

**MAINE POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT
AND
WASTE DISCHARGE LICENSE**

FACT SHEET

Date: September 28, 2018

MEPDES PERMIT: ME0037478
WASTE DISCHARGE LICENSE: W009190-6F-A-N

NAME AND ADDRESS OF APPLICANT:

**WHOLE OCEANS, LLC
c/o Pierce Atwood LLP
254 Commercial Street
Portland, Maine 04101**

COUNTY: HANCOCK

NAME AND ADDRESS WHERE DISCHARGE OCCURS:

**Route #15
Bucksport, Maine 04416**

RECEIVING WATER / CLASSIFICATION: Penobscot River, Class SC

COGNIZANT OFFICIAL AND TELEPHONE NUMBER:

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Chief Operating Officer**

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1. APPLICATION SUMMARY

- a. Application - On June 4, 2018, and as amended on September 10, 2018, Whole Oceans LLC (Whole Oceans/permittee hereinafter) submitted an application to the Department of Environmental Protection (Department hereinafter) for a new Maine Pollutant Discharge Elimination System (MEPDES) permit/Maine Waste Discharge License (WDL)(permit hereinafter) for the monthly average discharge of 18.6 million gallons per day, subject to the attached conditions of this permit, of treated waste water associated with a land based recirculating aquaculture system (RAS) to the Penobscot River main stem, Class SC, in Bucksport, Maine. See **Attachment A** of this Fact Sheet for a location map.

1. APPLICATION SUMMARY (cont'd)

- b. Source Description - The permittee proposes to rear Atlantic salmon from the egg life stage to market size fish weighing 10-12 pounds. The facility will be built in phases as follows:

Phase I (initial) production up to 5,000 metric tons (MT) = 11 million pounds

Phase II (intermediate) production at 5,001 MT – 10,000 MT = 22 million pounds

Phase III (full build out) production at 10,001 - 20,000 MT = 44 million pounds

The permittee has plans to construct a fish processing facility (head-on, gutted) on-site at a later date. Limitations and monitoring requirements for this facility are not factored into this permit as the permittee is undecided as whether to convey this water to the local municipal waste water treatment facility for treatment or treat the waste water on-site and discharge the treated water to the Penobscot River. A separate review and approval process would be required for both options.

- c. Waste Water Treatment - The Whole Oceans facility intends to use Recirculating Aquaculture System (RAS) technologies to reduce water consumption while rearing fish in land based farms. As a result of the reduced water consumption, elevated concentrations of waste metabolites develop. These elevated concentrations normally result in concentrations high enough that can be treated and removed by basic RAS technologies without having concentrations so high that the fish are negatively impacted. Fish waste products that are treated with RAS technologies include BOD₅, TSS, and ammonia.

Technologies which are used to reduce total water consumption include:

- Filtration to remove solids (TSS), which contain BOD₅
- Bio-Reactors which biologically oxidize ammonia into nitrate. Excess bacteria are discharged periodically from the bio-reactors during routine cleaning which will elevate effluent TSS and BOD₅ concentrations occasionally and
- Aeration and oxygenation equipment which strip carbon dioxide from the water and replace it with oxygen.

In a typical RAS, 99% of the total flow is recirculated. As less than 1% is discharged per pass, concentrations for untreatable dissolved contaminants can be 100% higher than would be found in typical flow-through facilities. However, because much of the contaminants are waste solids, or are converted to waste solids by the biofiltration process, they can be extracted before the waste is released into the environment.

The process flow diagram in **Attachment B** of this Fact Sheet shows how water, contaminants and mortalities which are discharged from independent RAS modules are combined and treated before the combined effluent is to be discharged into the Penobscot River.

1. APPLICATION SUMMARY (cont'd)

From each of the independent fish rearing modules (excluding the quarantine module) within the farm, morts (mortalities), backwash & sediments and overflow/tank drains are discharged. The quarantine facility has a process designed to minimize risk that a pathogen could be released in the liquid wastes, solid wastes or via mortalities discharged from the facility.

The morts extracted from the non-quarantine RAS modules never enter the effluent discharge but are removed and sent to a composting facility. Similarly, any fish that manage to escape from the RAS modules which are retained by the exclusion screens are also discharged to the composting facility.

The backwash and sediments discharged from the RAS modules include the filter backwash water plus any high TSS water discharged from the biofilters. This represents approximately 1/3 of the total discharge from the facility (estimated at 1.589 MGD or 250 m³/hr). These flows are combined to pass through a belt filter system that will, if required, include chemical flocculants to enhance performance, similar to those treatments used in potable water treatment facilities. To manage disposal, it may be desirable to thicken the solids further with a mechanical centrifuge system. The filtrate from the belt filter system would then be combined with the "clean water" effluent discharge from the RAS modules. If necessary, additional treatments to enhance fine solids capture could be added to the filtrate from the belt filter (prior to combining with clean water flows). Such treatments could include additional filtration or oxidation using ozone (that would convert residual BOD₅ to carbon dioxide).

The overflow water and tank drain water is already suitable for fish rearing. Addition of the water extracted from the backwash and sediments flows may raise concentrations to levels above those found in flow-through facility discharges, but can be limited to prevent concentrations rising above acceptable discharge limits to protect the receiving water. The combined flows will then pass through additional treatments including additional drum filtration, fish exclusion barriers, and UV disinfection before it is released into the outfall pipe.

Initially much of the BOD₅ discharged from the RAS modules is in the form of TSS. Because mineralization of the solids wastes begins immediately, releasing contaminants back into the accompanying liquids, it is more important to separate the solids from the liquids quickly rather than focus on interception of fine particulates. The belt filter proposed is very gentle with the waste solids so that they are not masticated before they can be separated from the supernatant. The optional centrifuge is an effective tool for further concentrating the solids without releasing of significant masses of solids into the supernatant.

1. APPLICATION SUMMARY (cont'd)

Estimates have been included of water quality in combined flows discharged from the RAS modules. However, as conditions are constantly changing inside the facility as the fish hatch, grow and are harvested, the estimates applied have been identified as 'worst case' conditions. For example, although influent and effluent flows of up to 4.65 MGD have been identified as possible for Phase I, it is expected, when contamination levels are lower, that as little as 2.1 MGD may be required. Similarly, smaller fish produce finer waste products that are harder to extract, so a larger percentage of the feed can actually be converted into BOD5 and TSS which is discharged from the modules. The larger fish produce more waste because they consume more feed, but the percentage of feed that is converted into contaminants carried in the discharge water is reduced. Therefore, estimates of waste flows use estimated peak feed rates instead of relying on average feed rates and flow rates. Estimates of the quality of water discharged from the facility have been calculated using estimates of feed and water consumed by similar RAS facilities in other parts of the world.

Discharge quality estimates have been made using weighted averages of overflow/drain water combined with supernatant from the backwash and sediments discharges. Water quality from the backwash and sediments flows have been based on changes in water quality through belt filter/flocculation systems that have been observed in other aquaculture facilities such as the discharge from the USDA MCWNAC/University of Maine CCAR facility in Franklin, Maine and with research performed at the Freshwater Institute in Shepherdstown, West Virginia where removals of TSS and BOD5 of approximately 80% were observed.

The treated wastewater is discharged to the Penobscot River via one of two outfalls that are designated as Outfall #001B and Outfall #003. Outfall #001A is located at the intake screen to the pump house providing cooling water to the turbine generator for Bucksport Generation LLC and sea water to the RAS facility. This outfall will be used to discharge backwash waters to clean the facility's intake screens. The discharge configuration consists of a 24" diameter discharge pipe that runs below the intake screens to the non-contact cooling water structure. The discharge pipe has twelve 6" diameter diffuser pipes located 4 feet on centers. This outfall configuration is beneficial to the facility as it provides for continuous cleaning of the screens.

