

**Report to the Joint Standing Committee
on the Environment and Natural Resources**

Review of Regulation of Waste Discharge from Finfish Aquaculture Facilities

Pursuant to Resolve 2023, ch. 59.

January 2024

Contact:
Brian Kavanah
Director, Bureau of Water Quality
Phone: (207) 530-0293
brian.w.kavanah@maine.gov



MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 State House Station | Augusta, Maine 04333-0017
www.maine.gov/dep

I. Executive Summary

This report is submitted to the Joint Standing Committee on Environment and Natural Resources pursuant to Resolve 2023, ch. 59, *Resolve, Directing the Department of Environmental Protection to Review Regulation of Waste Discharge from Finfish Aquaculture Facilities* (Resolve) (See Appendix D). The Resolve requires that the Department of Environmental Protection shall:

1. Conduct a review of applicable state laws and rules regulating the licensing of waste discharge from proposed finfish aquaculture facilities including any waste discharge modeling requirements or standards, and of prior and current waste discharge monitoring requirements imposed on licensed finfish aquaculture facilities in the State since 2004, including identification of any monitoring requirements imposed on those facilities that were subsequently removed and the basis for the removal.
2. Develop recommendations for the establishment of minimum criteria or standards for waste discharge modeling required as part of a license application for a finfish aquaculture facility, which must be based on the department's knowledge of current best management practices for those facilities.
3. Submit the report summarizing its review and any recommendations, including any proposed legislation, to the Joint Standing Committee on Environment and Natural Resources on or before January 15, 2024. The Committee may report out legislation relating to the report.

In this report the Department provides a summary of the types of finfish aquaculture facilities licensed by the Department (Section II) and laws and regulations that apply to the licensing of finfish aquaculture facilities (Section III). These laws and regulations are primarily broad-based requirements that are applicable to any discharge to waters of the state.

The report also provides a summary of specific license conditions from finfish aquaculture licenses and how they have evolved over time (Section IV).

Finally, the report provides recommendations regarding the establishment of minimum criteria or standards for waste discharge modeling required as part of a license application for a finfish aquaculture facility. For a variety of reasons, such as the site specific nature of water quality models, existing regulatory authority to require the use of water quality models, and pending rule making with the Board of Environmental

Protection to adopt nitrogen criteria for marine waters, the Department is recommending in this report that modelling requirements not be adopted via legislation (Section V).

II. Types of Finfish Aquaculture Facilities Licensed by the Department

For the purposes of this report, finfish aquaculture facilities are summarized in three categories by type and size.

- Large land-based systems, or large net pen facilities. These are relatively new projects that have garnered significant interest due to their size and/or location. It is noted the large net pen facility included in this section was not licensed, it was only proposed, and the application was returned by the Department as it did not meet the regulatory requirements for submittal. (See Appendix A).
- Net pen facilities licensed under the Department's General Permit - Net Pen Aquaculture. These are primarily salmon net pens, owned by Cooke Aquaculture, located in Downeast ocean waters. (See Appendix B).
- All land-based systems. There are a variety of hatcheries and fish rearing facilities that discharge to fresh water or marine water and are owned by a variety of entities including state, commercial, and educational. (See Appendix C).

III. Review of Applicable State Law and Rules

The Resolve requires the Department to, "conduct a review of applicable state laws and rules regulating the licensing of waste discharge from proposed finfish aquaculture facilities, including any waste discharge modeling requirements or standards....".

Maine waste discharge standards in law and rule are generally broad based and are applicable to many types of discharges such as municipal, industrial, and commercial facilities. Any industry specific standards are generally developed by the Environmental Protection Agency under authority of the Clean Water Act and are implemented by the state via waste discharge licensing actions. The state does not have laws or rules specific to the licensing of waste discharge from finfish aquaculture facilities (with the exception of 38 M.R.S. §413.10, and Rule Chapters 521 and 524 noted below), or for waste discharge modeling requirements or standards. However, as noted, there is a large body of state laws and rules regulating the licensing of any discharge of pollutants to waters of the state from any type of facility, including finfish aquaculture facilities. These laws and rules are as follows:

Classification and Standards

All waters of the state are classified in law at 38 M.R.S., Article 4-A. Water Classification Program (§§ 464-470). Article 4-A specifies the classification for each water body in the state and standards for each type of classification. Fresh waters are classified from highest to lowest as AA, A, B, and C. Marine waters are classified from highest to lowest as SA, SB, and SC.

