe concentrations of these substances or characteristics as "high," particularly without a reference for comparison. Cleaning residual TSS is higher than tank drainage TSS, but, compared to, for example, seafood processing wastewaters at other facilities, the TSS in these discharges is in not "high".

Similarly, the highest cleaning residual ammonia concentration was 3.84 mg/L. This is below the acute water quality criteria calculated by Ecology for Quilcene Bay in Table 24 of the fact sheet (6.51 mg/L); therefore, this concentration cannot be described as "high". In fact, if any descriptor should be used, "low" would be more appropriate, considering that the concentration is below the acute water quality standard. Additionally, the 3.84 mg/L value is the highest value measured. The average is 0.51 mg/L, and the second highest of 12 samples is 0.48 mg/L. The chronic water quality standard from Table 24 of the fact sheet is 0.98 mg/L, so the average and 11 of 12 samples were below both the acute and chronic water quality criteria.

Lastly, it is inaccurate to describe pH in terms of concentration and while a pH of 9 or 10 is elevated above neutral, it would not commonly be referred to as "high" pH; in particular, a pH of 9 would not be considered "high".

Response:

Edited sentence to reflect elevated solids and sometimes ammonia levels and that pH measures higher than in process water effluent since tank cleaning residual discharge is a segregated wastestream vs. the other type of discharge present on site, process water effluent.

Edited sentence: *While inconsistent, cleaning residual discharges displayed elevated levels of solids and sometimes ammonia, and higher pH levels when discharged as a segregated wastestream relative to process water effluent.*

Comment: Fact Sheet Page 19, solid wastes

Solid waste disposal is provided by Murrey's Olympic Disposal.

Response:

Edited the fact sheet for the correction.

Edited sentence: *All trash, operational debris, and used materials, including discarded algae bags, are hauled off-site through Murrey's Olympic Disposal services.*

Comment: Fact Sheet Page 20, Figure 7 Map of Proposed Permitted Outfalls.

The map gives latitude and longitudes for U01 through U07 along the presumed discharge pipeline route.

U04 to U07 are discharges from the 40s, 50s, 60s, and 70s greenhouses, respectively, U01 is continuous discharge from single seed systems, U02 is discharge from cultch tanks, and U03 is discharge from media filter backwash. As is noted in the SAP, the location of the underground piping is not known, and the locations are assumed based on proximity. It is also noted that, with the exception of U03, the upland wastewater streams are sampled from individual tanks. There no sample ports corresponding to the outfalls.

Response:

Created a paragraph (last one) on page 19 prior to map on page 20 to better describe the approximate outfall locations, discharge, and sampling scenarios for U01-U07.

New paragraph: The following map provides theoretical locations for U01 through U07. The map gives latitude and longitudes for U01 through U07 along the presumed discharge pipeline route. Outfalls for U04 to U07 are discharges from the 40s, 50s, 60s, and 70s greenhouses, respectively. Outfall U01 is continuous discharge from single seed systems, U02 is discharge from cultch tanks, and U03 is discharge from media filter backwash. The precise location of the underground piping is not known, and the locations are assumed based on proximity. It is also noted that, except for U03, the upland wastewater streams are sampled from individual tanks. There no sample ports corresponding to the outfalls

Comment: Fact Sheet Page 22, Figure 7

Should be Figure 8.

Response:

Edited the fact sheet for this correction.

Comment: Fact Sheet Page 23, last paragraph

"Quilcene Bay is a shallow, dynamic waterbody with a volume of approximately 40,000 million gallons of marine water a MLLW."

It should say "…at MLLW." Also, in this paragraph, 5 meters is 16.4 feet, not 15 feet, and 50 m is 164 feet, not 150 feet.

Response:

Edited the fact sheet for these corrections.

Comment: Fact Sheet Page 24, Figure 9.

The raft from which the temperature probes were mounted was approximately 3,000 ft north of where the arrow on the figure indicates. Also, the paragraph below the figure should be modified to specify that the temperature monitoring location was approximately a mile away and beyond the potential influence of the hatchery discharge and represents the natural background condition of the bay.

Response:

Edited the fact sheet for these corrections.

Comment: Fact Sheet Page 25, paragraph 1

"The creek daylights when the pipe ends at the shoreline of Quilcene Bay and exits from a 6-inch metal pipe."

The creek daylights as an 18-inch diameter corrugated plastic pipe.

Response:

Edited the fact sheet for this correction.

Comment: Fact Sheet Page 30, Table 7 footnote

"Each cleaning event creates a cleaning residual discharge that consists of approximately ten gallons of solids (biofilm and left-over larvae or algae) and neutralized bleach solution."

As written, it could be interpreted to imply that 10 gallons of solids are generated, which isn't accurate. The following, more accurate statement is recommended" ""Each cleaning event creates approximately ten gallons of cleaning residual containing neutralized bleach solution, rinse water, and some solids (biofilm and left-over larvae or alga")."

Response:

Edited the fact sheet for this clarification.

Comment: Fact Sheet Page 37, paragraph 2

"Two media filter units, MF1 and MF2, out of the four total at the hatchery backflush operate continuously and periodically throughout a 24-hour period discharge the backwash that blends with effluent that includes a large volume of continuously flowing headbox overflow and unused filtered bay water at outfall 04. Media filter 3 (MF3) and media filter 4 (MF4) discharge in a segregated manner through outfalls UC03 (02F) and QB05, respectively, without blending with process water. Backwash of media filters 3 and 4 occur infrequently, approximately several times a year also at the rate of 75 gallons per minute (gpm) for ten minutes."

As written, the statement conflates individual media filters, of which there are 26, with the four groupings of media filters identified in the Engineering Report: MF1 (14 filters) located on the east side of the hatchery building, MF2 (8 filters) on the south side of the hatchery building) MF3 (2 filters) located on the upland side of the road near the office, and MF4 (2 filters) located on the bulkhead.

Response:

Edited the fact sheet for this clarification.

Comment: Fact Sheet Page 37, paragraph 3

"The average and maximum total suspended solids (TSS) concentrations in the source water were 46/55 mg/L (bay) and 34/42 mg/L (well). The average TSS concentration in algae tank cleaning residual was 38 mg/L and a maximum of 60 mg/L. The average TSS concentration of the waste residual from cultch tank cleaning was 276 mg/L and a maximum of 830 mg/L. The discharge of media filter backwash was not characterized but was reported to be greater than that of any of their discharges (SLR 2021). The proposed permit requires monitoring of the media filter backwash."

There was no speculation in the text of the engineering report as to the TSS concentration of the backwash. Backwash could not be characterized as a segregated stream during the SAP because no backwashing of the upland media filters took place during the SAP and no sampling port is available for collection of backwash on the lowland side of the road. For the purpose of estimating the TSS concentration of the combined upstream discharges, backwash TSS was conservatively estimated as 830 mg/L, the highest concentration from the other waste streams.

Response:

Edited the fact sheet for this clarification.

Edited sentence: The discharge of media filter backwash was not characterized but the Permittee approximated it to be no more than the cleaning residuals maximum TSS concentration of 830 mg/L. (SLR 2021).

Comment: Fact Sheet Page 37, paragraph 4.

"The TSS concentrations of the solids determined in the tank cleaning waste residuals from cultch tanks and TSS concentrations of solids in media filter backwash discharges will likely exceed the narrative water quality criteria for aesthetics (visible plume)."

The volume of residual discharged when cleaning a tank is 10 gallons. It is not realistic for 10 gallons to generate a "plume" in the receiving environment. None of the facility's discharges have resulted in a visible plume during any of the multiple trips made to the facility by SLR to characterize the effluents and document conditions.

Response:

Edited the fact sheet for this clarification.

Edited paragraph 4: The TSS concentrations in tank cleaning waste residuals from cultch tanks and the estimated TSS concentrations of media filter backwash theoretically could produce a visible plume if present in sufficient enough quantity and in a segregated manner (i.e., no mixing with the receiving water). Of note is that these discharges are five to ten times that of background (i.e., source water) TSS levels. While cultch tank cleaning waste residual discharges are small and segregated (e.g., 10 gallons), the backflushing events have not been characterized. Simultaneously, there has been no plumes reported either by the Permittee, the engineers, Ecology, or others over the course preparing for and drafting this permit. These types of discharge occur at outfalls Q01, Q05, and U02 for cultch tank cleaning events and at outfalls Q04, U03 and Q05 for backwash.

Comment: Fact Sheet Page 38, paragraph 1.

"The average ammonia concentration in tank cleaning waste residual discharge from cultch tanks when discharged in a segregated manner (3.80 mg/L), as is the case at outfalls Q01, Q05 and U02, exceeds the ammonia chronic aquatic life criteria during the critical season for both marine and fresh waters."

The statement suggests that the parenthetical value of 3.8 mg/L is the average concentration, whereas it is the maximum. The average is 0.51 mg/L and the second highest of 12 samples is 0.48 mg/L. The marine and freshwater chronic aquatic life criteria are given in Tables 21 and 22 of the fact sheet as 0.978 and 1.217 mg/L, respectively. Chronic criteria are based on a 4-day exposure. Tank cleaning residuals are discharged over a period of, very conservatively, 2 minutes, which is 0.034% of the 4-day exposure time of the chronic water quality standard.

This very short duration of exposure, at a concentration that is below/barely above the water quality standard concentration, does not constitute a reasonable potential to exceed chronic water quality standards that are expressed as a 4-day average. Section 4.3.3 of the Technical

Support Document for Water Quality-Based Toxics Control (USEPA, 1990) establishes procedures for accounting for the duration of exposure. The approach is to assess whether, "a drifting organism would not be exposed to 1-hour average concentrations exceeding the CMC." The document continues: "The intent of the method is to prevent the actual time of exposure from exceeding the exposure time required to elicit an effect." Based on this guidance, it is important to consider the duration of the segregated discharge when assessing reasonable potential to exceed water quality standards.

Considering that 12 samples of cultch cleaning residual were collected during the permit application process, the very low duration of these discharges, and that ammonia concentrations in the discharges are already near or below the concentrations in the water quality standards, there is no need to further characterize these wastewater discharges.

Similarly, the duration of a tank cleaning residual discharge constitutes approximately 3% of the 1-hour exposure time of the acute standard, and therefore does not constitute a reasonable potential to exceed acute water quality standards.

Response:

Edited the fact sheet to correct for the description of the ammonia concentration to indicate 3.80 mg/L was the maximum measured and added clarity to the description of the ammonia risk potential.

Edited paragraph:
While the data varied widely (0.030 to 3.8m/L ammonia), the maximum ammonia concentration in tank cleaning waste residual discharge from cultch tanks when discharged in a segregated manner was 3.8 mg/L surpassing the chronic aquatic life criteria for both marine and freshwater of 0 .978 mg/L and 1.217 mg/L, respectively. Tank cleaning waste residual discharges occur in a segregated manner at outfalls Q01, Q05 and U02 and as a result, has calculated reasonable potential to exceed both the ammonia chronic and acute aquatic life criteria during the critical season for both marine and fresh waters. The calculation accounts for the data set, zero mixing, and the discharge having an average pH of 8.75 s.u.

Comment: Fact Sheet Page 39, paragraphs 4-6 on zinc in roof runoff

""Galvanized roofing material is commonly known to allow zinc to enter and concentrate in stormwater runoff. Zinc can be as high as 15 mg/L and is generally in the dissolved form (Ecology 2008 and Schriewer et al. 2008). Downspouts from the Hatchery building, which is partially covered in galvanized roofing material, allow roof runoff to flow into the wastewater discharging out of outfall Q03 (SLR 2021). Outfall Q03 discharges process water effluent at a rate of 0.7L per min. Based on Schriewer et al. (2008), a normal rainfall event can produce 20L of runoff per minute at a steady state concentration of 5 mg/L zinc. The resulting mixed discharge is 4.83 mg/L zinc, 100 times above the chronic marine water quality-based criterion of 0.081 mg/L zinc (81.0 µg/L).

Based on these calculations, when mixed with hatchery effluent, water discharging from outfall Q03 may have elevated zinc with reasonable potential to exceed the chronic aquatic life criteria of 81.0 µg/L at the point of discharge considering there is no mixing zone authorized. There were no zinc data presented in the wastewater characterization report therefore it will be a requirement to monitor zinc at outfall Q03 during rain events in the proposed permit."

It is important to note that the galvanized roofs at the facility are painted with white paint. The galvanized metal surface is not exposed to precipitation. As written on page 16 of the draft permit it appears that the requirement is to sample the roof runoff directly, whereas this statement in the fact sheet suggests monitoring would occur at outfall Q03. It is not practical nor typical to require monitoring of roof runoff at the point of generation. The permit should be revised to clarify that sampling would be required at outfall Q03.

Response:

Edited the fact sheet based on the work the Permittee indicates in their entity review follow-up letter dated October 24, 2022 supporting confirmation of roof surface conditions. Edited the last paragraph to include the update.

Based on reporting through entity review, the Permittee indicates that it will conduct a drone survey to confirm the hatchery building roof is painted to eliminate any exposed galvanized surface. While there were no zinc data *presented in the wastewater characterization report, it will be a requirement to monitor zinc at outfall Q03 during rain events in the proposed permit if the roof is found to have exposed surfaces.*

Comment: Fact Sheet Page 40, Summary of compliance

"The proposed permit is the first for the Hatchery. It is the result of a Clean Water Act citizen suit. A court decision in March 2018 held that the facility discharged in a manner that required authorization in accordance with the Clean Water Act."

This statement does not refer to Ecology's previous determination that an NPDES permit was not needed for the facility's discharges. To clarify why the facility did not apply for a permit before the court decision, Pacific Shellfish asks that Ecology revise the statement to read as follows: "The proposed permit is the first for the Hatchery. Ecology had previously determined that the facility's discharges did not require an NPDES permit. After a court decision in March 2018 determined that the hatchery's discharges require a permit, Pacific Shellfish applied to Ecology for an NPDES permit to authorize the discharges."

Response:

Edited paragraph to include at the end: *Ecology's position leading up to the U.S. Court of Appeals decision in 2018 was the Hatchery did not meet EPA's Concentrated Aquatic Animal Production Facility definition as a point source (40 C.F.R. § 122.24; 40 C.F.R. pt. 122, App. C) and as a result did not require an NPDES permit to authorize the discharges. Ecology reviewed the permittee's 2013 effluent study and had determined that Quilcene Bay water quality was unlikely to be altered.*

Comment: Fact Sheet Page 42, paragraph 1.

"Ecology proposes monitoring the segregated discharges of backwash at outfalls Q05 and U02 for quantity, TSS, and turbidity for the permit cycle. Ecology will re-evaluate in the next permit cycle after the Permittee submits their AKART evaluation for source control and treatment of media filter backwash as per the compliance schedule and there is further effluent characterization."

It is not typical or practical to require samples for every process at the point of generation. Backwash makes up less than 0.9% of the total estimated flow from the upland side of the facility. Backwashing of the media filters on the bulkhead (used to filter bay water for the beach nursery sprinklers) that would discharge to Q05 has historically been rare, perhaps one time per year; however, Pacific Shellfish intends to end this discharge; thus, monitoring and limits to this discharge would no longer be required.

Response:

Based on the entity review follow-up letter received October 24, 2022, confirming current practices, media filter group 4 no longer exists and was decommissioned in August 2022. There are no segregated discharges of backwash at outfall Q05. Removed monitoring requirements and noted date practice changed in fact sheet.

Comment: Fact Sheet Page 50, Turbidity.