Outfall #001B is located just upstream of Outfall #001A and consists of a 48" diameter steel pipe that extends out into the river approximately 230 feet and necks down to two 24" diameter steel pipes that make up the wye-shaped diffuser. The end of the pipe is covered by approximately 16 feet of water at mean low tide and 27 feet of water at mean high tide.

1. APPLICATION SUMMARY (cont'd)

Outfall #003 is currently being utilized as a cooling water discharge for the No. 3 Turbine for the power plant owned and operated by Bucksport Generation LLC. The cooling water itself is limited and monitored in accordance with MEPDES permit ME0002160 last issued by the Department on October 15, 2015. Cooling waters from the power plant and process waste water from the Whole Oceans facility can be co-mingled to be discharged through a sloping 36" steel pipe with a diffuser. The diffuser has 10, 12" diameter vertical ports spaced 10 feet on center to enhance mixing with the receiving waters. The diffuser ports are covered by between 27 feet and 43 feet of water at mean low tide and 38 feet and 54 feet of water at mean high tide.

2. PERMIT SUMMARY

This permitting action is establishing:

- a. Three tiers of technology based numeric limitations for flow, biochemical oxygen demand (BOD), total suspended solids (TSS), total nitrogen and pH;
- b. A requirement to seasonally (May – October) monitor the effluent for total phosphorus and total ammonia.
- c. A requirement for the permittee to conduct a dye study to determine the mixing characteristics of the treated effluent discharge from the facility with the receiving water;
- d. A requirement to conduct seasonal (May – October) ambient water quality monitoring of the Penobscot River;
- e. A requirement for the facility to develop and maintain an Operations & Maintenance (O&M) Plan for the production facility and the wastewater treatment facility;
- f. A requirement to limit the use of antibiotics, fungicides, bactericides, paracitocides and other chemical compounds;
- g. A requirement for the facility to develop and maintain a Containment Management System (CMS) to prevent escape of fish from the facility; and
- h. A requirement for the permittee to meet with the Department's permitting and compliance inspection staff 90 days prior to commencement of operations, to review applicability of the permit limitations, monitoring requirements and reporting requirements.

3. CONDITIONS OF PERMIT

Conditions of licenses, 38 M.R.S. § 414-A, requires that the effluent limitations prescribed for discharges, including, but not limited to, effluent toxicity, require the application of best practicable treatment (BPT), be consistent with the U.S. Clean Water Act, and ensure that the receiving waters attain the State water quality standards as described in Maine's Surface Water Classification System. In addition, *Certain deposits and discharges prohibited*, 38 M.R.S. § 420 and Department rule *Surface Water Toxics Control Program*, 06-096 CMR 530 (last amended March 21, 2012), require the regulation of toxic substances not to exceed levels set forth in *Surface Water Quality Criteria for Toxic Pollutants*, 06-096 CMR 584 (effective July 29, 2012), and that ensure safe levels for the discharge of toxic pollutants such that existing and designated uses of surface waters are maintained and protected.

4. RECEIVING WATER QUALITY STANDARDS

Classification of estuarine and marine waters, 38 M.R.S. § 469(2)(B)(1) classifies all tidal waters in Bucksport (which includes the area of the discharge) as Class SC waters. *Standards for classification of estuarine and marine waters*, 38 M.R.S. § 465-B(3) describes the standards for Class SC waters as follows:

Class SC waters shall be the 3rd highest classification.

- A. *Class SC waters must be of such quality that they are suitable for recreation in and on the water, fishing, aquaculture, propagation and restricted harvesting of shellfish, industrial process and cooling water supply, hydroelectric power generation, navigation and as a habitat for fish and other estuarine and marine life.*
- B. *The dissolved oxygen content of Class SC waters may be not be less than 70% of saturation. Between April 15th and October 31st, the number of enterococcus bacteria in these waters may not exceed a geometric mean of 14 per 100 milliliters in any 90-day interval or 94 CFU per 100 milliliters in more than one sample in any 90-day calendar interval. The number of total coliform bacteria or other specified indicator organisms in samples representative of the waters in restricted shellfish harvesting areas may not exceed the criteria recommended under the National Shellfish Sanitation Program, United States Food and Drug Administration.*
- C. *Discharges to Class SC waters may cause some changes to estuarine and marine life provided that the receiving waters are of sufficient quality to support all species of fish indigenous to the receiving waters and maintain the structure and function of the resident biological community.*

5. RECEIVING WATER QUALITY CONDITIONS

The State of Maine 2016 Integrated Water Quality Monitoring and Assessment Report, prepared by the Department pursuant to Sections 303(d) and 305(b) of the Federal Water Pollution Control Act, lists the Penobscot River Estuary, DEP Waterbody ID 722-45 (7,624 acres) in the area of the discharge, as:

Category 2: Estuarine and Marine Waters Attaining Some Designated Uses – Insufficient Information for Other Uses.

Category 4-A(b): Estuarine and Marine Waters with Impaired Use, TMDL Completed (for bacteria from combined sewer overflows). This category lists the Town of Bucksport's Publicly Owned Treatment Works as the responsible party for the elevated bacteria levels.

Category 5-B-1(a): Estuarine and Marine Waters Impaired for Bacteria Only – TMDL Required. The cause of the impairment is listed as elevated fecal indicators in DMR Pollution Area #35. See **Attachment C** of this Fact Sheet.

The Report lists all of Maine's fresh waters as, "Category 4-A: Waters Impaired by Atmospheric Deposition of Mercury." Impairment in this context refers to a statewide fish consumption advisory due to elevated levels of mercury in some fish tissues. The Report states, "All freshwaters are listed in Category 4A (Total Maximum Daily Load (TMDL) Completed) due to the USEPA approval of a Regional Mercury TMDL. Maine has a fish consumption advisory for fish taken from all freshwaters due to mercury. Many waters and many fish from any given water do not exceed the action level for mercury. However, because it is impossible for someone consuming a fish to know whether the mercury level exceeds the action level, the Maine Department of Health and Human Services decided to establish a statewide advisory for all freshwater fish that recommends limits on consumption. Maine has already instituted statewide programs for removal and reduction of mercury sources." Pursuant to 38 M.R.S. § 420(1-B)(B), "a facility is not in violation of the ambient criteria for mercury if the facility is in compliance with an interim discharge limit established by the Department pursuant to section 413 subsection 11." However, pursuant to *Interim Effluent Limitations and Controls for the Discharge of Mercury*, 06-096 CMR 519, the Department has made a best professional judgment determination to exempt fish hatcheries from applicability of the mercury rule.

The Department has made a best professional judgment determination based on information gathered to date, that as permitted, the discharge will not cause or contribute the failure of the receiving water to meet the standards of its ascribed classification and the designated uses of the waterbody will continue to be maintained and protected. If future modeling or ambient water quality monitoring determines the discharge is causing or contributing to the non-attainment, this permit will be re-opened per Special Condition O, *Reopening of The License For Modifications*, to impose more stringent limitations to meet water quality standards.

6. EFFLUENT LIMITATIONS & MONITORING REQUIREMENTS (cont'd)

- a. Flow: This permitting action is establishing a monthly average flow limitation of 4.65 MGD for Outfall #001B & Outfall #003 for Phase I, 9.3 MGD for Phase II and 18.6 MGD for Phase III based on information provided by the permittee.

- b. Dilution Factors: Dilution factors associated with wastewater discharges are derived in accordance with *Surface Water Toxics Control Program* 06-096 CMR 530 (effective date March 21, 2012). Department Regulation Chapter 530, states that for discharges to estuaries, dilution must be calculated using a method determined by the Department to be appropriate for the site conditions. Where freshwater river flow is dominant and instantaneous mixing across the width can be assumed, dilution must be calculated as in section 4(1) of the rule. Where tidal flow is dominant or incomplete mixing is assumed, dilution must be calculated as in section 4(2) of the rule. Where appropriate, other methods such as dye studies or water quality methods may be used.

At a full permitted flow of 18.6 MGD, the near-field dilution factors (utilized for toxics evaluations given acute and chronic effects) listed below are based on the Department's tidal velocity model and 15-minute travel time.