The classification system is used to direct the state in the management of its surface waters, protect the quality of those waters for their intended management purposes, and where standards are not achieved, direct the state to enhance the quality to achieve those purposes. The classification standards establish designated uses, related characteristics of those uses, and criteria necessary to protect the uses, and establish specific conditions for certain activities such as the discharge of wastewater.

Waste Discharge Requirements

Any discharge of pollutants to waters of the state requires a license from the Department.

38 M.R.S. §413. Waste discharge licenses:

- 1. License required. No person may directly or indirectly discharge or cause to be discharged any pollutant without first obtaining a license therefor from the department.*

The Department is authorized by the federal Environmental Protection Agency (EPA) to implement the Clean Water Act (CWA). Any license that the Department issues under 38 M.R.S. §413 for a discharge to surface waters implements both federal law under the CWA (Maine Pollutant Discharge Elimination System Permit - MEPDES) and state water quality law (Waste Discharge License - WDL). This integrated license is known as a MEPDES/WDL.

A discharge license may be issued in accordance with 38 M.R.S. §414-A.

§414-A. Conditions of licenses

- 1. Generally. The department shall issue a license for the discharge of any pollutants only if it finds that:
 - A. The discharge either by itself or in combination with other discharges will not lower the quality of any classified body of water below such classification;*
 - B. The discharge either by itself or in combination with other discharges will not lower the quality of any unclassified body of water below the**

classification which the board expects to adopt in accordance with this subchapter;

C. The discharge either by itself or in combination with other discharges will not lower the existing quality of any body of water, unless, following opportunity for public participation, the department finds that the discharge is necessary to achieve important economic or social benefits to the State and when the discharge is in conformance with section 464, subsection 4, paragraph F. The finding must be made following procedures established by rule of the board pursuant to section 464, subsection 4, paragraph F;

D. The discharge will be subject to effluent limitations that require application of the best practicable treatment. "Effluent limitations" means any restriction or prohibition including, but not limited to, effluent limitations, standards of performance for new sources, toxic effluent standards and other discharge criteria regulating rates, quantities and concentrations of physical, chemical, biological and other constituents that are discharged directly or indirectly into waters of the State. "Best practicable treatment" means the methods of reduction, treatment, control and handling of pollutants, including process methods, and the application of best conventional pollutant control technology or best available technology economically achievable, for a category or class of discharge sources that the department determines are best calculated to protect and improve the quality of the receiving water and that are consistent with the requirements of the Federal Water Pollution Control Act, as amended, and published in 40 Code of Federal Regulations. If no applicable standards exist for a specific activity or discharge, the department must establish limits on a case-by-case basis using best professional judgment, after consultation with the applicant and other interested parties of record. In determining best practicable treatment for each category or class, the department shall consider the existing state of technology, the effectiveness of the available alternatives for control of the type of discharge and the economic feasibility of such alternatives;

Best practicable treatment (BPT) for a particular category of discharger is developed by the EPA to establish a consistent minimum level of technology-based requirements for all discharges in that category nationwide. For the *Concentrated Aquatic Animal Production Point Source Category*, BPT and General Reporting requirements consistent with National Effluent Guidelines (NEG) are found at 40 Code of Federal Regulations (CFR), Part 451. <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-N/part-451>

This particular BPT standard is based on best practices and includes requirements for solids control, materials storage, structural maintenance, recordkeeping, training, feed management, waste collection and disposal, transport or harvest discharge, and carcass removal.

Coordination with Department of Marine Resources

38 M.R.S., §413.10 establishes requirements to align regulatory actions for the Department and the Department of Marine Resources for marine aquaculture projects.

Marine aquaculture projects. After the State receives authority to grant permits under the Federal Water Pollution Control Act, 33 United States Code, 1982, the department may issue to an owner of a marine aquaculture project a license for the discharge of pollutants to those waters only if the following conditions are satisfied:

- A. An application for a leasehold has been accepted as complete by the Department of Marine Resources and a copy of an approved leasehold is provided to the department prior to any discharge of pollutants;*
- B. The project will not have a significant adverse effect on water quality or violate the standards of the receiving water's classification;*
- C. The project will be managed and monitored in accordance with a program approved by the Department of Marine Resources;*
- D. The project is not located in waters classified as SA under section 465-B, subsection 1; and*
- E. Other applicable requirements of this chapter are met.*

A license issued pursuant to this subsection is void if water quality is significantly affected by the project.