"Ecology evaluated the impact of turbidity based on the range of turbidity measurements in the effluent and source water. Water quality-based limits have been set as a net limit based on the 95th percentile of the bay water (see Table 5 - Bay Source Water (Seawater) Intake Characterization Summary Statistics) plus 5 NTUs since the average turbidity was less than 5 NTU. The limit is an average monthly limit of 7 NTUs in the segregated discharge of tank drainage and algae bag residuals at outfalls Q01, Q05, U01, U02, U02, U04, U05, U06, and U07 and process water from outfalls Q03, Q04, U01."

The fact sheet states that the water-quality limits have been set based on the 95th percentile of the bay water. The 95th percentile from the referenced table is 2.95. Since the water quality standard is 5 NTU plus background, the standard should be 8 NTU, not 7 NTU.

Response:

Edited the fact sheet and the draft permit for this correction.

Comment: Fact Sheet Page 52, Tank Cleaning Waste Residual.

"Ecology found that discharges of cleaning waste residuals from cultch tank cleaning discharging from outfalls Q01, Q05, and U02 had elevated levels of ammonia, some exceeding the chronic criteria. Furthermore, Ecology conducted a reasonable potential analysis (See Ammonia section of Appendix D: Reasonable potential analysis for freshwater and marine receiving waterbodies). Ecology determined that the segregated wastestream discharge of cleaning waste residuals has reasonable potential to cause a violation of the water quality standards for both marine and freshwater discharges and calculated water quality-based effluent limits for use after the AKART evaluation (see Table 18)."

To say "some exceeding the chronic criteria" is misleading. Only 1 of 12 samples exceeded the chronic ammonia criterion, and no samples exceeded the acute criterion. Furthermore, as previously discussed on page 9 of this letter, Ecology didn't take into account the duration of the cleaning residual discharges when performing the RPA. The duration of exposure is significantly less than the exposure periods associated with the criteria.

Response:

Edited the fact sheet to correct for the description of the ammonia concentration to indicate 3.8 mg/L was the maximum measured and added clarity to the description of the ammonia risk potential.

Edited paragraph:
Ecology found that discharges of cleaning waste residuals from cultch tank cleaning discharging from outfalls Q01, Q05, and U02 had a maximum measured value of 3.8 mg/L ammonia that was above the chronic criteria. Ecology conducted a reasonable potential analysis (See Ammonia section of Appendix D: Reasonable potential analysis for freshwater and marine receiving waterbodies). The calculated reasonable potential to exceed both the ammonia chronic and acute aquatic life criteria during the critical season for both marine and fresh waters. Calculations accounted for the small (<20) data set. The potential also considered no mixing and the discharge having an average pH of 8.75 s.u.

Comment: Permit Page 9, footnote c.

"Monitoring and reporting must be conducted in accordance with S2 using the approved field method for daily testing and verification of field test through accredited compliance methods to be reported on DMRs."

The footnote was applied to ammonia, TRC, and pH, implying that all three are parameters measured in the field. Only pH and TRC are field parameters. Samples are sent to a lab for analysis of ammonia. It is assumed this is a typo and the footnote was meant to apply to TRC and pH only. This typo carries over to the subsequent effluent limit tables in the permit, and should be fixed in each instance.

Response:

Corrected and clarified the monitoring necessary for TRC, pH and ammonia in footnotes and tables.

Comment: Permit Page 11, table.

A 7 NTU turbidity limit is proposed for tank drainage and algae bag residual.

Previously, algae bag residual could be discharged when bags were removed, through residual entering floor drains. This process is being changed so that bags will be removed whole, with the small amounts of residual remaining in the bags, and the bags will be disposed of whole so that there is no discharge.

Also, as noted on page 14 of this letter, the limit, if based on the 95th percentile ambient concentration, should be 8 NTU. It should also be noted that the turbidity values used to approximate ambient were measured in intake water, not the water in the vicinity of the facility's discharge. The intakes are located at the bottom of the bay at a depth of approximately 50 feet and 2,000 feet from the hatchery's discharge. Based on this, bay source water turbidity may not be representative of the receiving water.

Response:

Based on the entity review follow-up letter received October 24, 2022 confirming current practices, the algae bag residual discharges are no longer occurring and the limits are not longer necessitated. Removed limits and monitoring requirements and noted date practice changed in fact sheet.

Comment: Permit Page 19, C5b.

The link for the SOP for Continuous Temperature Monitoring of Fresh Water Rivers and Streams is broken: "This publication is obsolete and no longer available."

Response:

Updated link for Ecology's Standard Operating Procedure EAP080, Version 2.2, Continuous Temperature Monitoring of Freshwater Rivers and Streams to be
https://apps.ecology.wa.gov/publications/SummaryPages/2203216.html

Comment: Permit Page 30, S5B1c. Testing Procedure.

The section appears be about creating SOPs for field testing procedures. However, under Section iii. the permit says: "Include steps for verification testing specifying the procedure to sample (when and how), the accredited test method being used, and the accredited lab performing and reporting results."

It is critically important to Pacific Shellfish's manufacturing process that there be no chlorine remaining in the tanks, thus they are diligent in neutralizing the chlorine. Also, as noted on page X of this letter, there is no reasonable potential for TRC to exceed water quality standards because these discharges are intermittent and of very short duration, while water quality standards are expressed on 1-hour and 4-day exposures. For these reasons, the permit should not require monthly verification.

However, if verification is required, the Testing Procedures must be clarified. As written, the requirement indicates that an accredited lab must perform the field verification, which is not a reasonable requirement considering that the verification frequency, depending on source, is monthly. Throughout the rest of the permit, the requirement is for "verification of field test through accredited compliance methods." The testing procedures should be rewritten to clarify that verification of the TRC method can be performed by hatchery staff using approved methods, such as though described in the USEPA Region 4 Operating Procedure for Field Screening of Total Residual Chlorine (SESDPROC-112-R5, April 26, 2017).

Response:

Clarified and clearly distinguished what total residual chlorine field testing and verification testing consists of in the fact sheet under IV. Monitoring Requirements, sections A, B, and C and under V. Other Permit Condition, section C, on page 60. Additionally, amended with more specificity the content of the best management practices SOP for Tank Cleaning and Managing Waste Residuals under the Section B, page 29 of the draft permit.

In summary, there are two types of monitoring that must be conducted to ensure no free chlorine is discharged above the limits: field and verification for total residual chlorine. The use of a field test kit such as that used currently by the Permittee can be used for each cleaning event if the approved best management practice SOP as outline in condition S5 is followed. Verification testing uses approved methodology, which could be the EPA Region 4 methodology but must be EPA-approved method (40 CFR Part 136) and conducted using an accredited laboratory (chapter 173-50 WAC).

Specific to verification monitoring, the lab accreditation process can be found at the website https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation/Applying-for-laboratory-accreditation. Ecology recommends the Permittee reach out directly to Ecology's accreditation staff to understand the application process including but not exclusively determining what approved methodology can be used, the procedures necessary to submit, and overall accreditation maintenance. Ecology has amended the permit Compliance Schedule (S8) to include an additional task to incorporate time needed to obtain accreditation and delayed verification monitoring until that point (task 1.3).

While field monitoring for total residual chlorine is required for each tank cleaning discharge event, the periodic verification tests must be conducted in accordance with the monitoring schedule for compliance reporting on the discharge monitoring reports. The goal is to use verification testing periodically to verify the field monitoring to maintain accuracy and ensure compliance while leveraging current practices, which must be approved in a best management practices SOP.

2. Comments on Confidential Business Information

Overall Ecology Response:

The information noted by the Permittee to be Confidential Business Information (CBI) is in the fact sheet and originated in and derived from the 2021 Engineering Report (SLR 2021). Ecology made some discretionary edits in some cases. See further below where exactly changes were made.

Comment: Fact Sheet Page 12, paragraph 1

"Prior to inoculation, seawater is disinfected using non-chlorination methods to remove pathogens and heated to 16-18°C using a heat exchanger. Hatchery staff inoculate the preconditioned water with multiple algae species and micronutrients to optimize growth at each step."

This text contains confidential business information (CBI), specifically the water temperatures, and the first of these two sentences should be deleted. Preconditioning of the water is an internal process and has no relevance to the discharge.

This comment also applies more broadly to the fact sheet as a whole. As written, it provides a level of detail on the specifics of industrial processes and procedures that far exceeds that for other NPDES permits and is unwarranted. Subsequent instances of this are noted in the following comments as having an undue proprietary level of detail.

Response:

Edited the statement to say the following: *Prior to inoculation, heated seawater is disinfected using non-chlorination methods to remove pathogens.* ~~*Hatchery staff inoculate the preconditioned water with multiple algae species and micronutrients to optimize growth at each step.*~~

Comment: Fact Sheet Page 12, paragraph 2

"…to 29°C. A portion of this water is drained repeatedly to add the batches of algae."

This text contains CBI and should be deleted.

Response:

Edited the statement to say the following:

The water that larvae, cultch, and single seed are maintained in is filtered and heated. ~~*A portion of this water is drained repeatedly to add the batches of algae.*~~

Comment: Fact Sheet Page 12, bullet 1

This text contains CBI relating to specific product formulations and should be revised to the following: "Larvae are sold in small batches that are placed in a coffee filter, sealed in a plastic bag, and are shipped by FedEx to the customer."

Response:

Edited bullet 1:

- *Larvae sold in batches, which are placed in a coffee filter, sealed in a plastic bag, and shipped by FedEx to the customer.*

Comment: Fact Sheet Page 17, Wastestream of Tank Cleaning Waste Residuals

"For cultch setting, algae, and larvae tanks, once emptied, a solution containing approximately 20 milliliters (mL) of 12.5% bleach in 5 liters of water is used to wash down tank interior surfaces (0.05% bleach solution). Tank cleaning is done by hand using a long-handled scrubber with an abrasive pad. The cleaning process results in approximately 10 gallons of cleaning solution and rinse water residuals in the bottom of the tank. The bleach in the cleaning residual is neutralized using sodium thiosulfate prior to discharge. Sodium thiosulfate in the efflorescent crystalline form is mixed into an aqueous working solution by adding 1,506 grams to 15 liters of water. A portion of this solution is poured into the cleaning solution residuals in the bottom of each tank and is mixed. The water is then tested using the colorimetric DPD field test for residual chlorine. No water is discharged until the bleach has been successfully neutralized.

In the single-seed setting system, cleaning entails draining the setting boxes, scrubbing the walls with an abrasive pad, refilling the boxes with salt water, adding approximately 0.75 quart of 12.5% bleach, and recirculating it through the system for a period of time. The bleach is neutralized by adding a comparable amount of 3% hydrogen peroxide to the recirculation water. The water is tested for residual chlorine and no discharge occurs until the bleach has been successfully neutralized."

Details in this section are considered CBI. Please revise as follows:

"For cultch setting, algae, and larvae tanks, once emptied, a bleach solution is used to wash down tank interior surfaces. The cleaning process results in approximately 10 gallons of cleaning solution and rinse water residuals in the bottom of the tank. The bleach in the cleaning residual is neutralized using sodium thiosulfate prior to discharge. The water is then tested using the colorimetric DPD field test for residual chlorine. No water is discharged until the beach has been successfully neutralized.

In the single-seed setting system, cleaning entails draining the setting boxes, scrubbing the walls with an abrasive pad, refilling the boxes with salt water, adding bleach, and recirculating it through the system for a period of time. The bleach is neutralized by adding hydrogen peroxide to the recirculation water. The water is tested for residual chlorine and no discharge occurs until the beach has been successfully neutralized."

Comment: Fact Sheet Page 18, paragraph 6

"The algae is grown up through a series of increasingly larger flasks, bags, and tanks until eventually fed out in concentrated batches to shellfish in tanks where a portion of water has been drained. (i.e., tank drainage wastestream) The tank is topped off with a concentrated algae volume to be held for a period of hours or days until feeding is repeated or shellfish is done growing and ready to sell."

This constitutes CBI and should be revised as follows:

"The algae is fed out to shellfish in tanks where a portion of water has been drained. (i.e., tank drainage wastestream), to be held for a period of hours or days until feeding is repeated or shellfish is done growing and ready to sell."

Response:

Edited the statement to say the following:

The algae are grown up through a series of increasingly larger rearing vessels until eventually fed out to shellfish in tanks where a portion of water has been drained (i.e., tank drainage wastestream). ~~The tank is topped off with a concentrated algae volume to be held for a period of hours or days until feeding is repeated or shellfish is done growing and ready to sell.~~

Comment: Fact Sheet Page 38, paragraph 4

"Tank cleaning events that are typical of those discharging to outfalls Q03 and Q04 starts with a five-liter solution of 0.05% sodium hypochlorite that is a solution of 50 mg/L chlorine (free and combined chlorine). The end cleaning residual is a mixture of the biological material from the tank walls and rinse water creating 37.9 Liters (10 gallons) at a concentration of 6.6 mg/L chlorine prior to neutralization."

The specific volumes and concentrations noted in this text constitutes an undue level of CBI and should be revised as follows:

"Tank cleaning events that are typical of those discharging to outfalls Q03 and Q04 consist of an approximately 10-gallon mixture of rinse water, neutralized bleach solution, and residual biological material from the tank walls."

3. Comments With Ecology Responses for Clarification of Rationale and Assumptions

Comment: Fact Sheet Page 18, last paragraph.

"The Permittee has not performed an analysis of all known, available, and reasonable treatment technology or source control for the limitation of any parameter of concern."

AKART analysis, including for TSS and temperature, was provided in the 2019 Engineering Report, as further discussed on page 19 of this letter below. Considering that the reasonable potential analysis for ammonia and chlorine may require revision because discharge times are well below the 1-hour and 4-day averaging periods for acute and chronic water quality standards, is additional AKART necessary?

Response:

The final engineering report prepared by SLR (Feb 2021) stated the Permittee employs no treatment for an added constituent or other parameters of concern in their wastestreams and effluent. While the 2019 draft engineering report outlines other permits and scenarios from other shellfish hatcheries and aquaculture industries, the Permittee has not performed an analysis of all known, available, and reasonable treatment technology or source control for the limitation of the specific parameters of concern at this site. The Compliance Schedule in the draft permit lays out a strategy for approaching AKART for specific discharges and parameters.

Comment: Fact Sheet Page 41, paragraph 3.

"The permit does not authorize discharge of the non-reported pollutants."

Pacific Shellfish asks Ecology to clarify this statement. Pacific Shellfish has reported in its application and other documents all the pollutants in its discharge for which it was required to provide information by the permit application forms and regulations, as well as any other pollutants present in significant quantities of which it was aware. Undoubtedly, however, there are small or insignificant amounts of many other substances in its intake water, which is taken from Quilcene Bay and marine wells. Is it Ecology's position that, if any such substance is identified in the facility's discharges—no matter how small or insignificant the amount—that the discharge of that substance is unauthorized and constitutes a violation of the requirement to obtain an NPDES permit? Or, rather, is it Ecology's position only that it does not intend the NPDES permit shield to extend to the discharge of any such unreported pollutant insofar as the discharge of that pollutant may cause or contribute to a violation of water quality standards? Or does the statement have some other meaning? See also the related comment below on Condition S1 of the permit.

Response:

Reference to non-reported pollutants in this permit condition means pollutants of concern, which are those that exist or have potential to exist in the discharge at concentrations that could cause or contribute to water quality standards violations. Not every pollutant, chemical, or parameter measured is determined to be a pollutant of concern. It is necessary the Permittee informs or reports if there is any pollutant, chemical or parameter that has criteria and would need to be regulated so to not cause or contribute to a violation of the water quality standards. It is correct to say the NPDES permit does not shield or authorize the discharge of non-reported pollutants if present or potentially present at a concentration that could cause or contribute to a violation of water quality standards.