Acute = 54:1 Chronic = 354:1 Harmonic mean = 354:1

The permittee discharges to the estuarine portion of the Penobscot River, which is strongly influenced by freshwater during high spring flows, large rainfall events, and during ebb tides. These conditions make it very difficult to accurately define the mixing characteristics of the effluent from the permittee's facility and the receiving water at any given point in time. In addition, Verona Island, immediately seaward of the discharge, causes the river to be split into two channels, one to the east side of the island and one to the west side. The west channel carries the majority of the flow in the river. Unlike on the west side of Verona Island, the eastern channel is narrow and shallow at mean low tide, and is bounded by sizable intertidal flats.

For far-field dilution factors (utilized to evaluate impacts from nutrients and BOD), the Department evaluated the mixing characteristics based on a tidal prism of 22,080 MGD and a freshwater 7Q10 of 1,940 MGD (3,000 cfs) for a tidal daily flushing of 24,020 MGD. The far-field dilution factors for the Whole Oceans discharge based on the three phases of discharge, 5,000 MT (4.65 MGD), 10,000 MT (9.3 MGD) and 20,000 MT (18.6 MGD) were derived as follows:

6. EFFLUENT LIMITATIONS & MONITORING REQUIREMENTS (cont'd)

Phase I (5,000 MT)

Tidal Flushing Volume = 24,020 MGD

Discharge Flow Rate= 4.65 MGD

$$\frac{24,020 \text{ MGD}}{4.65 \text{ MGD}} = 5,166:1$$

Phase II (10,000 MT)

Tidal Flushing Volume = 24,020 MGD

Discharge Flow Rate= 9.3 MGD

$$\frac{24,020 \text{ MGD}}{9.3 \text{ MGD}} = 2,583:1$$

Phase III (20,000 MT)

Tidal Flushing Volume = 24,020 MGD

Discharge Flow Rate= 18.6 MGD

$$\frac{24,020 \text{ MGD}}{18.6 \text{ MGD}} = 1,291:1$$

These dilutions are achieved at the southern end of Verona Island after the east and west channels combine.

Given the uncertainty as to the split in river flows to the east and west channels around Verona Island, this permit is requiring the permittee to conduct a dye study once Phase I operations have commenced and steady state conditions with eggs, fry, smolts and adult fish in grow out tanks have been achieved. The information derived from this dye study will assist the Department in more accurately assessing the hydraulics associated with the discharge in the two channels.

- c. **Biochemical Oxygen Demand (BOD₅) and Total Suspended Solids (TSS)**: This permitting action is establishing monthly average and daily maximum concentration limits of 30 mg/L and 50 mg/L respectively for BOD₅ and TSS based on Department best professional judgment (BPJ) of best practicable treatment (BPT) for re-circulating facilities. These limits were based on recommendations included in USEPA's 2002 proposed draft National Effluent Guidelines for TSS from re-circulated fish hatchery wastewater receiving a secondary level of treatment and the Department's long-standing view of the relationship with and significance of BOD₅, and consideration of effluent quality from facilities utilizing the Department's BPJ of minimum treatment technology. Mass limits were calculated based on the monthly average phased flow limits of 4.65 MGD, 9.3 MGD, 18.6 MGD, the applicable concentration limits, and a conversion factor of 8.34 lbs/gal for water. The limits were calculated as follows:

6. EFFLUENT LIMITATIONS & MONITORING REQUIREMENTS (cont'd)

Phase I (5,000 MT)

Monthly average: $(4.65 \text{ MGD})(30 \text{ mg/L})(8.34 \text{ lbs/gal}) = 1,163 \text{ lbs/day}$

Daily maximum: $(4.65 \text{ MGD})(50 \text{ mg/L})(8.34 \text{ lbs/gal}) = 1,939 \text{ lbs/day}$

Phase II (10,000 MT)

Monthly average: $(9.3 \text{ MGD})(30 \text{ mg/L})(8.34 \text{ lbs/gal}) = 2,327 \text{ lbs/day}$

Daily maximum: $(9.3 \text{ MGD})(50 \text{ mg/L})(8.34 \text{ lbs/gal}) = 3,878 \text{ lbs/day}$

Phase III (20,000 MT)

Monthly average: $(18.6 \text{ MGD})(30 \text{ mg/L})(8.34 \text{ lbs/gal}) = 4,654 \text{ lbs/day}$

Daily maximum: $(18.6 \text{ MGD})(50 \text{ mg/L})(8.34 \text{ lbs/gal}) = 7,756 \text{ lbs/day}$

The Department has modelled the impact of the Phase III discharge of BOD₅ on the ambient dissolved oxygen and determined the discharge will consume an additional 0.02 mg/L of dissolved oxygen in the receiving water. This level of depletion is considered to be not measurable and well below the acceptable level of accuracy of 0.2 mg/L (an order of magnitude higher) for instruments used for ambient water quality monitoring of dissolved oxygen.

- d. **Total Nitrogen (TN)** – Nitrogen is generally the limiting nutrient for primary productivity in marine waters. Discharges of excess quantities of immediately bioavailable nitrogen can cause algal blooms in the receiving waters, which can lead to negative impacts to dissolved oxygen levels. Immediately bioavailable nitrogen typically consists of dissolved inorganic forms, including nitrate (NO_3^-), nitrite (NO_2^-), and ammonium (NH_4^+). Total kjeldahl nitrogen (TKN) is the sum of organic nitrogen, ammonia (NH_3), and ammonium (NH_4^+). To calculate Total Nitrogen (TN), the concentrations of nitrate and nitrite are determined and added to TKN.

With the exception of ammonia, nitrogen is not acutely toxic; thus, the Department is considering a far-field dilution to be more appropriate when evaluating the more systemic types of influences associated with nitrogen in the marine environment. As of the date of this permitting action, the State of Maine has not promulgated numeric ambient water quality criteria for total nitrogen. According to several studies in USEPA's Region 1, numeric total nitrogen criteria have been established for relatively few estuaries, but the criteria that have been set typically fall between 0.35 mg/L and 0.50 mg/L to protect marine life using dissolved oxygen as the indicator. While the thresholds are site-specific, nitrogen thresholds set for the protection of eelgrass range from 0.30 mg/L to 0.39 mg/L.

6. EFFLUENT LIMITATIONS & MONITORING REQUIREMENTS (cont'd)

Given the absence of mapped eelgrass in both the east and west channels of the Penobscot River around Verona Island and the chronically high light attenuation occurring in the water column based on suspended solids and dissolved organic matter, the Department is not using a nitrogen threshold value intended to protect eelgrass in the vicinity of the discharge location. In the Department's best professional judgment of ambient nitrogen concentrations that are protective of Maine water quality standards, the Department instead considers a threshold of 0.45 mg/L to be appropriate to protect aquatic life, using dissolved oxygen (DO) as the indicator. The numeric value of 0.45 mg/L total nitrogen is being utilized as a guidance value. The Department utilizes a weight of evidence approach to determine attainment of water quality standards and places a greater weight on ambient water chemistry and biological data, including dissolved oxygen, pH, and chlorophyll *a* to determine whether the discharge will cause or contribute to violations of water quality.

The Department collected ambient water quality monitoring data at six to ten monitoring sites during May-October 2011, 2012, and 2018. See **Attachment D** of this Fact Sheet for the monitoring sites relative to Verona Island and local discharge locations. Ambient data collected from vertical water column profiles as well as from continuous deployments (continuous at sites P2 and O1 in 2018 only) indicate the Class SC dissolved oxygen criterion of 70% saturation was consistently met. Chlorophyll *a* concentrations were typically less than 5 µg/L, with the exception of one sampling event in 2012 during which concentrations at sites within the eastern channel ranged from 10.6-11.3 µg/L. Algal blooms are associated with prolonged levels of chlorophyll *a* levels of >10 µg/L. Visual monitoring of both channels as well as the Orland River estuary indicate that benthic diatom and green macroalgal mats on intertidal and shallow subtidal flats have been periodic in nature and restricted to the eastern shore of Verona Island and the Orland River estuary. During the period of widespread green macroalgal abundance in the Orland River estuary during summer 2007, no discharges from the former Verso mill site were occurring. As of the date of issuance of this permit, the Department has not identified any point source discharges as causing or contributing to these episodic algal blooms.