For the purposes of this subsection, an aquaculture project is a defined managed water area that uses discharges of pollutants into that designated area for the maintenance or production of harvestable plants or animals in estuarine or marine waters.

Waste Discharge Licensing Process and Implementation

The licensing process is a public process that follows the requirements established in Department regulations including the following:

Chapter 2, *Rules Concerning the Processing of Applications and Other Administrative Matters* governs various administrative activities of the Department including the processing of applications, appeals of Commissioner license decisions to the Board of Environmental Protection, petitions to modify, revoke or suspend a license, and license surrenders.

<https://www.maine.gov/sos/cec/rules/06/096/096c002.docx>

Chapter 521, *Applications for Waste Discharge Licenses*, describes procedures and requirements for applying for a waste discharge license. This rule is in addition to and supplements the basic procedures in Chapter 2. Section 7 is specific to Concentrated Aquatic Animal Production Facilities and Section 8 is specific to Aquaculture Projects.

<https://www.maine.gov/sos/cec/rules/06/096/096c521.doc>

Chapter 522, *Application Processing Procedures for Waste Discharge Licenses*. These rules allow for requests for a public hearing, public comments on draft licenses, and appeals of Department decisions.

<https://www.maine.gov/sos/cec/rules/06/096/096c522.doc>

Chapter 523, *Waste Discharge License Conditions* contains requirements for conditions which are applicable to all waste discharge licenses. Additionally, the rule provides procedures and considerations for establishing effluent limitations, compliance schedules, special conditions and monitoring requirements.

<https://www.maine.gov/sos/cec/rules/06/096/096c523.doc>

Chapter 524, *Criteria and Standards for Waste Discharge Licenses* contains criteria and standards for waste discharge licenses. These include implementation of technology-based treatment requirements for all discharges. Also included are criteria for consideration of aquaculture projects. Section 3 is specific to Aquaculture Projects.

<https://www.maine.gov/sos/cec/rules/06/096/096c524.doc>

Chapters 521, 522, 523 and 524 are adopted in accordance with the Department's performance partnership agreement with the EPA to implement delegated federal programs. These rule chapters are reviewed and approved by the EPA.

As part of the application review process for a MEPDES/WDL, the Department consults with various federal and state review agents and provides these entities with a draft permit for review and comment. Review agents include the EPA, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the Maine Department of Marine Resources. A draft license is also provided to any interested party that has requested a copy of the draft license.

Depending on the size, type, and location of the proposed facility the applicant may be required to provide a variety of ambient water column and sediment monitoring data to characterize the conditions of the receiving water and sediment for the proposed discharge such as water depth, temperature, salinity, current flow, dissolved oxygen profiles, bottom type(s), species abundance and species richness, and sulfide.

A MEPDES/WDL for aquaculture facilities (other than net pens) contains numerical limits and monitoring requirements for pollutants such as biochemical oxygen demand, total suspended solids, nitrogen, and phosphorus. Due to the absence of a defined discharge point, a net pen MEPDES/WDL contains monitoring requirements and numerical limits for the water column and sediment around the pens. Monitoring reports are submitted by the licensee to the Department at various frequencies depending on the content of the report (from monthly to annually) and reviewed by the Department facility inspector to ensure compliance. Certain sampling monitoring reports that are intended to characterize potential impacts are required at critical times of maximum biomass on site.

The MEPDES/WDL may also contain requirements for various types of ambient monitoring of the receiving water and for operational controls such as an operation and maintenance plan, disease control, spill prevention, prevention of fish escape, and information regarding fish feed. The MEPDES/WDL also contains a reopener clause to allow modification of conditions.

Licensed discharge facilities are inspected periodically by the DEP facility inspector to ensure they are operating in compliance with MEPDES/WDL requirements. Non-compliance is subject to enforcement action.

As noted in Section II above, for the purpose of this report, finfish aquaculture facilities are summarized in three categories by type and size. Large land-based systems, or large net pen facilities, net pen facilities licensed under the Department's General Permit - Net Pen Aquaculture, and all other land-based systems.

Linked below, is a copy of the MEPDES/WDL issued to Whole Oceans, LLC in Bucksport in 2018 as an example of a MEPDES/WDL for a large Recirculating Aquaculture System (RAS).

<https://www3.epa.gov/region1/npdes/permits/2018/finalme0037478permit.pdf>

Linked below is a copy of the General Permit – Net Pen Aquaculture that regulates ocean-based facilities where the fish are raised in net pens.