The draft NPDES permit requires compliance with Washington State Surface Water Quality Standards (WAC 173-201A) be met at all times. There are no exceptions to this. The water quality standards acknowledge that there are cases where background conditions do not meet standards. In some cases, these waters are considered impaired and in other cases it is deemed natural (i.e. due to Quilcene Bay's shallow nature). Ecology has identified this to be the case for temperature and is, therefore, requiring a temperature study to properly document this and how it affects the shellfish hatchery's ability to meet the temperature standard.

The permit is a tool to regulate and ensure progress towards compliance with water quality standards for point source discharges. Through the permit development process, water quality is characterized and pollutants that are likely to be present are assessed, and identified. Those likely pollutants that may violate water quality standards are termed "pollutants of concern." The discharge of these pollutants is then regulated in the permit through permit conditions and limitations. One condition is the compliance schedule that sets the timeframe for further evaluation of receiving water body quality, treatment technology and source controls, and sets dates for implementation so discharges will meet water quality standards within the first permit cycle or the next. The Permittee must meet these permit requirements and **comply with all parts of the water quality standards at all times**. This includes any violation to the standard: minor, or of short duration that is **caused by the permittee**.

Comment: Permit Page 7, condition S1, paragraph 3.

"Any pollutant not specifically authorized by this permit in concentrations that cause or contribute to an exceedance of receiving water quality standards established under Section 307(a) of the Clean Water Act or Chapter 173-201A WAC, or groundwater standards (Chapter 173-200 WAC) constitutes a violation of this permit and the Clean Water Act."

Pacific Shellfish asks Ecology to clarify this condition. (1) Which pollutants are "specifically authorized by this permit?" (2) Pacific Shellfish has reported in its application and other documents all the pollutants in its discharge for which it was required to provide information by the permit application forms and regulations, as well as any other pollutants present in significant quantities of which it was aware. Undoubtedly, however, there are small or insignificant amounts of many other substances in its intake water, which is taken from Quilcene Bay and marine wells. Is it Ecology's position that, if any such substance is identified in the facility's discharges—no matter how small or insignificant the amount—that the discharge of that substance is unauthorized and constitutes a violation of the requirement to obtain an NPDES permit? Or, rather, is it Ecology's position only that it does not intend the NPDES permit shield to extend to the discharge of any such unreported pollutant insofar as the discharge of that pollutant may cause or contribute to the violation of a water quality standard?

Response:

See above response. The latter is correct.

Comment: Permit Page 16, Monitoring Outfalls Q01, Q03, Q04, Q05, U01, U02, U04, U05, U06, and U07 All Tank Cleaning Waste Residual Discharges.

The permit requires monitoring of TSS and flow at "each event."

"Event" isn't defined in the permit. Is it every tank cleaning? Collecting samples from every tank cleaning is exceedingly burdensome. Collecting samples every time a discharge and tank cleaning happens would result in 30 to 50 samples per day. No other industry is required to collect samples from every single process at their facility at the point of wastewater generation. They aren't even required to collect samples from outfalls every single day; they collect samples a few times a month or few times a week.

Also, Q03 and Q04 are continuous, non-segregated discharges, of which cleaning residual is a small fraction. What defines an "event" for sampling at the continuous outfalls?

Response:

Ecology determined TSS is as a pollutant of concern generated from tank cleaning events and media filter backwash. Ecology decided it is appropriate to control TSS using technology-based limits that have been used at fish rearing facilities to control TSS in cleaning activities. Ecology is requiring an AKART evaluation for media filter backwash and monitoring. Since tank cleaning events are mostly a segregated discharge and are limited by a technology-based limit, each event or discharge of cleaning waste must not exceed the limit and must be monitored.

Comment: Permit Page 16, Monitoring Outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07 Segregated Waste Stream Tank Cleaning Residual Discharges.

The permit requires monitoring of pH, ammonia, TRC, and flow at "each event."

Same as above. Collecting samples every time a discharge and tank cleaning happens would result in 30 to 50 samples per day.

Response:

The water quality-based effluent limits are based on no mixing and compliance is required at the end of pipe. The monitoring is specific to segregated discharge of tank cleaning as there is no blending with process water to reduce the reasonable potential; each event or discharge of cleaning waste must not exceed this limit and must be monitored.

Comment: Permit Page 35. Temperature Study.

"The permittee must conduct a Receiving Waterbody Study to determine the seasonal background temperature conditions of Quilcene Bay at the hatchery location. The study must collect hydrologic spatial and temporal data for a duration of two years that characterize the bay for temperature background conditions and effluent heat load. This must include continuous monitoring data (temperature and flow) from all the hatchery intakes (influent), discharges (effluent), potential submerged outfall locations (s), and head of bay near the mussel rafts at 5 and 10 feet subsurface. The study must include ambient, influent, and effluent characterization. In addition, the study must include a data summary of the freshwater streams and river inputs (daily flow and temperature), bay retention time, seasonal stratification, and bathymetry at locations of proposed submerged outfall."

Draft permit condition S10 would require a temperature study of Quilcene Bay. Although the stated purpose is "to determine the seasonal background temperature conditions of Quilcene Bay at the hatchery location," the specific requirements would appear to require a detailed, year- round temperature characterization of the entire bay, including "the head of bay near the mussel rafts at 5 and 10 feet subsurface" (which is more than a mile from the facility); "a data summary of the freshwater streams and river inputs (daily flow and temperature)," "bay retention time"; and "seasonal stratification." The scope of this potentially enormously detailed and expensive study is not reasonably commensurate with its stated purpose. This requirement is too specific and unconstrained in how complicated it could be.

The discharge from Pacific Shellfish does not and cannot measurably affect the temperature of the waters of Quilcene Bay beyond the immediate vicinity of the discharge. As noted in the Fact Sheet, the volume of Quilcene Bay is 40 billion gallons, equivalent to 150 billion liters. Pacific Shellfish's effluent is approximately 840,000 gallons per day, which, at 20.4 degrees C, would warm the bay overall by only a negligible 0.00043 degrees C per day. For reference, solar radiation, under sunny skies, contributes approximately 1,000 times more heat per day to Quilcene Bay than Pacific's discharge.

With an average tidal range of 7.5 feet (mean high water minus mean low water) and a surface area of approximately 30 million square feet, the average volume of water that exits Quilcene Bay during an ebb tide is 6.7 million liters, or 4% of the volume of the Bay. This prevents the accumulation of heat from Pacific Shellfish in Quilcene Bay.

Considering these factors, Pacific Shellfish's thermal load to the wider Quilcene Bay is negligible. The draft requirement for a thermal study of Quilcene Bay should be replaced with a requirement to prepare a work plan for Ecology review and then conduct a mixing zone study and thermal plume assessment. The temperature study described in the draft permit is extremely complicated and not well defined or constrained in its complexity, and as such, further discussion of its infeasibility follows. As written, this scope of work would be enormous. It would require identification of every tributary into Quilcene Bay. Once a tributary was identified it would have to be assessed to evaluate whether it could be accessed. This would require a title search to determine ownership of the property. Then, access agreements would be required, which could take an extended period of time and require hiring of attorneys and related expenses associated with the agreements. Some property owners may not allow access, resulting in data gaps.

Eighteen streams and rivers that discharge to Quilcene were identified on the USGS StreamStats application. Once access to a stream or river had been negotiated and agreed to, each would have to be surveyed at a minimum of 2 cross sections along the path of the stream or river to measure cross sectional areas and slopes. Then the elevation of the water and temperature would have to be measured daily. This would require installation of a permanent structure, which would also have to be included in the access agreements and likely require Army Corps of Engineers permitting, NMFS consultation, and potentially Ecology shoreline permits. Following installation, these would have to be monitored regularly for damage or vandalism and would likely require replacement from time to time, resulting in data gaps.

The scope is unconstrained as to what “hydrologic spatial and temporal data” to “characterize the bay for temperature background conditions” would entail. Similarly, evaluation of bay retention time and seasonal stratification are also unconstrained. These requirements could be construed to require a complex, dynamic model of the hydrology, salinity, and thermal characteristics of Quilcene Bay, which would be an enormous undertaking that is completely unjustified considering it is well known that Quilcene Bay is an extremely warm water body, a simple mass/thermal balance, as discussed above, shows that it would be impossible for Pacific Shellfish’s discharge to measurably warm Quilcene Bay, and because sufficient data to assess the effect of the effluent on the water in the vicinity of the facility could readily be gathered from the intake water measurements and, for example, a single buoy located across the Bay at an area of similar depth.

Response:

The water quality study of the receiving water body for temperature will require a sampling and analysis plan that Ecology must approve. Based on the information provided above, Ecology understands that spatial and temporal conditions appeared broad. Ecology will assist through the development and approval process of the SAP to help identify and narrow what will be sufficient data to be collected and work with permittee in the scope of the study. The goal is to better understand the natural conditions and seasonal variability of the bay’s temperature and more fully evaluate any potential impact of the facility’s discharges, especially as more discharges are consolidated.

4. Comments Noted for Ecology’s Awareness

Comment: second paragraph of Review Letter Page 1:

Upon review of this draft permit and consideration of how it regulates the upland discharges to the culvert through which the unnamed creek flows, Pacific Shellfish intends to combine the upland discharges into a new pipeline separate from the culvert. This pipeline will discharge to an existing outfall that discharges to Quilcene Bay. Pacific Shellfish anticipates obtaining approvals from the Port of Port Townsend and Jefferson County (property stakeholders) and expects to complete this work by the end of 2022. In light of Pacific Shellfish’s commitment to eliminate all discharges to the culvert, the draft permit requires substantial revision to reflect this change. Pacific Shellfish is proposing to complete this project to eliminate all requirements associated with Outfalls U01 to U08, meaning all requirements related to monitoring, sampling, and related effluent limitations for these outfalls would therefore no longer be necessary and would be removed from the permit.

Comment: Fact Sheet Page 48, Table 17.

Designated uses of the unnamed creek are identified in the table as Core Summer Salmonid Habitat.

It is understood that this is a default designation applied to all freshwater streams not explicitly identified in table 602 of WAS 173-201A-600. However, it is important to note that this default designation is inconsistent with the actual and potential aquatic life uses of the creek. As noted at page 25, paragraph 2, of the fact sheet: "*Including where the discharges occur, the upper 1800- foot segment is classified a Type N stream-type by the Washington Department of Natural Resources (WDNR). This indicates that this section of creek does not meet the physical criteria nor does it flow during some portion of the year. Therefore, the creek does not meet the criteria to be an F type waterbody (i.e., habitat conducive to maintain fish-https://geo.nwifc.org/swifd/ accessed 2/8/22). The creek is not considered salmon or trout bearing in Washington Department*of Fish and Wildlife's (WDFW) database SalmonScape (accessed 2/8/22)."

5. Comments on The Technical Merits of The Permit to Be Considered After the Public Comment Period

Overall Ecology Response:

The process of entity review is to provide the permittee an opportunity to identify and correct facts of the permit and fact sheet, not the technical merit of the permit's conditions. The Permittee thoroughly reviewed the documents and supplied many applicable edits and changes.

However, at this time, Ecology documents the following comments in this responsiveness summary as received for consideration during the public comment period. Ecology has requested the Permittee review the responsiveness summary and resubmit any relevant comment during the public comment period for our continued consideration.

Ecology also acknowledges the continued process improvements and current work to address the tasks of the compliance schedule in the draft permit noted in the follow-up letter dated October 24, 2022, which can be found at the end of this summary. Ecology requested the permittee report any further updates during the public comment within their comments to be resubmitted.

The following comments are those that dispute or defend certain practices, limits, and monitoring requirements affecting the manner in which to authorize this facility's discharges. Therefore, these comments will be addressed after the public comment period of the draft permit and fact sheet is complete. After the close of the public comment period, Ecology will consider all comments received, determine what comments are substantive, and provide the appropriate responses and decisions.

Comment: Fact Sheet Page 16, heading and paragraph 2

"Cooling Water Intakes . . . The hatchery takes in 1.224 million gallons per day and only uses 21% of this intake for cooling."

Pacific Shellfish does not use intake water for cooling. Water used in the hatchery must be heated for optimal shellfish larvae growth. To reduce heating costs, intake water is pre-heated using the effluent. While this results in the effluent being cooled, this is not a cooling operation, it is a heat recovery process. A more appropriate statement would be, "The hatchery takes in approximately

1.224 million gallons per day; approximately 21% of this intake is pre-heated using heat in the effluent." Likewise, the intakes are not "cooling water intake structures," they are marine water intakes; the water is not used for cooling, it is used in the process, and to maintain head at the headboxes.

The fact sheet implies that Pacific Shellfish reported this as cooling water by submitting a 316(b)-related form, but it is important to note that the form was initially submitted in June 2021 to indicate the facility does not have cooling water intakes. The form was resubmitted to indicate there are cooling water intakes, but this was done at the urging of the Ecology, so Pacific Shellfish could "use the cooling effects of any outflowing unused marine well and surface water influent that blends with your wastestream" (email LN April 29, 2022).

Comment: Fact Sheet Page 16, paragraph 2

"CWA §316(b) requirements apply to all industrial NPDES permitted facilities with cooling water intake structures. EPA has promulgated best technology available (BTA) effluent guidelines for facilities meeting certain thresholds: This facility is below the thresholds requiring the facility to meet best technology available. However, an existing facility will be evaluated with Ecology's best professional judgment as per 40 CFR 125.90(b). Ecology has proposed in the permit a special condition that the Permittee must conduct an inspection of their intakes, determine the presence and type of screens, install screens if determined they are not present, and provide engineering drawings (as-built drawings) of all intakes."

The requirements of CWA §316(b) do not apply to the facility, either through EPA's rule or based on best professional judgment. "Cooling water" is defined by EPA as "water used for contact or non-contact cooling, including water used for equipment cooling, evaporative cooling tower makeup, and dilution of effluent heat content. The intended use of the cooling water is to absorb waste heat rejected from the process or process used. . . . Cooling water . . . that is used in a manufacturing process either before or after it is used for cooling . . . is not considered cooling water." 40 C.F.R. § 125.92(c) (emphasis added). As explained in the preceding comment, no intake water is needed or used to cool any equipment or processes at the facility. To the contrary, effluent is used to warm the intake water, which is thereafter used to support facility processes. Even if the incidental cooling of the effluent caused by warming the intake water could be deemed a use of the intake water for cooling, the intake water does not meet the definition of "cooling water" because it is thereafter used in facility processes for purposes other than cooling.

In addition, please note that the facility already regularly inspects and maintains the bay intakes.

Comment: Fact Sheet Page 16, first bullet, first paragraph.

"Segregated wastestreams have a reasonable potential to discharge some pollutants above minimum treatment standards and water quality-based effluent limits."

It is questionable that the segregated wastestreams have a reasonable potential to discharge some pollutants above water quality based effluent limits. It is important to note that most water quality standards are based on 4-day exposures (chronic standards) and 1-hour exposures (acute standards). Considering that the duration of discharge of many of the segregated wastestreams is very short, the reasonable potential analysis should account for the limited duration of discharge. Segregated effluents are likely to be significantly diluted before an hour has passed, let along 4 days. For purposes of the reasonable potential analysis, Pacific Shellfish estimates the following

durations of the various segregated waste streams:

- Cultch tank drainage: Estimated to be 60 to 75 minutes per tank. Of the 29 cultch tanks, 23 have what Ecology has classified as "segregated" discharges" (no blending with other continuous waste streams). Each tank is cleaned approximately every 2 weeks, averaging less than 2 tanks per day.