Ambient nitrogen data collected by the Department during 2011, 2012 and 2018 at locations bracketing the discharge location and when negligibly influenced by a sanitary wastewater or process water discharge, indicate ambient total nitrogen concentrations ranging from 0.27-0.60 mg/L, with an average value of 0.38 mg/L (n=25). The permittee has indicated the weighted average total nitrogen concentration discharged from the various waste streams at the facility after treatment is 48.1 mg/L. For Phase I, this permit is establishing a monthly average limitation of 1,865 lbs/day based on the following calculation:

$$\text{Monthly average: } (4.65 \text{ MGD})(48.1 \text{ mg/L})(8.34 \text{ lbs/gal}) = 1,865 \text{ lbs/day}$$

6. EFFLUENT LIMITATIONS & MONITORING REQUIREMENTS (cont'd)

The impact to the Penobscot River is as follows;

Total nitrogen concentrations in the effluent = 48.1 mg/L

Far-field dilution factor = 5,166:1

In-stream concentration after dilution: $\frac{48.1 \text{ mg/L}}{5,166} = 0.009 \text{ mg/L}$

Therefore, the increase in the nitrogen concentration above background under Phase I discharge conditions is 0.009 mg/L or 2.4%, well below the Department's Antidegradation policy threshold of 20% as being significant. See section 7 of this Fact Sheet for the discussion on Antidegradation.

Given the historic, episodic macroalgal blooms, this permit is establishing a seasonal ambient water quality monitoring program to track ambient water quality above and below the proposed discharge from the Whole Oceans facility. Upon issuance of this permit, the permittee will be required to sample a background station (P1), a station in the eastern channel (P4), a station at the southern tip of Verona Island (P6), a station in the western channel (P7), and a station at the confluence of eastern channel and the Orland River (O3) during ebb tides. The permittee will be required to monitor the water column for at least temperature, salinity, pH, dissolved oxygen, chlorophyll *a* and turbidity, and surface concentrations of total kjeldahl nitrogen, nitrate + nitrite nitrogen and total phosphorus.

This permit is not establishing total nitrogen limitations for Phase II and Phase III upon issuance. The Department has made the determination it needs the additional information collected from the dye study and the ambient water quality monitoring required by Special Conditions F and G respectively, before establishing said nitrogen limitations, if appropriate. Special Condition A, *Effluent Limitations and Monitoring Requirements*, of this permit only authorizes the permittee to discharge under Phase II and Phase III conditions only after receiving a formal modification of the permit to do so. The Department will establish limitations for total nitrogen for Phase II and Phase III at that time.

- e. Total Phosphorus – Given that nutrients are the primary pollutant of concern, this permit is establishing a monitoring requirement for total phosphorus to determine the loading to the Penobscot River for each phase of production. For a more in-depth discussion on total phosphorus, see Response to Comments #7b on pages 24 and 25 of this Fact Sheet.
- f. Fish on Hand: This permitting action is establishing a reporting requirement for monthly average and daily maximum mass of fish on hand. This parameter is intended to enable both the Department and the permittee to evaluate management practices at the facility and trends in effluent quality and receiving water impacts as it relates to fish being held on site at any given time. A minimum monitoring frequency of once per month is based on the Department's BPJ of the monitoring frequency necessary to accurately characterize facility effluent conditions.

6. EFFLUENT LIMITATIONS & MONITORING REQUIREMENTS (cont'd)

g. Toxics - Department rule *Surface Water Toxics Control Program*, 06-096 CMR 530 requires the regulation of toxic substances not to exceed levels set forth in *Surface Water Quality Criteria for Toxic Pollutants*, 06-096 CMR 584. Chapter 530 §(2)(D)(5) states "*The Department may waive or reduce testing or replace testing with requirements adequate to characterize the toxicity of identified pollutants when a discharger provides information adequate to:*

- a. *Identify all toxic pollutants present or demonstrate that no toxic pollutants are used in its processes in toxic amounts;*
- b. *Demonstrate that chemicals used in or formed by the discharger's industrial processes are not known or suspected to result in the formation of toxic pollutants in toxic amounts; and*
- c. *Demonstrate the discharger does not process or treat waters known or suspected to contain toxic pollutants."*

The permittee's application for this permit has provided the information cited above and the only pollutant of concern that approaches the threshold by which it has a reasonable potential to cause or contribute to a violation of the acute ambient water quality criteria is ammonia. As a result, the Department is making a best professional judgment to require the permittee to seasonally (May-October) monitor the treated effluent from the facility for total ammonia.

h. pH - This permitting action is establishing a pH range limit of 6.0 - 9.0 standard units (su), considered by the Department as a best practicable treatment standard for fish hatcheries and rearing facilities and consistent with the pH limit established in discharge permits for these facilities.

7. ANTI-DEGRADATION - IMPACT ON RECEIVING WATER QUALITY

Maine's anti-degradation policy is included in 38 M.R.S., Section 464(4)(F) and addressed in the *Conclusions* section of this permit. Pursuant to the policy, where a new or increased discharge is proposed, the Department shall determine whether the discharge will result in a lowering of existing water quality.

In making a determination as to whether a new or increased discharge will result in a lowering of existing water quality, the DEP shall consider the following:

- a. The predicted change in ambient water quality, concentrations of chemical pollutants, or mass loading of pollutants under critical water quality conditions.

7. ANTI-DEGREDDATION - IMPACT ON RECEIVING WATER QUALITY

- b. The predicted consumption of the remaining assimilative capacity of the receiving water. The remaining assimilative capacity is the increment of existing water quality above the minimum standards of the assigned classification under critical water quality conditions.
- c. The predicted change in the ability of the receiving water to support aquatic life and to meet applicable aquatic life and habitat criteria.
- d. The possible additive or synergistic effects of the discharge in combination with other existing discharges.
- e. The cumulative lowering over time of water quality resulting from the proposed discharge in combination with previously approved discharges.

Based on the above considerations, the DEP makes case-by-case determinations as to whether a new or increased discharge will result in a significant lowering of existing water quality. However, in any case where the new or increased discharge will consume 20% or more of the remaining assimilative capacity for dissolved oxygen or other water quality parameter, the resulting lowering of water quality will be determined to be significant.

Based on ambient water quality monitoring of dissolved oxygen conducted in 2018, the Department has made the determination the receiving water is attaining the standards of its assigned classification of >70% saturation. In addition, ambient chlorophyll *a* levels of 5 ug/L measured in 2018 are at approximately half of ambient levels which the Department considers to be indicative of algal bloom levels. The Department has also assessed the impact of the discharge of BOD, TSS and total and nitrogen from the Whole Ocean's facility and determined the impact to ambient dissolved oxygen levels is ten (10) times lower than the accuracy (± 0.2 mg/L) for instruments used in ambient water quality monitoring of dissolved oxygen and the impact to nitrogen levels at Phase I is ten (10) times lower than the certified laboratory minimum level of detection of 0.1 mg/L. Both are well below the threshold of 20% of the assimilative capacity cited in the Department's Anti-Degradation guidance.

Based on the information provided in this Fact Sheet, the Department has made the determination that the discharge approved by this permit will not result in a significant lowering of water quality. As permitted, the Department has determined the existing and designated water uses will be maintained and protected and the discharge will not cause or contribute to the failure of the Penobscot River estuary to meet standards for Class SC classification.

8. PUBLIC COMMENTS

Public notice of this application was made in the *Ellsworth American* newspaper on or about March 8, 2018. The Department receives public comments on an application until the date a final agency action is taken on the application. Those persons receiving copies of draft permits must have at least 30 days in which to submit comments on the draft or to request a public hearing, pursuant to *Application Processing Procedures for Waste Discharge Licenses*, 06-096 CMR 522 (effective January 12, 2001).

9. DEPARTMENT CONTACTS

Additional information concerning this permitting action may be obtained from, and written comments sent to:

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Division of Water Quality Management
Bureau of Water Quality
Department of Environmental Protection
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10. RESPONSE TO COMMENTS

During the period of September 28, 2018, through the issuance date of the permit/license, the Department solicited comments on the proposed draft permit/license to be issued for the discharge(s) from the Whole Oceans LLC facility. The Department received written comments from the following entities:

Maine Department of Marine Resources (DMR)
National Oceanic & Atmospheric Administration (NOAA)
National Resources Council of Maine (NRCM)
Friends of Penobscot Bay (FOPB)
Penobscot Indian Nation (PIN)
Gulf of Maine Institute (GMI)
Atlantic Salmon Federation (ASF)
Kennebec River Biosciences (KRB)
Whole Oceans LLC

Town of Bucksport
Des FitzGerald
Andrew Stevenson
James Merkel
Lew McGregor
Holly Faubel
Deborah Capwell
Karin Spitfire
Eileen Wolper

Therefore, the Department has prepared a Response to Comments as follows.

Water Quality Monitoring/Dye Study

Comment #1a (DMR) – DMR requests the opportunity to review and provide comments on any dye study plan and be provided any subsequent results of the dye study conducted with consideration to low and high flow periods. The DMR requests a thorough hydrographic review and/or model near the discharge location to determine the discharge dilution plume relative to the movement of the salt water wedge and associated turbidity maximum.

Response #1a: The DMR request is acceptable to the Department. Special Condition F, *Dye Study*, requires the dye study plan to be submitted to the Department for review and approval six months following the effective date of the permit. The Department will forward a copy of the plan to DMR once it is received by the Department.

Comment #1b (NRCM): NRCM states DEP should require at least one ambient water quality monitoring site very close to the WO outfall. The site should be as close to the WO facility as MP3 in Attachment D is to the Bucksport waste water treatment facility. The commenter requests monitoring near the outfall should include searching for *beggiatoa* mats. Significant growth has occurred under salmon pens when they are poorly run.

Response #1b: - The Department Division of Environmental Assessment responsible for ambient water quality monitoring to date does not agree a monitoring site closer to the outfall than monitoring station P2 is appropriate. A monitoring site closer will likely be within the zone of initial dilution for the discharge and will not capture the impact to ambient conditions but capture the characteristics of effluent as it mixes with the receiving water. Such a monitoring station will not be helpful in the overall assessment of the impact of the discharge on ambient conditions.

As for monitoring for *beggiatoa* mats, the Department does not believe this is necessary. *Beggiatoa* mats under the net pen sites were observed at sites where excessive quantities of uneaten food were collecting directly under the pen sites. The mats were generally associated with food depths of 6 to 24 inches deep. The WO facility is anticipating a 91% removal of fish feces and uneaten food as the waste stream passes through the waste water treatment facility. However, if the treatment facility fails to perform as expected and higher than expected solids loss results, the Department would be willing to revisit searching for *beggiatoa* mats.

Comment #1c (NRCM): NRCM states DEP should require WO to monitor all parameters it can with sondes rather than just turbidity. Parameters would include at least temperature, pH and dissolved oxygen.

Response #1c: - The Department agrees. Special Condition G, *Ambient Water Quality Monitoring*, has been rewritten to make clear which parameters are to be collected via a sonde and which parameters are to be monitored via grab sampling.

Water Quality Monitoring/Dye Study

Comment#1d (Holly Faubel) – The commenter states that WO should provide either peer reviewable modeling or a security bond to address algal blooms taking into account historic and predictive modeling of river and bay temperatures.

Response #1d: Special Condition F, *Dye Study*, Special Condition G, *Ambient Water Quality Monitoring*, and effluent monitoring required by Special Condition A, *Effluent Limitations and Monitoring Requirements*, will provide the necessary information the Department needs to determine whether the discharge from the WO is causing or contributing algal blooms.

Comment #1e (Karin Spitfire, FOPB): The commenter believes the impact from the dischargers (WO & Nordic Aquafarms) should be considered together rather than separately or sequentially. Unless this is done, it is not clear that the standards of Maine's anti-degradation policy will be met.

Response 1e: The Department will be evaluating both facilities separately as well as collectively. For WO, an independent evaluation of the discharge indicates the impact to ambient water quality is not measurable at the southern tip of Verona Island. As a result, the discharge from the WO facility will have no impact on the ambient water quality at the Nordic Aquafarms site. Therefore, the state's antidegradation policy has been met in that the discharge will not cause or contribute to failure of the receiving water to meet the standards of its assigned classification, and all designated use will be maintained and protected.

Antibiotics

Comment #2a (DMR)- DMR states the quantity of antibiotics in the draft permit application appears to be greater than necessary, as the annual level is based on maximum dosage, when the proposed use is limited to emergencies. DMR requests monthly reporting of antibiotic usage and the pathogen being treated as well as monitoring of residual antibiotics in the near-field sediments be conducted. DMR also requests development of a monitoring program to evaluate discharge effects of antibiotics at 18.6 MGD to the near field and far field marine environment and impacts to marine organisms.

Response #2a: DMR is correct in that the quantities in the application are too high as the mass calculation for Aquaflo® (florfenicol) was miscalculated and should be 750 kg/yr not 7,500 kg/yr. In addition, the annual quantities appear high because they were calculated based on maximum dosages not limited emergencies which inflates the mass values.

The Department has revised the permit to require the permittee to include monthly reporting of antibiotic usage and the pathogen being treated as well as monitoring of residual antibiotics in the effluent, but not the near-field sediments. If the effluent values are not detected at any flow regime there is no reason to conduct near field or far field sediment sampling or assess impacts to marine environments. However, if antibiotics are detected in the effluent that are at levels that have a

Antibiotics(cont'd)

reasonable potential to exceed thresholds that may impact marine organisms, the Department may re-open the permit pursuant to Special Condition O, *Reopening of Permit For Modifications*, to establish sediment sampling or require an assessment to the marine environment and or impacts to marine organisms.

Comment 2b (Andrew Stevenson) – The commenter thinks it is important for the DEP, DACF, DMR and the public to know how the fungicides, bactericides, parasiticides, antibiotics and therapeutants will be controlled, tracked, destroyed or neutralized. The commenter requests the applicant provide the DEP with credible information about how these substances bio-accumulate in the salmon (if they do) or how they persist in the effluent and the solids waste flows (if they do not).

Response #2b: The use of antibiotics in the salmon farming industry is becoming increasingly rare and in the case of Land Based/ RAS salmon industry extremely rare. If antibiotics are used, they are usually for a very short duration (e.g., 10 days) and they are never used prophylactically (on an ongoing basis) as they are commonly used in poultry or hog production. Atlantic salmon experts such as the Freshwater Institute, who have been growing fish for over 30 years, note that they have never used antibiotics. They typically are successful using mild treatments with salt or hydrogen peroxide to keep fish healthy. Whole Oceans will adopt these same practices.

Comment #2c (PIN, Holly Faubel): The commenters recommends that when drugs are used for disease control, the permittee should be required to monitoring the effluent for fungicides, bactericides, parasiticides, antibiotics and therapeutants to determine if the waste water treatment facility is capable of removing them before discharge to the river. The PIN also questions why environmental monitoring and evaluation is required for Investigational New Animal Drugs (INADs) but not other compounds used?

Response #2c : The Department has revised the permit to require the permittee to include monthly reporting of antibiotic usage and the pathogen being treated as well as monitoring of residual antibiotics in the effluent. INADs are investigational drugs and have not been completely vetted like the other compounds approved by the FDA. The environmental monitoring and evaluation is designed to gather additional data on the efficacy of the drug(s) as well as their fate and transport.