- Single seed systems: Estimated to be 56 minutes to drain one single seed system (5,600 gallons at 100 gpm). There are 6 single seed systems, with only 4 running at a time, on average. Systems are cleaned once per week, averaging less than 1 system per day.

- Tank (cultch, algae) cleaning: Estimated 2 minutes (10 gallons at 5 gpm) per tank. As discussed above, there are 23 cultch tanks with segregated discharges with less than 2/day being cleaned, on average. Of the 71 algae tanks, 27 have what Ecology has classified as "segregated" discharges. Each algae tank is cleaned approximately every 3 days, averaging 9 tanks per day.

- Algae bags: Not applicable, bags get thrown away every 10 weeks, there is no neutralizing or cleaning involved.

- Backwashing media filters: The only filters that are segregated are the two on the upland side of the road. A backwash cycle is 10 minutes per filter (20 minutes if they backwash sequentially). Backwash occurs once per day.

Comment: Fact Sheet Page 39, paragraphs 1 & 2.

"Described in more detail in Part II, when tank cleaning waste residuals are discharged in a segregated manner, there is increased potential for total residual chlorine to be above the acute aquatic life criteria (marine 13.0 µg/L and freshwater 19.0 µg/L) since the minimum detection limit is greater than the aquatic life criteria. However, the amount of chemical that will completely neutralize the free chlorine must be calculated, administered, and reported by trained staff. These *segregated discharges occur at outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07.*

Described in more detail in Part IV, the proposed permit requires an accredited lab and approved methodology to be used for regular verification testing as a standard practice. Verification testing is necessary to verify that the field test is functioning with precision and accuracy, neutralization process is functioning correctly, and that the discharge complies with the permit's effluent limits. Reporting that the concentration is below the lowest possible detection limit will indicate that the discharges meet permit limits. It is a requirement in the proposed permit to establish a best management practice plan and standard operating procedure that trained staff with standardized chemical solutions test every tank cleaning waste residual event. Additionally, all field and accredited verification testing must be recorded and reported."

The permit requirements (in this section and elsewhere) around chlorine are onerous and unwarranted. Neutralization is confirmed with the field test before each cleaning residual discharge as part of the facility's standard operations. The facility has a very strong vested interest in ensuring that the chlorine is neutralized because chlorine is toxic to the facility's product. As a matter of doing business effectively, they must neutralize the chlorine. Too much chlorine will completely kill off a tank of larvae or algae and even very low concentrations of residual chlorine will significantly reduce product yields.

Additionally, with the exception of the single seed system, the duration of discharge of tank cleaning residuals is well below the 1-hour exposure times assumed when establishing the acute water quality standards (marine 13.0 µg/L and freshwater 19.0 µg/L). Tank cleaning residuals, which are approximately 10 gallons, are discharged over a period of, very conservatively, 2 minutes, which is 3% of the 1-hour exposure time of the acute standard. This duration of exposure, at a concentration, if present at all, would be below/barely above the concentration of the water quality standard, does not constitute a reasonable potential to exceed water quality standards, particularly when it is quite likely that these discharges will be mixed with other wastewater streams.

Considering that neutralization of chlorine is critical to facility operations, that 12 samples of tank cleaning residual were collected during the permit application process, the very low duration of these discharges, and that chlorine concentrations in the discharges are below detection limits or already near the concentration of the water quality standards, there is no need to further characterize these wastewater discharges.

The field test has a minimum detectable free chlorine of 20 µg/L (0.02 mg/L). A dilution of only 1.6 is needed to meet the 13 µg/L chronic criteria, and the fact that the discharge occurs over a period of 1/2880th of the 4-day exposure time for chronic criteria, makes it exceedingly unlikely that a discharge could result in an exceedance the time-averaged criteria.

Comment: Fact Sheet Page 41, TBEL for TSS.

The permit sets a TBEL for TSS in tank cleaning residual of 100 mg/L.

Tank cleaning residual, consisting of approximately 10 gallons of rinse water, neutralized bleach, and residual organic matter cleaned from the sides of the tanks, contained TSS concentrations as high as 830 mg/L, as observed as part of the sampling program. Apart from using more rinse water, i.e. dilution, there is no practical way to treat this wastewater since the wastewater discharges out of the bottom of the tank and into underground piping. That underground piping is also used for regular tank drainage, so the tank cleaning residual cannot be segregated.

Furthermore, this 100 mg/L limit is a limit that cannot be met, and appears to be based on the faulty premise that limits for offline settling basins and rearing pond drawdowns for fish release are appropriate for cleaning residual discharges. The Fact Sheet states that the TSS limit is based on the effluent standards for fish hatcheries in WAC 173-221A-100. In the WAC, the limit specifically applies to discharge from offline settling basins and rearing pond drawdowns for fish release. There are no analogues for these processes in Pacific Shellfish's tank cleaning procedures; cleaning residual volumes are too small to use a settling basin, and drawdown and cleaning are not similar processes. Based on this, it is not appropriate apply the 100 mg/L limit from WAC 173- 221A-100 to Pacific Shellfish's tank cleaning residual.

Also, it is reiterated that it is unlikely, due to the small volume of the discharge and the fact that it mixes with other waters in the culvert through which the unnamed stream flows, for the cleaning residual to result in a visible "plume." No plume has been observed by SLR staff during 6 different site visits completed to characterize site wastewaters.

Comment: Fact Sheet Page 42, paragraph 1.

"Ecology proposes monitoring the segregated discharges of backwash at outfalls Q05 and U02 for quantity, TSS, and turbidity for the permit cycle. Ecology will re-evaluate in the next permit cycle after the Permittee submits their AKART evaluation for source control and treatment of media filter backwash as per the compliance schedule and there is further effluent characterization."

It is not typical or practical to require samples for every process at the point of generation. Backwash makes up less than 0.9% of the total estimated flow from the upland side of the facility. Backwashing of the media filters on the bulkhead (used to filter bay water for the beach nursery sprinklers) that would discharge to Q05 has historically been rare, perhaps one time per year; however, Pacific Shellfish intends to end this discharge; thus, monitoring and limits to this discharge would no longer be required.

Comment: Fact Sheet Page 46, last paragraph.

"Additionally, for a mixing zone to be considered, the study must include the relocation of the outfall(s) further into the bay and effluent diffusion must be identified."

Mixing zones are not prohibited adjacent to shorelines, nor is a submerged, multiport diffuser required to grant a mixing zone. Indeed, Ecology's Permit Writer's Manual at page 169 expressly allows a mixing zone for a shore discharge, while cautioning that care must be taken to ensure that such a mixing zone does not have adverse biological effects. Because of the nature of the facility's discharges, there is no significant risk of adverse biological effects along the shore, and no such effects are present. In fact, the facility maintains its own cultch bag nursery along the shore in front of the hatchery building.

It is recognized that WAC 173-201A-400(2) requires dischargers to fully apply AKART before being authorized a mixing zone. AKART was presented in the 2019 engineering report. The discharges are either small enough in volume, or low enough in concentration (or both) that application of additional treatment is not reasonable.

Comment: Fact Sheet Page 57, Temperature Limits

"After the AKART evaluation recommendation(s) is approved, a mixing zone for temperature may be considered depending on the results of the receiving waterbody study, extensions of outfalls into the bay, and a mixing zone study."

AKART for temperature was discussed in the 2019 engineering report. Further, as noted on Page 22 of this letter, the temperature of the discharge from Pacific does not and cannot have a measurable effect on the temperature of Quilcene Bay. Also, as discussed on page 13, there is no requirement for a submerged outfall for a mixing zone allocation.

Comment: Fact Sheet Page 58, Wastewater Monitoring

"Effluent from Outfalls U01, Q03, and Q04 that discharge process water must be monitored for flow, temperature, turbidity, pH, BOD5, TSS, TOC, salinity and total residual chlorine. Continuous monitoring for flow, temperature, turbidity, and pH is to become effective with completion of compliance schedule, task 1."

The continuous monitoring requirements are onerous and unwarranted, particularly for turbidity, which had a maximum value of 17 NTU. U01 consists of approximately 150,000 gpd continuous flow from single-seed setting systems. The maximum turbidity measured for this discharge during implementation of the SAP was only 17 NTU.

It cannot be said for sure whether the results include any bag room discharge, since it is small and infrequent (<0.03% of the discharge). However, since it makes up such a small fraction of the discharge it is not likely to have a measurable effect. The water quality criterion is 8 NTU (the fact sheet incorrectly stated 7 NTU).

Requiring continuous monitoring for turbidity when is it only approximately twice the criterion, without a mixing zone, is unnecessarily excessive. Periodic grab sampling should be sufficient.

Comment: Permit Page 8, first table.

A 100 mg/L TSS limit is proposed for tank cleaning residual.

Tank cleaning residual TSS concentrations as high as 830 mg/L were observed as part of the sampling program. Apart from using more rinse water, i.e. dilution, there is no practical way to treat this wastewater since the wastewater discharges out of the bottom of the tank and into underground piping.

The Fact Sheet states that the TSS limit is based on the effluent standards for fish hatcheries in WAC 173-221A-100. In the WAC, the referenced limit specifically applies to discharge from offline settling basins and rearing pond drawdowns for fish release. There are no analogues for these processes in Pacific Shellfish's tank cleaning procedures; cleaning residual volumes are too small to use a settling basin, and drawdown and cleaning are not similar processes. Based on these factors, it is not appropriate to apply the 100 mg/L limit from WAC 173-221A-100 to Pacific Shellfish's tank cleaning residual

Also, it is reiterated that there is reasonable potential for the cleaning residual to result in a visible "plume." No plume has been observed by SLR staff during 6 different site visits completed to characterize site wastewaters.

Comment: Permit Page 14, Section S2A.

The permit requires continuous metering of source water flow and temperature.

This would require installation of five flow meters, including on the three influents that are well water. What is the intent of measuring inflow when a significant portion of the water goes into head boxes that then overflows? Installing five flow meters would be logistically difficult in the cramped influent area. It would likely require a complete re-design of the area, possibly including a new structure.

Comment: Permit Page 14, Section S2A.

The permit requires monitoring of source water for turbidity, BOD, TSS, TOC, and salinity.

It is unclear what purpose this monitoring would this serve. The source water is filtered prior to use in the facility.

Comment: Permit Page 15, Monitoring Process Water Discharges.

The permit includes a compliance schedule for initiating continuous monitoring of effluent at U01, Q03, and Q04 for turbidity (in addition to flow, temperature, and pH).

As noted with respect to the fact sheet, continuous monitoring for turbidity is onerous and unwarranted. The maximum turbidity recorded for these discharges in the SAP was 17 NTU. This is only approximately twice the water quality standard of 8 NTU (incorrectly identified at 7 NTU in the fact sheet). Given how little dilution is needed (approximately 1:1), periodic (quarterly) grab sampling would be sufficient.

Comment: Permit Page 16, Monitoring Outfalls Q01, Q03, Q04, Q05, U01, U02, U04, U05, U06, and U07 All Tank Cleaning Waste Residual Discharges.

The permit requires monitoring of TSS and flow at "each event."

"Event" isn't defined in the permit. Is it every tank cleaning? Collecting samples from every tank cleaning is exceedingly burdensome. Collecting samples every time a discharge and tank cleaning happens would result in 30 to 50 samples per day. No other industry is required to collect samples from every single process at their facility at the point of wastewater generation. They aren't even required to collect samples from outfalls every single day; they collect samples a few times a month or few times a week.

Also, Q03 and Q04 are continuous, non-segregated discharges, of which cleaning residual is a small fraction. What defines an "event" for sampling at the continuous outfalls?

Comment: Permit Page 16, Monitoring Outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07 Segregated Waste Stream Tank Cleaning Residual Discharges.

The permit requires monitoring of pH, ammonia, TRC, and flow at "each event."

Same as above. Collecting samples every time a discharge and tank cleaning happens would result in 30 to 50 samples per day.

Comment: Permit Page 19, C5.

The permit requires weekly calibration of continuous monitoring instruments "unless it can demonstrate a longer period is sufficient based on monitoring reports or manufacturer's requirements."

This is excessive and includes:

8 flow meters (5 source water + 3 process water_

8 temperature meters (5 source water + 3 process water)

3 turbidity meters (3 process water)

3 pH meters (3 process water)

Calibration at the manufacturer's recommended frequency is recommended.

Comment: Permit Page 33 and 34. Compliance Schedule, Item 3.2.

"Evaluate all known, available, and reasonable treatment technology (i.e., AKART analysis) and report recommendations for the treatment or source control of the segregated discharges of tank cleaning waste residuals from outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07 for pH and ammonia. Include whether the technology-based limits derived from implementation of AKART will meet the water quality based effluent limits."

It is not reasonable to treat segregated discharges of tank cleaning waste residuals for pH and ammonia. The volume of these residuals is very small, they are often discharged through drains at the bottoms of tanks, and, as such, cannot be segregated from other discharges, and the concentrations of ammonia are quite low. Additionally, considering the small volume, low concentrations of ammonia, and short duration (approximately 2 minutes) of tank drainage discharges, there is no reasonable potential that these discharges would result in exceedance of water quality standards, which are based on 1-hour (acute) and 4-day (chronic) exposures. Ammonia is not used or manufactured at the facility, and while it is present at very low concentrations, it does not have reasonable potential to exceed water quality standards and those concentrations are so low that an effort to attempt to segregate them (requiring excavation and re-piping of significant portions of the entire facility) and treat them is unreasonable.

Permit Page 34, Compliance Schedule, Item 3.3

"Perform an AKART analysis and report recommendations for the treatment or source control of removed solids from media filtration of source water. Include whether the technology-based limits can be derived from implementation of AKART."

Pacific Shellfish provided the following AKART analysis in the Engineering Report dated May 2019 (it has been updated for clarity and to focus on solids):

An all known available and reasonable technology (AKART) assessment has been applied to Pacific Shellfish's discharge of total suspended solids (TSS). The AKART approach consisted of the following steps:

1. Compare wastewater characteristics with applicable surface water quality standards and receiving water characteristics.

Samples of Pacific Shellfish's discharge and intake water were collected in 2018 and 2019 (and subsequently in 2020). Note that there is no water quality standard for TSS other than for discharges to not result in a visible plume.

2. Compare wastewater characteristics with the applicable EPA effluent limit guidelines (ELGs).

There are no ELGs for shellfish hatcheries

3. Review other shellfish hatchery NPDES permits for their permitted treatment technologies

There are no shellfish hatcheries in Washington permitted under the NPDES program.

The Whisky Creek shellfish hatchery in Tillamook, Oregon is permitted under the 300J general permit for aquatic animal production facilities. There are no treatment technologies specified in the permit.

The California NPDES General Permit for Discharges from Aquaculture Facilities and Aquariums was reviewed. There are no treatment technologies specified in the permit other than settling, screening, or filtering to "minimize or eliminate the discharge of waste solids to the greatest extent practicable." The practicality of "settling, screening, or filtering" is discussed further in item 4, below.

4. Assess the feasibility of other known treatment technologies including consideration of economics, treatment efficiency, feasibility, and if other water quality constituents are addressed.