Comment #2d (Holly Faubel): The commenter requests WO documents its containment strategy for participation in the INAD program.

Response #2d: Special Condition I, *Disease Control*, §4(b)(3) contains the requirements of the environmental monitoring and evaluation program associated with the use INADs. The Department considers this sufficient for what the commenter terms as the containment strategy.

Antibiotics(cont'd)

Comment #2e (NOAA) – The commenter requested the Department incorporate a requirement for a biosecurity plan for the facility to eliminate introducing or spreading any pathogens (bacterial or viral) into the environment. This should be included in Special Condition I, *Use of Drugs for Disease Control*, of the permit.

Response# 2e: The permittee is actively preparing a biosecurity plan for the facility and will be prepared to submit the plan to the Department at the same time as the CMS plan. Both will be due on or before 6 months after the effective date of the permit.

Comment #2f (Karin Spitfire): The commenter requests standards be set for pesticides, germicides etc. that may be given to the fish and have those standards be evaluated by scientists who have nothing to gain from the aquaculture industry.

Response #2f: The fungicides, bactericides, parasiticides, antibiotics and therapeutants identified in the WOs application have been reviewed by IFWs fish pathologist, the State of Maine veterinarian and DMR staff familiar with aquaculture. The only compound identified as being of concern is Praziquantel (trematodes) which is not FDA approved and is therefore being removed from the final permit.

Containment and Escapement

Comment #3a (DMR) – DMR requests to be notified immediately of any tank or system failures where fish containment is compromised regardless of whether escaped quantities are known.

Response #3a: Special Condition K, *Protection of Atlantic Salmon*, has been modified accordingly in the final permit.

Comment #3b (NRCM,NOAA): The commenters stated DEP should require WO to prevent the escape of any fish and report the escape of even one fish.

Response 3b:: Special Condition K, *Protection of Atlantic Salmon*, has been modified accordingly in the final permit.

Comment #3c (NOAA) – The commenter requests Special Condition K, *Protection of Atlantic Salmon*, include a requirement for the Containment Management System (CMS) plan to be submitted to NOAA and the UFWS for review and approval prior to issuing a discharge permit for the facility. In addition, NOAA states that in the event anticipated risks to the ESA listed Atlantic salmon GOM DPS population from the facility increases as a result of improperly designed, operated on inadequate protective measures in place, the Services (NOAA and USFWS) reserve the right to require additional conditions such as marking of fish to identify the facility, and/or require rearing only North American origin populations to reduce the impacts from escapes.

Containment and Escapement

Response #3c: Special Condition K, *Protection of Atlantic Salmon*, of the draft permit requires the permittee to submit the CMS to the Department six months after the effective date of the permit for review and approval. The permittee is actively preparing a CMS plan for the facility and will be submitting it to the Department in a timely fashion, well in advance of the commencement of operations. Therefore, Special Condition K of the final permit has been revised to require the permittee to submit the CMS plan to the NOAA, USFWS and DMR for review at the same time as the submission to the Department. The Department will remain the agency responsible for final approval. In addition, Special Condition K has been modified to bar any eggs or fish of any age to be stocked at the site without final approval of the CMS.

Solids & Sludge Disposal

Comment #4a (Andrew Stevenson) – The commenter states there is not enough information in the application to tell how long sludge solids can be held at the facility before they must be trucked away and no description of the holding facilities that might be constructed. The commenter requests that the beneficial use be identified before DEP makes a permitting decision. The commenter also requests the applicant identify landfills capable of receiving and safely burying sterilized solids slurry generated in the quarantine area of the facility.

Response #4a : The sludge will be dealt with in two forms, solid and liquid, as each is used in different composting features. The solid form will be kept in a concrete bunker, which provides secondary containment, and when filled will be emptied to a sludge (slurry) tanker for removal on a regular basis to a Maine composting facility. WO is currently in negotiations with Maine composting facilities. WO is also examining the potential of using liquid waste and drying it out, through a drying process on site, down to a 15-20% solid, which will be stored in a similar concrete tank, and removed on a regular basis to an anaerobic digestion facility in Maine for use. There are a number of landfill facilities WO is currently in negotiations with to manage the facility's sludge, as they are currently licensed for other terrestrial animal disposal containment. The solids and sludge will pass through an in-house sterilization unit prior to tanker removal.

Comment #4b (Andrew Stevenson) – The commenter requests the applicant provide more details of incinerating or ensiling of mortalities and screenings from fish exclusion barriers. If either of the operations is part of the overall facility design, the commenter requests the applicant provide more information. If either operation is performed offsite by a third-party then the applicants need to identify the companies or services that can provide safe handling and disposal of the mortalities.

Response #4b: Ensilation will be carried out on site utilizing standard proven ensilation equipment, which will be installed and operated by WO staff. The ensilation activities will take place in an enclosed building, and once the process of ensilation has taken place, the sludge will be stored in a cement bunker with secondary containment, and removed on a regular basis to appropriate composting facilities.

Solids & Sludge Disposal

Comment #4c: (Andrew Stevenson) – The commenter states the waste stream flows diagrams indicate fish processing waste water is collected in sealed tanks and is then pumped to the municipal sewer but on other flow schematics indicates all waste water is being treated on-site and discharged to the Penobscot River. The commenter requests the applicant revise the application documents to clearly state that the only waste water to be discharged to the Bucksport municipal waste water treatment facility will be sanitary waste flows only from normal activities such as bathrooms and cafeterias if this is the case.

Response #4c: The permittee has not finalized its decision on whether to treat fish processing waste water on-site or convey it to the municipal waste water treatment facility. Once that decision is finalized the Department will require the permittee to submit revised schematics. This permitting actions does not take into consideration the waste stream from a fish processing facility. Inclusion of said waste stream will require a separate approval process and formal modification of this permit.

Fish Feed

Comment #5a (Andrew Stevenson): The commenter requests the applicant provide additional information on the composition of the feedstocks that WO will feed its fish at all stages of their life cycle. Without clear a clear statement of feedstock constituents, DEP cannot determine the complete nature of the plant effluent or the solid waste streams.

Response #5a: The permittee has not made a final decision on the formulation of their fish feed yet as this sector of the aquaculture industry is growing rapidly and new formulations are being created every month. To address the commenters concern, a new Special Condition L, *Fish Feed*, has been added to the final permit requiring the permittee to submit a list of all the ingredients in the feed prior to stocking it on site. Should the Department find compounds of concern which the Department believes need to be monitored in the final effluent, the permit may be reopened pursuant to Special Condition O, *Reopening Permit For Modification*, to require additional monitoring or impose limitations on pollutants of concern.

Comment #5b (PIN): The commenter questions why the facility is not subject to toxicity testing requirements of the DEP's Surface Water Toxics Control Program given potential toxicity from the fish food and drugs used at the facility.

Response #5b: 06-096 CMR Chapter 530, *Surface Water Toxics Control Program*, §2(D)(5) authorizes the Department to waive or reduce testing or replace testing with requirements adequate to characterize the toxicity of the identified pollutants when the discharger provides information as to the pollutants used at a facility. In the absence of the use of chemicals in Attachment C of the permit, the pollutants of concern are not toxic pollutants and routine whole effluent toxicity (WET (testing), analytical chemistry and priority pollutant testing are not necessary.

Fish Feed

However, the Department has revised the final permit to require the permittee to include monthly reporting of antibiotic usage and the pathogen being treated as well as monitoring of residual antibiotics in the effluent if used. If the effluent values are not detected at any flow regime there is no reason to conduct Chapter 530 toxicity testing requirements. However, if antibiotics are detected in the effluent that are at levels that have a reasonable potential to exceed thresholds that may impact marine organisms, the Department may re-open the permit to establish Chapter 530 testing requirements, sediment sampling or require an assessment to the marine environment and or impacts to marine organisms.