A sample of Outfall 08-15 water collected when media filter backwashing was occurring contained 93 mg/L TSS. Bay intake water averaged 25 mg/L TSS, with a maximum value of 33 (average and maximum of 46 and 55 mg/L, respectively, from 2021 SAP monitoring program). Capital costs associated with a system suitable for 80- to 120-gpm of media filter backwash would include new sumps, pumps, and piping to route backwash wastewater from all of the backwash systems to a treatment system, likely requiring a new treatment system building, an equalization tank with mixing to prevent settling, pumps, bag filter units, and controls and are estimated to range between $100,000 and $300,000. Operating costs would include maintenance on sump pumps and other components of the system, bag filter changeouts, and labor and are estimated to range from $3,000 to $5,000 per month. Because media filter backwashing is intermittent and mixing with other discharges and at the shoreline will rapidly reduce the TSS concentrations to near background levels, the expense to engineer, install, and operate/maintain filtration on media filter backwash discharges is not reasonable.

Comment: Permit Page 36. Water Source Intake Structures and Screen Report, Condition S11.

As discussed on page 4 of this letter, the facility does not use any water for cooling, and its intake structures are not cooling water intake structures. Although the facility uses heat exchangers to warm intake water for use in the facility's processes, no water is used to cool facility processes. Neither the cooling water intake structure requirements in Clean Water Act § 316(b) nor EPA's implementing rules apply. Accordingly, condition S11 should be removed.

September 20, 2022

Jessica Christensen
Department of Ecology
Southwest Regional Office – WQ
PO Box 47775
Olympia, WA 98504-7775

Re: Comments to Draft Permit WA004114 for Pacific Shellfish

Dear Ms. Christensen,

On behalf of Pacific Shellfish, SLR International Corporation is submitting these comments to Draft Permit WA004114. On August 19, 2022, Washington Department of Ecology (Ecology) transmitted draft National Pollutant Discharge Elimination System (NPDES) permit WA0041114 and the associated Fact Sheet for the Pacific Shellfish hatchery in Quilcene for applicant review. Pacific Shellfish appreciates the opportunity to provide the following comments on the draft Permit and Fact Sheet. Comments are ordered starting with the fact sheet (and then the permit) and are identified based on the location within the respective documents of the provision addressed by the comment.

Upon review of this draft permit and consideration of how it regulates the upland discharges to the culvert through which the unnamed creek flows, Pacific Shellfish intends to combine the upland discharges into a new pipeline separate from the culvert. This pipeline will discharge to an existing outfall that discharges to Quilcene Bay. Pacific Shellfish anticipates obtaining approvals from the Port of Port Townsend and Jefferson County (property stakeholders) and expects to complete this work by the end of 2022. In light of Pacific Shellfish's commitment to eliminate all discharges to the culvert, the draft permit requires substantial revision to reflect this change. Pacific Shellfish is proposing to complete this project to eliminate all requirements associated with Outfalls U01 to U08, meaning all requirements related to monitoring, sampling, and related effluent limitations for these outfalls would therefore no longer be necessary and would be removed from the permit.

PERMIT FACT SHEET

Page 1, paragraph 6. *"The proposed permit is the first NPDES permit for the facility after a court decision in 2018 determined the hatchery discharged in a manner that required authorization in accordance with the Clean Water Act."*

> This statement does not refer to Ecology's previous determination that an NPDES permit was not needed for the facility's discharges. Ecology previously determined that the facility did not meet

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its regulatory criteria for NPDES permits and that the facility was not otherwise a significant contributor of pollutants. A citizens group disagreed with that regulatory determination and commenced a citizen suit under the Clean Water Act to require the facility to obtain a permit. The Western District of Washington found that a permit was required, and that decision was appealed to the Ninth Circuit. Ecology filed an amicus brief with the Ninth Circuit urging it to reverse Judge Leighton's decision that the facility required a permit because the facility did not meet its threshold standard for an NPDES permit, and because Ecology had made an independent judgment that the facility was not a significant contributor of pollutants to Quilcene Bay. In urging the Ninth Circuit to reject the premise of the citizen suit and to dismiss the case, Ecology emphasized that any other decision "would force Ecology to divert its scarce resources for a facility that is not a threat to the waters of the State." Pacific Shellfish requests Ecology to include this important history in the Fact Sheet, in efforts to more fully clarify why this is the first time Ecology is permitting this facility.

Page 3 List of Figure. The list is incomplete. Missing Figures 7, 9, and 10, which are also misnumbered in the body of the fact sheet.

Page 9, paragraph 4. *"Ecology received a draft engineering report in June 2019. The report was insufficient in that it did not adequately characterize source water and discharges. Ecology discussed with the Permittee our findings and planned a site visit."*

The characterization of the draft engineering report as "insufficient" is misleading and unnecessary to present the facts pertinent to the permit. The facility is complex, was unfamiliar to Ecology, and had never been issued an NPDES permit. Because this was the first time that Ecology has drafted a permit for this industry, Ecology itself was uncertain regarding precisely what information the report should include. Because there was no permitting template that Ecology could use for this permit, Ecology engaged in more of an iterative process to gather information about the industry and worked with Pacific Shellfish and its consultants to determine what information was necessary for it to first gather and then evaluate in order to eventually regulate this facility's discharge. Pacific Shellfish submitted the engineering report to assist Ecology in identifying the pertinent information necessary to begin the permitting process. Pacific Shellfish suggests removing the sentence, "The report was insufficient in that it did not adequately characterize source water and discharges"; revising the next-to-last sentence of the same paragraph to replace "completing a sufficient engineering report" with "completing the engineering report"; and revising the last sentence of the following paragraph to replace "Ecology accepted the final application package that contained an engineering report with sufficient information of the source water and the discharges to begin drafting a permit in September 2021" with "Ecology accepted the final application package and began drafting a permit in September 2021.

SLR

Page 12, paragraph 1. *"Prior to inoculation, seawater is disinfected using non-chlorination methods to remove pathogens and heated to 16-18°C using a heat exchanger. Hatchery staff inoculate the preconditioned water with multiple algae species and micronutrients to optimize growth at each step."*

This text contains confidential business information (CBI), specifically the water temperatures, and the first of these two sentences should be deleted. Preconditioning of the water is an internal process and has no relevance to the discharge.

This comment also applies more broadly to the fact sheet as a whole. As written, it provides a level of detail on the specifics of industrial processes and procedures that far exceeds that for other NPDES permits and is unwarranted. Subsequent instances of this are noted in the following comments as having an undue proprietary level of detail.

Page 12, paragraph 2. *"...to 29°C. A portion of this water is drained repeatedly to add the batches of algae."*

This text contains CBI and should be deleted.

Page 12, bullet 1. This text contains CBI relating to specific product formulations and should be revised to the following: "Larvae are sold in small batches that are placed in a coffee filter, sealed in a plastic bag, and are shipped by FedEx to the customer."

Page 13, paragraph 1. The number of media filters is identified in the fact sheet as 22. The correct number is 26: 14 in grouping MF1 on the east side of the main hatchery building, 8 in MF2 on the south side of the hatchery building, 2 in MF3 on the upland side of the road near the office, and 2 in MF4 on the end of the bulkhead.

Page 16, heading and paragraph 2. ***"Cooling Water Intakes . . .*** *The hatchery takes in 1.224 million gallons per day and only uses 21% of this intake for cooling."*

Pacific Shellfish does not use intake water for cooling. Water used in the hatchery must be heated for optimal shellfish larvae growth. To reduce heating costs, intake water is pre-heated using the effluent. While this results in the effluent being cooled, this is not a cooling operation, it is a heat recovery process. A more appropriate statement would be, "The hatchery takes in approximately 1.224 million gallons per day; approximately 21% of this intake is pre-heated using heat in the effluent." Likewise, the intakes are not "cooling water intake structures," they are marine water intakes; the water is not used for cooling, it is used in the process, and to maintain head at the headboxes.

The fact sheet implies that Pacific Shellfish reported this as cooling water by submitting a 316(b)-related form, but it is important to note that the form was initially submitted in June 2021 to indicate the facility does not have cooling water intakes. The form was resubmitted to indicate there are cooling water intakes, but this was done at the urging of the Ecology, so Pacific Shellfish could "use the cooling effects of any outflowing unused marine well and surface water influent that blends with your wastestream" (email LN April 29, 2022).

Page 16, paragraph 2. "*CWA §316(b) requirements apply to all industrial NPDES permitted facilities with cooling water intake structures. EPA has promulgated best technology available (BTA) effluent guidelines for facilities meeting certain thresholds: This facility is below the thresholds requiring the facility to meet best technology available. However, an existing facility will be evaluated with Ecology's best professional judgment as per 40 CFR 125.90(b). Ecology has proposed in the permit a special condition that the Permittee must conduct an inspection of their intakes, determine the presence and type of screens, install screens if determined they are not present, and provide engineering drawings (as-built drawings) of all intakes.*"

The requirements of CWA §316(b) do not apply to the facility, either through EPA's rule or based on best professional judgment. "Cooling water" is defined by EPA as "water used for contact or non-contact cooling, including water used for equipment cooling, evaporative cooling tower makeup, and dilution of effluent heat content. The intended use of the cooling water is to absorb waste heat rejected from the process or process used. . . . Cooling water . . . that is used in a manufacturing process either before *or after* it is used for cooling . . . is not considered cooling water." 40 C.F.R. § 125.92(c) (emphasis added). As explained in the preceding comment, no intake water is needed or used to cool any equipment or processes at the facility. To the contrary, effluent is used to warm the intake water, which is thereafter used to support facility processes. Even if the incidental cooling of the effluent caused by warming the intake water could be deemed a use of the intake water for cooling, the intake water does not meet the definition of "cooling water" because it is thereafter used in facility processes for purposes other than cooling.

In addition, please note that the facility already regularly inspects and maintains the bay intakes.

Page 16, first bullet, first paragraph. "Segregated wastestreams have a reasonable potential to discharge some pollutants above minimum treatment standards and water quality-based effluent limits."

It is questionable that the segregated wastestreams have a reasonable potential to discharge some pollutants above water quality based effluent limits. It is important to note that most water quality standards are based on 4-day exposures (chronic standards) and 1-hour exposures (acute standards). Considering that the duration of discharge of many of the segregated wastestreams is very short, the reasonable potential analysis should account for the limited duration of discharge. Segregated effluents are likely to be significantly diluted before an hour has passed, let along 4 days. For purposes of the reasonable potential analysis, Pacific Shellfish estimates the following durations of the various segregated waste streams:

- Cultch tank drainage: Estimated to be 60 to 75 minutes per tank. Of the 29 cultch tanks, 23 have what Ecology has classified as "segregated" discharges" (no blending with other continuous waste streams). Each tank is cleaned approximately every 2 weeks, averaging less than 2 tanks per day.
- Single seed systems: Estimated to be 56 minutes to drain one single seed system (5,600 gallons at 100 gpm). There are 6 single seed systems, with only 4 running at a time, on average. Systems are cleaned once per week, averaging less than 1 system per day.
- Tank (cultch, algae) cleaning: Estimated 2 minutes (10 gallons at 5 gpm) per tank. As discussed above, there are 23 cultch tanks with segregated discharges with less than 2/day being cleaned, on average. Of the 71 algae tanks, 27 have what Ecology has classified as "segregated" discharges. Each algae tank is cleaned approximately every 3 days, averaging 9 tanks per day.
- Algae bags: Not applicable, bags get thrown away every 10 weeks, there is no neutralizing or cleaning involved.
- Backwashing media filters: The only filters that are segregated are the two on the upland side of the road. A backwash cycle is 10 minutes per filter (20 minutes if they backwash sequentially). Backwash occurs once per day.

Page 17, paragraph 1. *"Setting up to grow new bags of algae produces a discharge of concentrated residual of dead algae that is discarded to make space for a new culture."*

It is not technically correct to claim there is "discharge" from the algae bags. When the bags are retired, approximately every 10 weeks, the bags will be removed and thrown away. There will be no discharge from this process. (This is a change to the process. Previously, a small amount of liquid may have gone to floor drains as the bags were removed, but the change-out process is being changed to eliminate this discharge.)

Page 17, paragraph 1. *"There are 22 total media filters that operate to filter intake water of the suspended solids to precondition the source water for culturing algae and shellfish."*

There are 26 total media filters. Of these, 24 media filters are used to precondition the source water for culturing algae and shellfish, including the filters in MF1 (14) MF2 (8) and MF3 (2). The remaining two filters in MF4 on the end of the bulkhead are used to filter bay water for the sprinklers that water the bag nursery on the beach when water is low and temperatures are hot.

Page 17, paragraph 3. *"The cleaning residuals contain high concentrations of solids, ammonia, and pH when discharged as a segregated wastestream."*

It is not appropriate to describe concentrations of these substances or characteristics as "high," particularly without a reference for comparison. Cleaning residual TSS is higher than tank drainage TSS, but, compared to, for example, seafood processing wastewaters at other facilities, the TSS in these discharges is in not "high".

Similarly, the highest cleaning residual ammonia concentration was 3.84 mg/L. This is below the acute water quality criteria calculated by Ecology for Quilcene Bay in Table 24 of the fact sheet (6.51 mg/L); therefore, this concentration cannot be described as "high". In fact, if any descriptor should be used, "low" would be more appropriate, considering that the concentration is below the acute water quality standard. Additionally, the 3.84 mg/L value is the highest value measured. The average is 0.51 mg/L, and the second highest of 12 samples is 0.48 mg/L. The chronic water quality standard from Table 24 of the fact sheet is 0.98 mg/L, so the average and 11 of 12 samples were below both the acute and chronic water quality criteria.

Lastly, it is inaccurate to describe pH in terms of concentration and while a pH of 9 or 10 is elevated above neutral, it would not commonly be referred to as "high" pH; in particular, a pH of 9 would not be considered "high".

Page 17, Wastestream of Tank Cleaning Waste Residuals. *"For cultch setting, algae, and larvae tanks, once emptied, a solution containing approximately 20 milliliters (mL) of 12.5% bleach in 5 liters of water is used to wash down tank interior surfaces (0.05% bleach solution). Tank cleaning is done by hand using a long-handled scrubber with an abrasive pad. The cleaning process results in approximately 10gallons of cleaning solution and rinse water residuals in the bottom of the tank. The bleach in the cleaning residual is neutralized using sodium thiosulfate prior to discharge. Sodium thiosulfate in the efflorescent crystalline form is mixed into an aqueous working solution by adding 1,506 grams to 15 liters of water. A portion of this solution is poured into the cleaning solution residuals in the bottom of each tank and is mixed. The water is then tested using the colorimetric DPD field test for residual chlorine. No water is discharged until the beach has been successfully neutralized.*

In the single-seed setting system, cleaning entails draining the setting boxes, scrubbing the walls with an abrasive pad, refilling the boxes with salt water, adding approximately 0.75 quart of 12.5% bleach, and recirculating it through the system for a period of time. The bleach is neutralized by adding a comparable amount of 3% hydrogen peroxide to the recirculation water. The water is tested for residual chlorine and no discharge occurs until the beach has been successfully neutralized."

Details in this section are considered CBI. Please revise as follows:

SLR

"For cultch setting, algae, and larvae tanks, once emptied, a bleach solution is used to wash down tank interior surfaces. The cleaning process results in approximately 10 gallons of cleaning solution and rinse water residuals in the bottom of the tank. The bleach in the cleaning residual is neutralized using sodium thiosulfate prior to discharge. The water is then tested using the colorimetric DPD field test for residual chlorine. No water is discharged until the beach has been successfully neutralized.

In the single-seed setting system, cleaning entails draining the setting boxes, scrubbing the walls with an abrasive pad, refilling the boxes with salt water, adding bleach, and recirculating it through the system for a period of time. The bleach is neutralized by adding hydrogen peroxide to the recirculation water. The water is tested for residual chlorine and no discharge occurs until the beach has been successfully neutralized."

Page 18, paragraph 6. *"The algae is grown up through a series of increasingly larger flasks, bags, and tanks until eventually fed out in concentrated batches to shellfish in tanks where a portion of water has been drained. (i.e., tank drainage wastestream) The tank is topped off with a concentrated algae volume to be held for a period of hours or days until feeding is repeated or shellfish is done growing and ready to sell."*

This constitutes CBI and should be revised as follows:

"The algae is fed out to shellfish in tanks where a portion of water has been drained. (i.e., tank drainage wastestream), to be held for a period of hours or days until feeding is repeated or shellfish is done growing and ready to sell."

Page 18, last paragraph. "The Permittee has not performed an analysis of all known, available, and reasonable treatment technology or source control for the limitation of any parameter of concern."

AKART analysis, including for TSS and temperature, was provided in the 2019 Engineering Report, as further discussed on page 19 of this letter below. Considering that the reasonable potential analysis for ammonia and chlorine may require revision because discharge times are well below the 1-hour and 4-day averaging periods for acute and chronic water quality standards, is additional AKART necessary?

Page 19, solid wastes. Solid waste disposal is provided by Murrey's Olympic Disposal.

Page 20, Figure 7 Map of Proposed Permitted Outfalls. The map gives latitude and longitudes for U01 through U07 along the presumed discharge pipeline route.

U04 to U07 are discharges from the 40s, 50s, 60s, and 70s greenhouses, respectively, U01 is continuous discharge from single seed systems, U02 is discharge from cultch tanks, and U03 is discharge from media filter backwash. As is noted in the SAP, the location of the underground piping is not known, and the locations are assumed based on proximity. It is also noted that, with the exception of U03, the upland wastewater streams are sampled from individual tanks. There no sample ports corresponding to the outfalls.

Page 22, Figure 7. Should be Figure 8.

Page 23, last paragraph. "*Quilcene Bay is a shallow, dynamic waterbody with a volume of approximately 40,000 million gallons of marine water a MLLW.*"

It should say "…at MLLW." Also, in this paragraph, 5 meters is 16.4 feet, not 15 feet, and 50 m is 164 feet, not 150 feet.

Page 24, Figure 9. The raft from which the temperature probes were mounted was approximately 3,000 ft north of where the arrow on the figure indicates. Also, the paragraph below the figure should be modified to specify that the temperature monitoring location was approximately a mile away and beyond the potential influence of the hatchery discharge and represents the natural background condition of the bay.

Page 25, paragraph 1. "*The creek daylights when the pipe ends at the shoreline of Quilcene Bay and exits from a 6-inch metal pipe.*"

The creek daylights as an 18-inch diameter corrugated plastic pipe.

Page 30, Table 7 footnote. "*Each cleaning event creates a cleaning residual discharge that consists of approximately ten gallons of solids (biofilm and left-over larvae or algae) and neutralized bleach solution.*"

As written, it could be interpreted to imply that 10 gallons of solids are generated, which isn't accurate. The following, more accurate statement is recommended" ""Each cleaning event creates approximately ten gallons of cleaning residual containing neutralized bleach solution, rinse water, and some solids (biofilm and left-over larvae or alga")."

Page 37, paragraph 2. "*Two media filter units, MF1 and MF2, out of the four total at the hatchery backflush operate continuously and periodically throughout a 24-hour period discharge the backwash that blends with effluent that includes a large volume of continuously flowing headbox overflow and unused filtered bay water at outfall 04. Media filter 3 (MF3) and media filter 4 (MF4) discharge in a segregated manner through outfalls UC03 (02F) and QB05, respectively, without blending with process water. Backwash of media filters 3 and 4 occur infrequently, approximately several times a year also at the rate of 75 gallons per minute (gpm) for ten minutes.*"

As written, the statement conflates individual media filters, of which there are 26, with the four groupings of media filters identified in the Engineering Report: MF1 (14 filters) located on the east side of the hatchery building, MF2 (8 filters) on the south side of the hatchery building) MF3 (2 filters) located on the upland side of the road near the office, and MF4 (2 filters) located on the bulkhead.

Page 37, paragraph 3. *"The average and maximum total suspended solids (TSS) concentrations in the source water were 46/55 mg/L (bay) and 34/42 mg/L (well). The average TSS concentration in algae tank cleaning residual was 38 mg/L and a maximum of 60 mg/L. The average TSS concentration of the waste residual from cultch tank cleaning was 276 mg/L and a maximum of 830 mg/L. The discharge of media filter backwash was not characterized but was reported to be greater than that of any of their discharges (SLR 2021). The proposed permit requires monitoring of the media filter backwash."*

There was no speculation in the text of the engineering report as to the TSS concentration of the backwash. Backwash could not be characterized as a segregated stream during the SAP because no backwashing of the upland media filters took place during the SAP and no sampling port is available for collection of backwash on the lowland side of the road. For the purpose of estimating the TSS concentration of the combined upstream discharges, backwash TSS was conservatively estimated as 830 mg/L, the highest concentration from the other waste streams.

Page 37, paragraph 4. *"The TSS concentrations of the solids determined in the tank cleaning waste residuals from cultch tanks and TSS concentrations of solids in media filter backwash discharges will likely exceed the narrative water quality criteria for aesthetics (visible plume)."*

The volume of residual discharged when cleaning a tank is 10 gallons. It is not realistic for 10 gallons to generate a "plume" in the receiving environment. None of the facility's discharges have resulted in a visible plume during any of the multiple trips made to the facility by SLR to characterize the effluents and document conditions.

Page 38, paragraph 1. *"The average ammonia concentration in tank cleaning waste residual discharge from cultch tanks when discharged in a segregated manner (3.80 mg/L), as is the case at outfalls Q01, Q05 and U02, exceeds the ammonia chronic aquatic life criteria during the critical season for both marine and fresh waters."*

The statement suggests that the parenthetical value of 3.8 mg/L is the average concentration, whereas it is the maximum. The average is 0.51 mg/L and the second highest of 12 samples is 0.48 mg/L. The marine and freshwater chronic aquatic life criteria are given in Tables 21 and 22 of the fact sheet as 0.978 and 1.217 mg/L, respectively. Chronic criteria are based on a 4-day exposure. Tank cleaning residuals are discharged over a period of, very conservatively, 2 minutes, which is 0.034% of the 4-day exposure time of the chronic water quality standard.

This very short duration of exposure, at a concentration that is below/barely above the water quality standard concentration, does not constitute a reasonable potential to exceed chronic water quality standards that are expressed as a 4-day average. Section 4.3.3 of the *Technical Support Document for Water Quality-Based Toxics Control* (USEPA, 1990) establishes procedures for accounting for the duration of exposure. The approach is to assess whether, "a drifting organism would not be exposed to 1-hour average concentrations exceeding the CMC." The document continues: "The intent of the method is to prevent the actual time of exposure from exceeding the exposure time required to elicit an effect." Based on this guidance, it is important to consider the duration of the segregated discharge when assessing reasonable potential to exceed water quality standards.

Considering that 12 samples of cultch cleaning residual were collected during the permit application process, the very low duration of these discharges, and that ammonia concentrations in the discharges are already near or below the concentrations in the water quality standards, there is no need to further characterize these wastewater discharges.

Similarly, the duration of a tank cleaning residual discharge constitutes approximately 3% of the 1-hour exposure time of the acute standard, and therefore does not constitute a reasonable potential to exceed acute water quality standards.

Page 38, paragraph 4. *"Tank cleaning events that are typical of those discharging to outfalls Q03 and Q04 starts with a five-liter solution of 0.05% sodium hypochlorite that is a solution of 50 mg/L chlorine (free and combined chlorine). The end cleaning residual is a mixture of the biological material from the tank walls and rinse water creating 37.9 Liters (10 gallons) at a concentration of 6.6 mg/L chlorine prior to neutralization."*

The specific volumes and concentrations noted in this text constitutes an undue level of CBI and should be revised as follows:

"Tank cleaning events that are typical of those discharging to outfalls Q03 and Q04 consist of an approximately 10-gallon mixture of rinse water, neutralized bleach solution, and residual biological material from the tank walls."

Page 39, paragraphs 1 & 2. *"Described in more detail in Part II, when tank cleaning waste residuals are discharged in a segregated manner, there is increased potential for total residual chlorine to be above the acute aquatic life criteria (marine 13.0 µg/L and freshwater 19.0 µg/L) since the minimum detection limit is greater than the aquatic life criteria. However, the amount of chemical that will completely neutralize the free chlorine must be calculated, administered, and reported by trained staff.* These segregated discharges occur at outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07.

Described in more detail in Part IV, the proposed permit requires an accredited lab and approved methodology to be used for regular verification testing as a standard practice. Verification testing is necessary to verify that the field test is functioning with precision and accuracy, neutralization process is functioning correctly, and that the discharge complies with the permit's effluent limits. Reporting that the concentration is below the lowest possible detection limit will indicate that the discharges meet permit limits. It is a requirement in the proposed permit to establish a best management practice plan and *standard operating procedure that trained staff with standardized chemical solutions test every tank cleaning waste residual event. Additionally, all field and accredited verification testing must be recorded and reported."*

The permit requirements (in this section and elsewhere) around chlorine are onerous and unwarranted. Neutralization is confirmed with the field test before each cleaning residual discharge as part of the facility's standard operations. The facility has a very strong vested interest in ensuring that the chlorine is neutralized because chlorine is toxic to the facility's product. As a matter of doing business effectively, they must neutralize the chlorine. Too much chlorine will completely kill off a tank of larvae or algae and even very low concentrations of residual chlorine will significantly reduce product yields.

Additionally, with the exception of the single seed system, the duration of discharge of tank cleaning residuals is well below the 1-hour exposure times assumed when establishing the acute water quality standards (marine 13.0 µg/L and freshwater 19.0 µg/L). Tank cleaning residuals, which are approximately 10 gallons, are discharged over a period of, very conservatively, 2 minutes, which is 3% of the 1-hour exposure time of the acute standard. This duration of exposure, at a concentration, if present at all, would be below/barely above the concentration of the water quality standard, does not constitute a reasonable potential to exceed water quality standards, particularly when it is quite likely that these discharges will be mixed with other wastewater streams.

Considering that neutralization of chlorine is critical to facility operations, that 12 samples of tank cleaning residual were collected during the permit application process, the very low duration of these discharges, and that chlorine concentrations in the discharges are below detection limits or already near the concentration of the water quality standards, there is no need to further characterize these wastewater discharges.

The field test has a minimum detectable free chlorine of 20 µg/L (0.02 mg/L). A dilution of only 1.6 is needed to meet the 13 µg/L chronic criteria, and the fact that the discharge occurs over a period of 1/2880th of the 4-day exposure time for chronic criteria, makes it exceedingly unlikely that a discharge could result in an exceedance the time-averaged criteria.

Page 39, paragraphs 4-6 on zinc in roof runoff. "*"Galvanized roofing material is commonly known to allow zinc to enter and concentrate in stormwater runoff. Zinc can be as high as 15 mg/L and is generally in the dissolved form (Ecology 2008 and Schriewer et al. 2008). Downspouts from the Hatchery building, which is partially covered in galvanized roofing material, allow roof runoff to flow into the wastewater discharging out of outfall Q03 (SLR 2021).*

Outfall Q03 discharges process water effluent at a rate of 0.7L per min. Based on Schriewer et al. (2008), a normal rainfall event can produce 20L of runoff per minute at a steady state concentration of 5 mg/L zinc. The resulting mixed discharge is 4.83 mg/L zinc, 100 times above the chronic marine water quality-based criterion of 0.081 mg/L zinc (81.0 µg/L).

Based on these calculations, when mixed with hatchery effluent, water discharging from outfall Q03 may have elevated zinc with reasonable potential to exceed the chronic aquatic life criteria of 81.0 µg/L at the point of discharge considering there is no mixing zone authorized. There were no zinc data presented in the wastewater characterization report therefore it will be a requirement to monitor zinc at outfall Q03 during rain events in the proposed permit."

It is important to note that the galvanized roofs at the facility are painted with white paint. The galvanized metal surface is not exposed to precipitation. As written on page 16 of the draft permit it appears that the requirement is to sample the roof runoff directly, whereas this statement in the fact sheet suggests monitoring would occur at outfall Q03. It is not practical nor typical to require monitoring of roof runoff at the point of generation. The permit should be revised to clarify that sampling would be required at outfall Q03.

Page 40, Summary of compliance. *"The proposed permit is the first for the Hatchery. It is the result of a Clean Water Act citizen suit. A court decision in March 2018 held that the facility discharged in a manner that required authorization in accordance with the Clean Water Act."*

This statement does not refer to Ecology's previous determination that an NPDES permit was not needed for the facility's discharges. To clarify why the facility did not apply for a permit before the court decision, Pacific Shellfish asks that Ecology revise the statement to read as follows: "The proposed permit is the first for the Hatchery. Ecology had previously determined that the facility's discharges did not require an NPDES permit. After a court decision in March 2018 determined that the hatchery's discharges require a permit, Pacific Shellfish applied to Ecology for an NPDES permit to authorize the discharges."

Page 41, paragraph 3. *"The permit does not authorize discharge of the non-reported pollutants."*

Pacific Shellfish asks Ecology to clarify this statement. Pacific Shellfish has reported in its application and other documents all the pollutants in its discharge for which it was required to provide information by the permit application forms and regulations, as well as any other pollutants present in significant quantities of which it was aware. Undoubtedly, however, there are small or insignificant amounts of many other substances in its intake water, which is taken from Quilcene Bay and marine wells. Is it Ecology's position that, if any such substance is identified in the facility's discharges—no matter how small or insignificant the amount—that the discharge of that substance is unauthorized and constitutes a violation of the requirement to obtain an NPDES permit? Or, rather, is it Ecology's position only that it does not intend the NPDES permit shield to extend to the discharge of any such unreported pollutant insofar as the discharge of that pollutant may cause or contribute to a violation of water quality standards? Or does the statement have some other meaning? See also the related comment below on Condition S1 of the permit.

Page 41, TBEL for TSS. The permit sets a TBEL for TSS in tank cleaning residual of 100 mg/L.

Tank cleaning residual, consisting of approximately 10 gallons of rinse water, neutralized bleach, and residual organic matter cleaned from the sides of the tanks, contained TSS concentrations as high as 830 mg/L, as observed as part of the sampling program. Apart from using more rinse water, i.e. dilution, there is no practical way to treat this wastewater since the wastewater discharges out of the bottom of the tank and into underground piping. That underground piping is also used for regular tank drainage, so the tank cleaning residual cannot be segregated.

Furthermore, this 100 mg/L limit is a limit that cannot be met, and appears to be based on the faulty premise that limits for offline settling basins and rearing pond drawdowns for fish release are appropriate for cleaning residual discharges. The Fact Sheet states that the TSS limit is based on the effluent standards for fish hatcheries in WAC 173-221A-100. In the WAC, the limit specifically applies to discharge from offline settling basins and rearing pond drawdowns for fish release. There are no analogues for these processes in Pacific Shellfish's tank cleaning procedures; cleaning residual volumes are too small to use a settling basin, and drawdown and cleaning are not similar processes. Based on this, it is not appropriate apply the 100 mg/L limit from WAC 173-221A-100 to Pacific Shellfish's tank cleaning residual.

Also, it is reiterated that it is unlikely, due to the small volume of the discharge and the fact that it mixes with other waters in the culvert through which the unnamed stream flows, for the cleaning residual to result in a visible "plume." No plume has been observed by SLR staff during 6 different site visits completed to characterize site wastewaters.