As for fish feed, a new Special Condition L, *Fish Feed*, has been added to the final permit requiring the permittee to submit a list of all the ingredients in the feed prior to stocking it on site. Should the Department find compounds of concern which the Department believes need to be monitored in the final effluent, the permit may be reopened pursuant to Special Condition O, *Reopening Permit For Modification*, to require additional monitoring or impose limitations on pollutants of concern.

Pursuant to Chapter 530, 2(D)(4) requires all dischargers waived or reduced testing must file an annual certification statement that describes:

- (a) Changes in the number or types of non-domestic wastes contributed directly or indirectly to the wastewater treatment works that may increase the toxicity of the discharge;
- (b) Changes in the operation of the treatment works that may increase the toxicity of the discharge; and
- (c) Changes in industrial manufacturing processes contributing wastewater to the treatment works that may increase the toxicity of the discharge.

Therefore, a new Special Condition M, *06-096 CMR 530(2)(D)(4) Statement For Reduced/Waived Toxics Testing*, has been added to the final permit requiring the permittee to file the annual Chapter 530.

Comment #5c (Deborah Capwell): The commenter states WO's hasn't said what they are planning to feed the fish. If we don't know that, how can we know what kind of impact the fish feces and uneaten food will have on the whole operation?

Response #5c : The permittee has not made a final decision on the formulation of their fish feed yet as this sector of the aquaculture industry is growing rapidly and new formulations are being created every month. To address the commenters concern, a new Special Condition L, *Fish Feed*, has been added to the final permit requiring the permittee to submit a list of all the ingredients in the feed prior to stocking it on site. Should the Department find compounds of concern which the Department believes need to be monitored in the final effluent, the permit may be reopened pursuant to Special Condition O, *Reopening Permit For Modification*, to require additional monitoring or impose limitations on pollutants of concern.

BOD & TSS

Comment #6a (NRCM): NRCM states the proposed levels of BOD, TSS and nutrient discharges are too high given another RAS facility proposed by Nordic AquaFarms Inc in Belfast proposes significantly lower treatment levels than WO. If the DEP accepts Nordic Aquafarms numbers as true, it should not approve the WO permit as written and at least require WO meet comparable limits as proposed by Nordic Aquafarms.

Response #6a: The Department acknowledges the contrast in the proposed effluent values for the two facilities. Until the facilities are constructed and running at steady state conditions and gathering effluent data via monitoring, it is impossible to determine what level of treatment these facilities will be able to actually achieve. As result, the Department is not in a position to accept either facilities proposal to be the standard for this new industry.

There are no promulgated numeric effluent guidelines/standards for discharges from RAS facilities, net pen facilities or flow through fish rearing facilities which the Department could utilize to establish best practicable treatment (BPT) standards. Therefore, limitations for BOD, TSS and nitrogen in this permit are based on a Department best professional judgment (BPJ) of effluent values expected from the waste water treatment proposed by the applicant. The treatment train of a drum filter followed by biofiltration followed by ultraviolet disinfection appears to be the standard treatment train for this industry. According to the permittee's application, it expects percent removal rates of 79% for BOD, 91% reduction for TSS, 89% for total phosphorus and 19% for nitrogen.

To address the commenters concern, the Department is footnoting the three parameters indicating that the next permit renewal, the Department will conduct a statistical evaluation of the data for the three parameters. Assuming the Nordic Aquafarm permit is approved, the Department will perform the same statistical evaluation for the Nordic facility and evaluate the results of the two facilities and make another BPJ of BPT for the industry (applicable to both facilities) based on actual performance data.

Nutrients

Comment #7a (NRCM): The commenter states DEP should require year-round monitoring and limitations for nutrients as nutrients may accumulate in sediments in winter months, and this accumulation may affect water quality in warmer months,

Response #7a ; The Department's Division of Environmental Assessment that has been conducting ambient water quality monitoring on the Penobscot River in the vicinity of the discharge and around Verona Island does not think it is necessary to establish limitations or monitoring requirements for nutrients on a year-round basis. Any potential changes to ambient water quality due to nutrients will be limited to discharges during the summer months. The Department believes the required seasonal nutrient monitoring requirement is appropriate and therefore the permit remains unchanged.

Nutrients (cont'd)

Comment #7b (PIN) – The commenter requests that total phosphorus limitations be established for the facility similar to the approach used in the proposed draft permit for total nitrogen. Phosphorus limits are necessary to ensure adequate water quality protections

Response #7b: Waste Discharge License Conditions, 06-096 CMR 523 specifies that water quality based limits are necessary when it has been determined that a discharge has a reasonable potential to cause or contribute to an excursion above any State water quality standard including State narrative criteria. In addition, 06-096 CMR 523 specifies that water quality based limits may be based upon criterion derived from a proposed State criterion, or an explicit State policy or regulation interpreting its narrative water quality criterion, supplemented with other relevant information which may include: EPA's Water Quality Standards Handbook, October 1983, risk assessment data, exposure data, information about the pollutant from the Food and Drug Administration, and current EPA criteria documents.

USEPA's Quality Criteria for Water 1986 (Gold Book) puts forth an in-stream phosphorus concentration goal of less than 0.100 mg/L in streams or other flowing waters not discharging directly to lakes or impoundments, to prevent nuisance algal growth. The use of the 0.100 mg/L Gold Book goal is consistent with the requirements of 06-096 CMR 523 noted above for use in a reasonable potential (RP) calculation.

Based on the above rationale, the Department has chosen to utilize the Gold Book goal of 0.100 mg/L. It is the Department's intent to continue to make determinations of actual attainment or impairment based upon environmental response indicators from specific water bodies. The use of the Gold Book goal of 0.100 mg/L for use in the RP calculation will enable the Department to establish water quality based limits in a manner that is reasonable and that appropriately establishes the potential for impairment, while providing an opportunity to acquire environmental response indicator data, numeric nutrient indicator data, and facility data as needed to refine the establishment of site-specific water quality-based limits for phosphorus. Therefore, this permit may be reopened during the term of the permit to modify any reasonable potential calculation, phosphorus limits, or monitoring requirements based on site-specific data.

For the background concentration in the Penobscot River just upstream of the permittee's discharge, the Department utilized a background concentration of 0.017 mg/L. This value was determined to be representative of background conditions in ambient water quality sampling in the summer of 2014. For effluent concentration, the Department utilized a value of 0.9 mg/L based on information from the permittee's application.

Nutrients (cont'd)

Using the following calculation, the permittee's facility does not exceed or have a reasonable potential to exceed the EPA's Gold Book value of 0.100 mg/L and the Department's 06-096 CMR Chapter 583 draft criteria of 0.030 mg/L for Class B waters (classification before transition to Class SC). The calculations are as follows:

$$Cr = \frac{Q_e C_e + Q_s C_s}{Q_r}$$

Q _e = effluent flow i.e. facility design flow	=	18.6 MGD
C _e = effluent pollutant concentration	=	0.9 mg/L
Q _s = 7Q10 flow of receiving water (Brewer)	=	2,096 MGD (3,243 cfs)
C _s = upstream concentration	=	0.017 mg/L
Q _r = receiving water flow	=	2,115 MGD
Cr = receiving water concentration	=	?

$$Cr = \frac{(18.6 \text{ MGD} \times 0.9 \text{ mg/L}) + (2,098 \text{ MGD} \times 0.017 \text{ mg/L})}{2,115 \text{ MGD}} = 0.025 \text{ mg/L}$$

Cr = 0.025 mg/L < 0.100 mg/L ⇒ **No reasonable potential**

Cr = 0.025 mg/L < 0.030 mg/L ⇒ **No reasonable potential**

Given the facility does not exhibit a reasonable potential to exceed the Department's draft criteria, the Department does not believe a limitation is appropriate. However, the permit does contain a seasonal monitoring requirement for total phosphorus. If discharge levels are considerably higher than the value the permittee has presented in its application and the calculation indicates the discharge does exceed or have a reasonable to exceed the draft criteria, the Department may reopen the permit pursuant to Special Condition O, *Reopening of Permit For Modifications*, to establish appropriate limitations and or monitoring requirements.

Miscellaneous

Comment #8a (Andrew Stevenson): The commenter states the topographic map in the application depicts the saltwater intake point as being downstream of discharge point Outfall #003. Is this accurate? If not the applicant needs to provide a revised map.

Response #8a : The topographic map is incorrect. The intake structure for the facility is located along the banks of the Penobscot River in between discharge Outfalls #001B and Outfall #003. The facility has the option to discharge from Outfall #001B or Outfall #003. Outfall #003 will be the primary discharge outfall which is located downstream of the intake structure. The Fact Sheet of the draft states the following:

Miscellaneous (cont'd)

The treated wastewater is discharged to the Penobscot River via one of two outfalls that are designated as Outfall #001B and Outfall #003. Outfall #001A is located at the intake screen to the pump house providing cooling water to the turbine generator for Bucksport Generation LLC and sea water to the RAS facility. This outfall will be used to discharge backwash waters to clean the facility's intake screens. The discharge configuration consists of a 24" diameter discharge pipe that runs below the intake screens to the non-contact cooling water structure. The discharge pipe has twelve 6" diameter diffuser pipes located 4 feet on centers. This outfall configuration is beneficial to the facility as it provides for continuous cleaning of the screens.

Outfall #001B is located just upstream of Outfall #001A and consists of a 48" diameter steel pipe that extends out into the river approximately 230 feet and necks down to two 24" diameter steel pipes that make up the wye-shaped diffuser. The end of the pipe is covered by approximately 16 feet of water at mean low tide and 27 feet of water at mean high tide.

Outfall #003 (downstream of Outfall #001A) is currently being utilized as a cooling water discharge for the No. 3 Turbine for the power plant owned and operated by Bucksport Generation LLC. The cooling water itself is limited and monitored in accordance with MEPDES permit ME0002160 last issued by the Department on October 15, 2015. Cooling waters from the power plant and process waste water from the Whole Oceans facility can be co-mingled to be discharged through a sloping 36" steel pipe with a diffuser. The diffuser has 10, 12" diameter vertical ports spaced 10 feet on center to enhance mixing with the receiving waters. The diffuser ports are covered by between 27 feet and 43 feet of water at mean low tide and 38 feet and 54 feet of water at mean high tide.

Comment #8b (NOAA): The commenter suggests the facility should have requirements to eliminate impingement and entrainment of juvenile fish on the facility's intake screens and that said measures are properly maintained and monitored regularly.

Response #8b: The Fact Sheet for the NPDES permit for the former mill contained an analysis by the USEPA concluded the intake structure for the mill utilizes best available technology (BAT) thereby satisfying the requirement of Section 316(b) of the Clean Water Act to minimize adverse environmental impact on the waterway. Section 316(b) of the Clean Water Act regulates cooling water intake structures that can be responsible for killing fish and other organisms either from being trapped against the structures (impingement) or drawn into the systems' and then exposed to extreme heat, chemicals or physical stress (entrainment). Though the intake structure will be utilized for something other than cooling water and is not subject to Section 316(b) requirements, BAT is still being applied.

Miscellaneous (cont'd)

Comment #8c (Holly Faubel) – The commenter states that testing for BOD, TSS and ammonia testing will only be done for May-Oct while the facility is discharging 12 months out of the year and that scientific reports show that ammonia is more hazardous to fish at colder temperatures. The commenter requests WO be required to conduct testing year-round.

Response #8c: The draft permit contains year-round monitoring for BOD and TSS at a frequency of 3/Week. Ammonia is seasonal, May 1 – October 31. The Department has adopted ambient water quality criteria (AWQC) for ammonia. The toxicity associated with ammonia is pH and temperature dependent. The higher the temperature the lower the AWQC meaning it is more toxic at higher temperatures not lower temperatures. Therefore, monitoring for total ammonia in the warmer months is appropriate but not necessary in the colder months.

Comment #8d: (Deborah Capwell) – The commenter states that the permit application she accessed is for a little over 5,000 tons. Will WO have to reapply when they are at full build out of 20,000 tons?

Response #8d: The permit authorizes the facility to discharge under full production capacity of 20,000 metric tons. See pages 6 and 7 of 21 of the permit. However, total nitrogen limits for Phases II & III will be established at a later date after a statistical evaluation is conducted on the nutrient data that is collected for Phase I. The permittee will be required to submit a permit modification application to incorporate these limitations.

Comment #8e (Holly Faubel) – The commenter requests WO be required to provide a plan for handling complete die-off of their total tonnage if fish.

Response #8e : If in the event of a total, or significant mortality event, WO has stated it will activate the Catastrophic Mortality Composting Plan, whereby all fish will be quickly and efficiently removed from the tanks, via pumps, to slurry (bulk) tankers for immediate transport to either pre-agreed rendering facilities or landfill sites for composting.

Comment #8f (FOPB): The commenter states it is not clear how WO's slaughterhouse effluent will be managed. Will it be sent to Bucksport's POTW or get discharged as part of WO's waste water effluent?

Response #8f: The permittee has not made a final decision on whether to construct a fish processing facility on-site and therefore, this draft permit does not take that process into consideration. If a processing facility is constructed, the permittee has indicated it will explore both the treatment and disposal of the waste water on-site or by way of the municipal waste water treatment facility. A separate review and approval process would be required for these options.

Miscellaneous (cont'd)

Comment #8g (Deborah Capwell): Can the Bucksport's municipal system handle such a significant increase in the sanitary waste water (around 10,000 gallons/day)? If not, what is the back-up plan?

Response #8g: The WO facility is not likely to generate around 10,000 gallons per day of sanitary waste water. The facility will employ somewhere around 100 people. The Maine State Plumbing Code allocates 30 gallons/day/employee which would total 3,000 gpd. The permittee has indicated it has spoken to the Town of Bucksport about the ability to serve and been told there is sufficient capacity to receive the sanitary waste water from WO. It is noted the treatment facility completed an upgrade to a secondary level of treatment in calendar year 2017.

Comment #8h (Eileen Wolper): If the Bucksport Sanitary Water Treatment Facility cannot handle the amount of fish oil and nutrient load of fish processing, will that effluent end up being dumped into the Penobscot River? Will there be a way to monitor this? Is the Water Treatment Plant of Bucksport aware of this potential compromise in their sewage treatment from fish oil? Who pays for any necessary upgrades to the city facility? Will oil content of effluent be monitored and reported?

Response #8h: The permittee has not made a final decision on whether to construct a fish processing facility on-site and therefore, this draft permit does not take that process into consideration. If a processing facility is constructed, the permittee has indicated it will explore the option of treating the waste water onsite or convey it to the municipal waste water treatment facility. A separate review and approval process would be required for these options. Conveyance to the municipal waste water treatment will likely result in WO providing some level of pretreatment before the waste water is conveyed to the municipal treatment facility.

Comment #8i (FOPB, Jim Merkel) – The Department should be evaluating kairomones in the discharge.

Response #8i: A fish pathologist at the MIFW researched the kairomone issue and found literature that suggests that kairomones have very short half lives in aquatic environments (minutes to hours to days, all depending on the study and design). A quick search also found experimental evidence to support that exposure to UV light from the sun is a major factor in the rate of degradation. As UV light is known to degrade a number of chemicals and organic compounds, such is not surprising. Noteworthy in these studies is the effect that UV light exposure had at natural environmental levels, a dose that is less than 1/1000th of the dose that WO will use for effluent UV treatment. Based on the limited available information, it is likely that the UV effluent treatment, which is included in the WO operational plan, will neutralize kairomone content to that of being ecologically insignificant. When combined with information that kairomone discharge from land-based salmon farms is unlikely to result in the attraction and accumulation of sea lice in Penobscot Bay, the concern over kairomones in the discharge seems to be unwarranted.