Page 42, paragraph 1. "*Ecology proposes monitoring the segregated discharges of backwash at outfalls Q05 and U02 for quantity, TSS, and turbidity for the permit cycle. Ecology will re-evaluate in the next permit cycle after the Permittee submits their AKART evaluation for source control and treatment of media filter backwash as per the compliance schedule and there is further effluent characterization.*"

It is not typical or practical to require samples for every process at the point of generation. Backwash makes up less than 0.9% of the total estimated flow from the upland side of the facility. Backwashing of the media filters on the bulkhead (used to filter bay water for the beach nursery sprinklers) that would discharge to Q05 has historically been rare, perhaps one time per year; however, Pacific Shellfish intends to end this discharge; thus, monitoring and limits to this discharge would no longer be required.

Page 46, last paragraph. *"Additionally, for a mixing zone to be considered, the study must include the relocation of the outfall(s) further into the bay and effluent diffusion must be identified."*

Mixing zones are not prohibited adjacent to shorelines, nor is a submerged, multiport diffuser required to grant a mixing zone. Indeed, Ecology's Permit Writer's Manual at page 169 expressly allows a mixing zone for a shore discharge, while cautioning that care must be taken to ensure that such a mixing zone does not have adverse biological effects. Because of the nature of the facility's discharges, there is no significant risk of adverse biological effects along the shore, and no such effects are present. In fact, the facility maintains its own cultch bag nursery along the shore in front of the hatchery building.

It is recognized that WAC 173-201A-400(2) requires dischargers to fully apply AKART before being authorized a mixing zone. AKART was presented in the 2019 engineering report. The discharges are either small enough in volume, or low enough in concentration (or both) that application of additional treatment is not reasonable.

Page 48, Table 17. Designated uses of the unnamed creek are identified in the table as Core Summer Salmonid Habitat.

It is understood that this is a default designation applied to all freshwater streams not explicitly identified in table 602 of WAS 173-201A-600. However, it is important to note that this default designation is inconsistent with the actual and potential aquatic life uses of the creek. As noted at page 25, paragraph 2, of the fact sheet: "*Including where the discharges occur, the upper 1800-foot segment is classified a Type N stream-type by the Washington Department of Natural Resources (WDNR). This indicates <u>that this section of creek does not meet the physical criteria nor does it flow during some portion of the year. Therefore, the creek does not meet the criteria to be an F type waterbody (i.e., habitat conducive to maintain fish-https://geo.nwifc.org/swifd/ accessed 2/8/22). The creek is not considered salmon or trout bearing</u> in Washington Department of Fish and Wildlife's (WDFW) database SalmonScape (accessed 2/8/22).*"

Page 50, Turbidity. *"Ecology evaluated the impact of turbidity based on the range of turbidity measurements in the effluent and source water. Water quality-based limits have been set as a net limit based on the 95th percentile of the bay water (see Table 5 - Bay Source Water (Seawater) Intake Characterization Summary Statistics) plus 5 NTUs since the average turbidity was less than 5 NTU. The limit is an average monthly limit of 7 NTUs in the segregated discharge of tank drainage and algae bag residuals at outfalls Q01, Q05, U01, U02, U02, U04, U05, U06, and U07 and process water from outfalls Q03, Q04, U01."*

The fact sheet states that the water-quality limits have been set based on the 95^{th} percentile of the bay water. The 95^{th} percentile from the referenced table is 2.95. Since the water quality standard is 5 NTU plus background, the standard should be 8 NTU, not 7 NTU.

Page 52, Tank Cleaning Waste Residual. "*Ecology found that discharges of cleaning waste residuals from cultch tank cleaning discharging from outfalls Q01, Q05, and U02 had elevated levels of ammonia, some exceeding the chronic criteria. Furthermore, Ecology conducted a reasonable potential analysis (See Ammonia section of Appendix D: Reasonable potential analysis for freshwater and marine receiving waterbodies). Ecology determined that the segregated wastestream discharge of cleaning waste residuals has reasonable potential to cause a violation of the water quality standards for both marine and freshwater discharges and calculated water quality-based effluent limits for use after the AKART evaluation (see* ***Table 18****).*"

To say "some exceeding the chronic criteria" is misleading. Only 1 of 12 samples exceeded the chronic ammonia criterion, and no samples exceeded the acute criterion. Furthermore, as previously discussed on page 9 of this letter, Ecology didn't take into account the duration of the cleaning residual discharges when performing the RPA. The duration of exposure is significantly less than the exposure periods associated with the criteria.

Page 57, Temperature Limits: "*After the AKART evaluation recommendation(s) is approved, a mixing zone for temperature may be considered depending on the results of the receiving waterbody study, extensions of outfalls into the bay, and a mixing zone study.*"

AKART for temperature was discussed in the 2019 engineering report. Further, as noted on Page 22 of this letter, the temperature of the discharge from Pacific does not and cannot have a measurable effect on the temperature of Quilcene Bay. Also, as discussed on page 13, there is no requirement for a submerged outfall for a mixing zone allocation.

Page 58, Wastewater Monitoring: "*Effluent from Outfalls U01, Q03, and Q04 that discharge process water must be monitored for flow, temperature, turbidity, pH, BODs, TSS, TOC, salinity and total residual chlorine. Continuous monitoring for flow, temperature, turbidity, and pH is to become effective with completion of compliance schedule, task 1.*"

The continuous monitoring requirements are onerous and unwarranted, particularly for turbidity, which had a maximum value of 17 NTU. U01 consists of approximately 150,000 gpd continuous flow from single-seed setting systems. The maximum turbidity measured for this discharge during implementation of the SAP was only 17 NTU.

It cannot be said for sure whether the results include any bag room discharge, since it is small and infrequent (<0.03% of the discharge). However, since it makes up such a small fraction of the discharge it is not likely to have a measurable effect. The water quality criterion is 8 NTU (the fact sheet incorrectly stated 7 NTU).

Requiring continuous monitoring for turbidity when is it only approximately twice the criterion, even without a mixing zone, is unnecessarily excessive. Periodic grab sampling should be sufficient.

Permit

Page 7, condition S1, paragraph 3. *"Any pollutant not specifically authorized by this permit in concentrations that cause or contribute to an exceedance of receiving water quality standards established under Section 307(a) of the Clean Water Act or Chapter 173-201A WAC, or groundwater standards (Chapter 173-200 WAC) constitutes a violation of this permit and the Clean Water Act."*

Pacific Shellfish asks Ecology to clarify this condition. (1) Which pollutants are "specifically authorized by this permit?" (2) Pacific Shellfish has reported in its application and other documents all the pollutants in its discharge for which it was required to provide information by the permit application forms and regulations, as well as any other pollutants present in significant quantities of which it was aware. Undoubtedly, however, there are small or insignificant amounts of many other substances in its intake water, which is taken from Quilcene Bay and marine wells. Is it Ecology's position that, if any such substance is identified in the facility's discharges—no matter how small or insignificant the amount—that the discharge of that substance is unauthorized and constitutes a violation of the requirement to obtain an NPDES permit? Or, rather, is it Ecology's position only that it does not intend the NPDES permit shield to extend to the discharge of any such unreported pollutant insofar as the discharge of that pollutant may cause or contribute to the violation of a water quality standard?

Page 8, first table. A 100 mg/L TSS limit is proposed for tank cleaning residual.

Tank cleaning residual TSS concentrations as high as 830 mg/L were observed as part of the sampling program. Apart from using more rinse water, i.e. dilution, there is no practical way to treat this wastewater since the wastewater discharges out of the bottom of the tank and into underground piping.

The Fact Sheet states that the TSS limit is based on the effluent standards for fish hatcheries in WAC 173-221A-100. In the WAC, the referenced limit specifically applies to discharge from offline settling basins and rearing pond drawdowns for fish release. There are no analogues for these processes in Pacific Shellfish's tank cleaning procedures; cleaning residual volumes are too small to use a settling basin, and drawdown and cleaning are not similar processes. Based on these factors, it is not appropriate to apply the 100 mg/L limit from WAC 173-221A-100 to Pacific Shellfish's tank cleaning residual

Also, it is reiterated that there is reasonable potential for the cleaning residual to result in a visible "plume." No plume has been observed by SLR staff during 6 different site visits completed to characterize site wastewaters.

Page 9, footnote c. *"Monitoring and reporting must be conducted in accordance with S2 using the approved field method for daily testing and verification of field test through accredited compliance methods to be reported on DMRs."*

> The footnote was applied to ammonia, TRC, and pH, implying that all three are parameters measured in the field. Only pH and TRC are field parameters. Samples are sent to a lab for analysis of ammonia. It is assumed this is a typo and the footnote was meant to apply to TRC and pH only. This typo carries over to the subsequent effluent limit tables in the permit, and should be fixed in each instance.

Page 11, table. A 7 NTU turbidity limit is proposed for tank drainage and algae bag residual.

> Previously, algae bag residual could be discharged when bags were removed, through residual entering floor drains. This process is being changed so that bags will be removed whole, with the small amounts of residual remaining in the bags, and the bags will be disposed of whole so that there is no discharge.
>
> Also, as noted on page 14 of this letter, the limit, if based on the 95th percentile ambient concentration, should be 8 NTU. It should also be noted that the turbidity values used to approximate ambient were measured in intake water, not the water in the vicinity of the facility's discharge. The intakes are located at the bottom of the bay at a depth of approximately 50 feet and 2,000 feet from the hatchery's discharge. Based on this, bay source water turbidity may not be representative of the receiving water.

Page 14, Section S2A. The permit requires continuous metering of source water flow and temperature.

> This would require installation of five flow meters, including on the three influents that are well water. What is the intent of measuring inflow when a significant portion of the water goes into head boxes that then overflows? Installing five flow meters would be logistically difficult in the cramped influent area. It would likely require a complete re-design of the area, possibly including a new structure.

Page 14, Section S2A. The permit requires monitoring of source water for turbidity, BOD, TSS, TOC, and salinity.

> It is unclear what purpose this monitoring would this serve. The source water is filtered prior to use in the facility.

Page 15, Monitoring Process Water Discharges. The permit includes a compliance schedule for initiating continuous monitoring of effluent at U01, Q03, and Q04 for turbidity (in addition to flow, temperature, and pH).

As noted with respect to the fact sheet, continuous monitoring for turbidity is onerous and unwarranted. The maximum turbidity recorded for these discharges in the SAP was 17 NTU. This is only approximately twice the water quality standard of 8 NTU (incorrectly identified at 7 NTU in the fact sheet). Given how little dilution is needed (approximately 1:1), periodic (quarterly) grab sampling would be sufficient.

Page 16, Monitoring Outfalls Q01, Q03, Q04, Q05, U01, U02, U04, U05, U06, and U07 All Tank Cleaning Waste Residual Discharges. The permit requires monitoring of TSS and flow at "each event."

"Event" isn't defined in the permit. Is it every tank cleaning? Collecting samples from every tank cleaning is exceedingly burdensome. Collecting samples every time a discharge and tank cleaning happens would result in 30 to 50 samples per day. No other industry is required to collect samples from every single process at their facility at the point of wastewater generation. They aren't even required to collect samples from outfalls every single day; they collect samples a few times a month or few times a week.

Also, Q03 and Q04 are continuous, non-segregated discharges, of which cleaning residual is a small fraction. What defines an "event" for sampling at the continuous outfalls?

Page 16, Monitoring Outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07 Segregated Waste Stream Tank Cleaning Residual Discharges. The permit requires monitoring of pH, ammonia, TRC, and flow at "each event."

Same as above. Collecting samples every time a discharge and tank cleaning happens would result in 30 to 50 samples per day.

Page 19, C5. The permit requires weekly calibration of continuous monitoring instruments "*unless it can demonstrate a longer period is sufficient based on monitoring reports or manufacturer's requirements*."

This is excessive and includes:

- 8 flow meters (5 source water + 3 process water_
- 8 temperature meters (5 source water + 3 process water)
- 3 turbidity meters (3 process water)
- 3 pH meters (3 process water)

Calibration at the manufacturer's recommended frequency is recommended.

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Page 19, C5b. The link for the SOP for Continuous Temperature Monitoring of Fresh Water Rivers and Streams is broken: "This publication is obsolete and no longer available."

Page 30, S5B1c. Testing Procedure. The section appears be about creating SOPs for field testing procedures. However, under Section iii. the permit says: *"Include steps for verification testing specifying the procedure to sample (when and how), the accredited test method being used, and the accredited lab performing and reporting results."*

It is critically important to Pacific Shellfish's manufacturing process that there be no chlorine remaining in the tanks, thus they are diligent in neutralizing the chlorine. Also, as noted on page X of this letter, there is no reasonable potential for TRC to exceed water quality standards because these discharges are intermittent and of very short duration, while water quality standards are expressed on 1-hour and 4-day exposures. For these reasons, the permit should not require monthly verification.

However, if verification is required, the Testing Procedures must be clarified. As written, the requirement indicates that an accredited lab must perform the field verification, which is not a reasonable requirement considering that the verification frequency, depending on source, is monthly. Throughout the rest of the permit, the requirement is for "verification of field test through accredited compliance methods." The testing procedures should be rewritten to clarify that verification of the TRC method can be performed by hatchery staff using approved methods, such as though described in the USEPA Region 4 Operating Procedure for Field Screening of Total Residual Chlorine (SESDPROC-112-R5, April 26, 2017).

Page 33 and 34. Compliance Schedule, Item 3.2. *"Evaluate all known, available, and reasonable treatment technology (i.e., AKART analysis) and report recommendations for the treatment or source control of the segregated discharges of tank cleaning waste residuals from outfalls Q01, Q05, U01, U02, U04, U05, U06, and U07 for pH and ammonia. Include whether the technology-based limits derived from implementation of AKART will meet the water quality based effluent limits."*

It is not reasonable to treat segregated discharges of tank cleaning waste residuals for pH and ammonia. The volume of these residuals is very small, they are often discharged through drains at the bottoms of tanks, and, as such, cannot be segregated from other discharges, and the concentrations of ammonia are quite low. Additionally, considering the small volume, low concentrations of ammonia, and short duration (approximately 2 minutes) of tank drainage discharges, there is no reasonable potential that these discharges would result in exceedance of water quality standards, which are based on 1-hour (acute) and 4-day (chronic) exposures. Ammonia is not used or manufactured at the facility, and while it is present at very low concentrations, it does not have reasonable potential to exceed water quality standards and those concentrations are so low that an effort to attempt to segregate them (requiring excavation and re-piping of significant portions of the entire facility) and treat them is unreasonable.

Page 34, Compliance Schedule, Item 3.3. *"Perform an AKART analysis and report recommendations for the treatment or source control of removed solids from media filtration of source water. Include whether the technology-based limits can be derived from implementation of AKART."*

Pacific Shellfish provided the following AKART analysis in the Engineering Report dated May 2019 (it has been updated for clarity and to focus on solids):

An all known available and reasonable technology (AKART) assessment has been applied to Pacific Shellfish's discharge of total suspended solids (TSS). The AKART approach consisted of the following steps:

1. Compare wastewater characteristics with applicable surface water quality standards and receiving water characteristics.

   Samples of Pacific Shellfish's discharge and intake water were collected in 2018 and 2019 (and subsequently in 2020). Note that there is no water quality standard for TSS other than for discharges to not result in a visible plume.

2. Compare wastewater characteristics with the applicable EPA effluent limit guidelines (ELGs).

   There are no ELGs for shellfish hatcheries

3. Review other shellfish hatchery NPDES permits for their permitted treatment technologies.

   There are no shellfish hatcheries in Washington permitted under the NPDES program.

   The Whisky Creek shellfish hatchery in Tillamook, Oregon is permitted under the 300J general permit for aquatic animal production facilities. There are no treatment technologies specified in the permit.

   The California NPDES General Permit for Discharges from Aquaculture Facilities and Aquariums was reviewed. There are no treatment technologies specified in the permit other than settling, screening, or filtering to "minimize or eliminate the discharge of waste solids to the greatest extent practicable." The practicality of "settling, screening, or filtering" is discussed further in item 4, below.

4. Assess the feasibility of other known treatment technologies including consideration of economics, treatment efficiency, feasibility, and if other water quality constituents are addressed.

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A sample of Outfall 08-15 water collected when media filter backwashing was occurring contained 93 mg/L TSS. Bay intake water averaged 25 mg/L TSS, with a maximum value of 33 (average and maximum of 46 and 55 mg/L, respectively, from 2021 SAP monitoring program). Capital costs associated with a system suitable for 80- to 120-gpm of media filter backwash would include new sumps, pumps, and piping to route backwash wastewater from all of the backwash systems to a treatment system, likely requiring a new treatment system building, an equalization tank with mixing to prevent settling, pumps, bag filter units, and controls and are estimated to range between $100,000 and $300,000. Operating costs would include maintenance on sump pumps and other components of the system, bag filter changeouts, and labor and are estimated to range from $3,000 to $5,000 per month. Because media filter backwashing is intermittent and mixing with other discharges and at the shoreline will rapidly reduce the TSS concentrations to near background levels, the expense to engineer, install, and operate/maintain filtration on media filter backwash discharges is not reasonable.

Page 35. Temperature Study. *"The permittee must conduct a Receiving Waterbody Study to determine the seasonal background temperature conditions of Quilcene Bay at the hatchery location. The study must collect hydrologic spatial and temporal data for a duration of two years that characterize the bay for temperature background conditions and effluent heat load. This must include continuous monitoring data (temperature and flow) from all the hatchery intakes (influent), discharges (effluent), potential submerged outfall locations (s), and head of bay near the mussel rafts at 5 and 10 feet subsurface. The study must include ambient, influent, and effluent characterization. In addition, the study must include a data summary of the freshwater streams and river inputs (daily flow and temperature), bay retention time, seasonal stratification, and bathymetry at locations of proposed submerged outfall."*

Draft permit condition S10 would require a temperature study of Quilcene Bay. Although the stated purpose is "to determine the seasonal background temperature conditions of Quilcene Bay at the hatchery location," the specific requirements would appear to require a detailed, year-round temperature characterization of the entire bay, including "the head of bay near the mussel rafts at 5 and 10 feet subsurface" (which is more than a mile from the facility); "a data summary of the freshwater streams and river inputs (daily flow and temperature)," "bay retention time"; and "seasonal stratification." The scope of this potentially enormously detailed and expensive study is not reasonably commensurate with its stated purpose. This requirement is too specific and unconstrained in how complicated it could be.

The discharge from Pacific Shellfish does not and cannot measurably affect the temperature of the waters of Quilcene Bay beyond the immediate vicinity of the discharge. As noted in the Fact Sheet, the volume of Quilcene Bay is 40 billion gallons, equivalent to 150 billion liters. Pacific Shellfish's effluent is approximately 840,000 gallons per day, which, at 20.4 degrees C, would warm the bay overall by only a negligible 0.00043 degrees C per day. For reference, solar radiation, under sunny skies, contributes approximately 1,000 times more heat per day to Quilcene Bay than Pacific's discharge.

With an average tidal range of 7.5 feet (mean high water minus mean low water) and a surface area of approximately 30 million square feet, the average volume of water that exits Quilcene Bay during an ebb tide is 6.7 million liters, or 4% of the volume of the Bay. This prevents the accumulation of heat from Pacific Shellfish in Quilcene Bay.

Considering these factors, Pacific Shellfish's thermal load to the wider Quilcene Bay is negligible. The draft requirement for a thermal study of Quilcene Bay should be replaced with a requirement to prepare a work plan for Ecology review and then conduct a mixing zone study and thermal plume assessment.The temperature study described in the draft permit is extremely complicated and not well defined or constrained in its complexity, and as such, further discussion of its infeasibility follows. As written, this scope of work would be enormous. It would require identification of every tributary into Quilcene Bay. Once a tributary was identified it would have to be assessed to evaluate whether it could be accessed. This would require a title search to determine ownership of the property. Then, access agreements would be required, which could take an extended period of time and require hiring of attorneys and related expenses associated with the agreements. Some property owners may not allow access, resulting in data gaps.

Eighteen streams and rivers that discharge to Quilcene were identified on the USGS StreamStats application. Once access to a stream or river had been negotiated and agreed to, each would have to be surveyed at a minimum of 2 cross sections along the path of the stream or river to measure cross sectional areas and slopes. Then the elevation of the water and temperature would have to be measured daily. This would require installation of a permanent structure, which would also have to be included in the access agreements and likely require Army Corps of Engineers permitting, NMFS consultation, and potentially Ecology shoreline permits. Following installation, these would have to be monitored regularly for damage or vandalism and would likely require replacement from time to time, resulting in data gaps.

The scope is unconstrained as to what "hydrologic spatial and temporal data" to "characterize the bay for temperature background conditions" would entail. Similarly, evaluation of bay retention time and seasonal stratification are also unconstrained. These requirements could be construed to require a complex, dynamic model of the hydrology, salinity, and thermal characteristics of Quilcene Bay, which would be an enormous undertaking that is completely unjustified considering it is well known that Quilcene Bay is an extremely warm water body, a simple mass/thermal balance, as discussed above, shows that it would be impossible for Pacific Shellfish's discharge to measurably warm Quilcene Bay, and because sufficient data to assess the effect of the effluent on the water in the vicinity of the facility could readily be gathered from the intake water measurements and, for example, a single buoy located across the Bay at an area of similar depth.

Page 36. Water Source Intake Structures and Screen Report, Condition S11.

As discussed on page 4 of this letter, the facility does not use any water for cooling, and its intake structures are not cooling water intake structures. Although the facility uses heat exchangers to warm intake water for use in the facility's processes, no water is used to cool facility processes.

Neither the cooling water intake structure requirements in Clean Water Act § 316(b) nor EPA's implementing rules apply. Accordingly, condition S11 should be removed.

Thank you for the opportunity to provide these comments to the Draft permit. If you have any questions or would like to discuss the rationale behind any of these comments, please do not hesitate to reach out.

Sincerely,
SLR International Corporation

Steve Hammer, P.E.
Principal Engineer

Cc Laurie Niewolney, Washington Department of Ecology
Steve Eberl, Washington Department of Ecology
John Diamant, Washington Department of Ecology
Miranda Reis, Pacific Shellfish

Enc None

October 24, 2022

Jessica Christensen
Department of Ecology
Southwest Regional Office – WQ
PO Box 47775
Olympia, WA 98504-7775

Re: Response to Ecology Request for Additional Information Relating to Draft Permit WA004114 for Pacific Shellfish

Dear Ms. Christensen,

On behalf of Pacific Shellfish (Pacific), SLR International Corporation is submitting this letter to provide additional information requested by Laurie Niewolny in an email dated October 17, 2022 regarding follow up to Pacific Shellfish's comments to Draft Permit WA004114.

Ecology requested the following information:

1. A description of the elements and timeline for completing draft compliance schedule tasks 3.1, 3.2, and 3.3.
2. A discussion of the staffing that would be required for the monitoring program proposed in the draft permit
3. Confirmation that the hatchery roof is completely painted, without any exposed galvanized surfaces
4. The date when disposal of algae bags as trash, without discharge of any residual materials, commenced
5. Describe any changes from practices as described in the 2021 Engineering Report, either being conducted currently or planned for the future

Each of these items is described below.

1. <u>Timeline for Completing Draft Permit Tasks 3.1, 3.2, and 3.3</u>

Pacific proposes the following timeline, broken down into phases for the purposes of presenting a chronological schedule.

Phase 1: October 2022 through July 1, 2023

During Phase 1, Pacific will gather information necessary to conduct the engineering design work for draft Compliance Schedule Tasks 3.1 (evaluate options to prevent marine water discharges from outfalls U01 through U07 to the unnamed creek) and 3.3 (AKART analysis for the treatment or source control of removed solids from media filtration of source water) and complete the work required to finish draft Task 4.1 (implement the recommendations to prevent marine water discharges to the unnamed creek). Pacific intends to complete draft Tasks 3.1 and 4.1 ahead of the schedule presented in the Draft Permit to eliminate the segregated discharges to the unnamed creek and the monitoring requirements and discharge limits for those discharges. As discussed below, those monitoring requirements would be extremely difficult and expensive to meet. The outfall described in the Draft permit as Q01 will be re-routed so that it is combined with these upland discharges. This new combined outfall, for the purposes of this letter, will be called New Outfall 01.

In addition, at this time, Pacific will combine the outfalls described in the Draft Permit as Outfalls Q03, Q04, and Q05 into a single outfall that, for the purposes of this letter, will be called New Outfall 02.

It is critical during site reconnaissance conducted during this phase to collect detailed information on various other site systems – such as bay influent pump and piping configurations, filter backwash systems, heat recovery systems – during Phase 1 so that the work completed during Phase 1 complements the final configuration of the facility and meets Ecology's criteria. The work will be completed per the following timeline:

Draft Task 3.1

- October/November 2022: Pacific engages with the Port and County
- November 2 to 4, 2022: Engineer conducts site reconnaissance
- November 2022: Prepare Engineering Report for submittal to Ecology
- December 9, 2022: Submit Engineering Report to Ecology
- December 23, 2022: Receive Response from Ecology
- January 11, 2023: If necessary, submit revised Engineering Report
- January 25, 2023: Receive final approval from Ecology

Draft Task 4.1

- February/March 2023: Construction

Draft Task 1.1 (Sampling and Analysis Plan for Continuous Monitoring)

- July 1, 2023: Submit Sampling and Analysis Plan (including flow monitoring design) to Ecology

The Phase 1 work will meet the conditions of draft compliance schedule Task 1.1, Task 3.1, and Task 4.1.

Phase 2: July 2, 2023 through January 1, 2024

Draft Task 1.2 (Implementation of Continuous Monitoring)

- January 1, 2024: Complete construction required to install continuous monitoring equipment on New Outfall 01 and New Outfall 02.

Draft Task 3.2 (AKART Analysis of Segregated Discharges to the Unnamed Creek for pH and Ammonia) and Draft Task 4.2 (Implementation of Approved AKART for Segregated Discharges)

- Completion of draft Tasks 3.1 and 4.1 will eliminate the segregated discharges addressed by draft Tasks 3.2 and 4.2; therefore, draft Tasks 3.2 and 4.2 become unnecessary following Phase 1.

Phase 3: January 2, 2024 through January 1, 2026

Draft Task 3.3 (AKART Analysis for Removed Solids from Media Filtration of Source Water)

- January 1, 2026: Submit AKART analysis and report for filter backwash water. The AKART report will be submitted along with recommendations and designs for implementation, as necessary.

Draft Task 3.4 (AKART Analysis for Heat Load)

- January 1, 2026: Submit AKART analysis and report for heat load. This AKART report will evaluate heat reduction strategies, including outfall consolidation, per *Methods to Reduce or Avoid Thermal Impacts to Surface Water: A Manual for Small Municipal Wastewater Treatment Plants*, June 2007, Ecology Publication # 07-10-08. The AKART report will recommend whether a mixing zone study is appropriate. The AKART report will be submitted along with recommendations and designs for implementation, as necessary.

Phase 4: January 2, 2026 to July 1, 2027

Draft Task 4.1 will be completed as part of Phase 1.

- Draft Task 4.2 will not be necessary after completion of draft Task 4.1 because no segregated discharges will remain and there will be no reasonable potential that the discharges from New Outfall 01 and New Outfall 02 could exceed water quality standards for the relevant pollutants.

Draft Task 4.3 (Implementation of Approved AKART for Removed Solids)

- The recommendations and designs, if necessary, submitted for draft Task 3.3 will be implemented by July 1, 2027.

Draft Task 4.4 (Implementation of Approved AKART for Heat Load)

- The recommendations and designs, if necessary, submitted for draft Task 3.4 will be implemented by July 1, 2027.

2. Staffing required for the monitoring program proposed in the draft permit

As written, the draft permit requires sampling of the residue from every single tank cleaning event. Pacific understands that Ecology has requested this because the discharges from the tank cleaning events are considered "segregated" discharges and could theoretically, if there were no other discharge occurring at the time, discharge directly to the freshwater stream in the culvert or into Quilcene Bay, and Ecology believes that these discharges could result in exceedance of water quality standards at the point of discharge. Each of these tank cleaning events, however, results in a discharge of only approximately 10 gallons. If a mixing zone were provided, these 10-gallon discharges could not possibly result in an exceedance of water quality standards at the edge of a mixing zone; the volume is just too small.

Pacific cleans 20 to 40 tanks per day, and potentially more on occasion. Thus, collection of samples every single time a tank is cleaned would require collection of 20 to 40 or more samples per day. These samples would have to be tested on site for residual chlorine and pH and submitted to an analytical laboratory for analysis of total suspended solids (TSS) and ammonia. Because the facility operates 16 hours a day, 7 days a week (potentially 24 hours a day at some times of the year), the collection, field testing, sample labeling, sample handling, and shipping required to collect and analyze 20 to 40 or more samples per day – from discharges that are of extremely low volume – would require hiring 4 to 5 new staff solely dedicated to this task.

Pacific is not aware of any industrial facility that is required to monitor every single discharge of 10 gallons of wastewater. In fact, industrial facilities routinely are required to collect wastewater samples from their outfalls only a few times per month, despite discharging thousands and sometimes millions of gallons every day.

Pacific is also concerned about the time and monetary commitment required to obtain the accreditation for chlorine testing. None of its other facilities have had to obtain this type of certification, and the process for obtaining and maintaining this accreditation is unclear. Additionally, since testing would be required for each "event" multiple staff would need to be trained in the procedures.

3. Confirmation that the hatchery roof is completely painted

From the ground, exposed galvanized surfaces have not been observed on the painted hatchery roof. To verify, within the next 2 weeks, Pacific will either fly a drone to look for exposed galvanized surfaces on the roof, or, if a drone is not available, personnel will go up on the roof to look for exposed galvanized surfaces.

4. Modification in handling algae bag changeouts

On July 1, 2022, Pacific stopped the practice of cutting open used (i.e. ready to be disposed of) algae grow bags, which allowed the residual algae to go to the floor and then floor drains. Since that date and going forward, Pacific has and will dispose of the bags, with whatever remaining residual is left in the bags, as garbage.

5. Other changes from practices as described in the 2021 Engineering Report

Except as described above, there have been no changes in facility practices and operations, and no plans for changes, from those described in the 2021 Engineering Report, except that one media filtration unit (MF4) was decommissioned in August 2021.

Thank you for the opportunity to provide this information. If you have any questions, please do not hesitate to reach out.

Sincerely,
SLR International Corporation

Steve Hammer, P.E.
Principal Engineer

Cc Laurie Niewolny, Washington Department of Ecology
Steve Eberl, Washington Department of Ecology
John Diamant, Washington Department of Ecology
Miranda Ries, Pacific Shellfish

Enc None

APPENDIX G — Response to Public Review and Comment

[Ecology will complete this section after the public notice of draft period.]