<https://www.maine.gov/dep/water/wd/net-pen-aquaculture/MEG130000-2014permit.pdf>

Linked below, is a copy of the MEPDES/WDL issued to American Unagi in Waldoboro in 2019 as an example of a MEPDES/WDL for a small Recirculating Aquaculture System (RAS).

<https://www3.epa.gov/region1/npdes/permits/2019/finalme0002780permit.pdf>

IV. Prior and Current Waste Discharge Monitoring Requirements Imposed on Licensed Finfish Aquaculture Facilities in the State since 2004.

The Resolve requires the Department to review, “prior and current waste discharge monitoring requirements imposed on licensed finfish aquaculture facilities in the State since 2004, including identification of any monitoring requirements imposed on those facilities that were subsequently removed and the basis for the removal.”

MEPDES/WDL have a term of five years and are renewable. As long as the applicant has submitted a timely renewal application, the MEPDES/WDL stays in effect past the expiration date until the Department acts on the application. During the renewal process, the MEPDES/WDL is reviewed to determine if any license conditions need to be added, removed, or modified based on new laws or regulations, new information, changes in operation, or other factors. It is common for permit conditions to be modified upon renewal.

Many of the licensed finfish aquaculture facilities in the State since 2004 have been licensed via the Department’s General Permit for Net Pen Aquaculture.¹ This permit was first issued in 2003 after a series of public hearings by the Board of Environmental Protection. It was reissued by the Department in 2008 and again in 2014. The current General Permit for Net Pen Aquaculture is available here:

<https://www.maine.gov/dep/water/wd/net-pen-aquaculture/index.html>

As required by the Resolve, the following identifies any monitoring requirements imposed on those facilities that were subsequently removed and the basis for the removal.

2008 Permit Renewal:

The 2008 renewal of the Department’s General Permit for Net Pen Aquaculture contained the following summary of changes to the permit. The basis for the change,

¹ In accordance with Department Regulation, Chapter 529: *General Permits for Certain Wastewater Discharges*, a general permit is issued by the State to cover multiple individual discharge sources and locations which all have the same type of discharges, and which involve situations where the Department determines there is a relatively low risk for significant environmental impact.

as noted in the permit Fact Sheet or Response to Comments, has been inserted in italics in parentheses after each item. Some of these responses have been paraphrased in the interest of brevity.

PERMIT SUMMARY

This permitting action is significantly different from the 6/19/03 permitting action and 9/13/07 modification in that it is:

1. Eliminating the requirement for facilities to participate in the Finfish Aquaculture Monitoring Program (FAMP) administered by the Maine Department of Marine Resources (MeDMR);

(At the time of permit issuance, the FAMP is no longer funded and is therefore essentially nonexistent.)

2. Eliminating previous Special Condition K, Husbandry Practices;

(This General Permit eliminates previous Special Condition K, Husbandry Practices, of the 6/19/03 General Permit. The Department has determined that the MeDMR provides adequate oversight of facility activities related to husbandry practices and that there are other control measures in this General Permit to prevent adverse environmental impacts from facilities operating in compliance with this General Permit.)

3. Eliminating the requirement to report the facility's food conversion ratio (FCR);

(The Department has considered this request and has determined that FCR reporting is not necessary to assess compliance with the General Permit or water quality standards. Additionally, the information necessary to calculate a facility's FCR is available through data submitted to the MeDMR.)

4. Eliminating near-field and far-field ambient water quality monitoring requirements (previous Special Condition E.6 and E.7);

(This permitting action is eliminating previous Special Condition II.E. 6 and 7 (near-field and far-field water quality monitoring requirements) based on a review of monitoring data for the period of September 2003 –October 2007, which indicates substantial compliance with the numeric dissolved oxygen limitations. Ambient salinity, transparency, and temperature monitoring and reporting requirements required by Special Condition II.E. 6 and 7 are also being eliminated in this permitting action as the Department has collected adequate information for these parameters since implementation of the 2003 General Permit.)

5. Revising the sediment and benthic monitoring characteristics and requirements (Special Condition E.5 of this permit);

(The 6/19/03 permit required sediment and benthic monitoring “within the mixing zone where benthic impact is observed to be the greatest.” Following considerable discussion on this matter with the MeDMR, the Department concurs that the sampling protocol for benthic monitoring should be changed to a predetermined location. This approach will provide for consistent and comparable monitoring among permitted facilities. The impact thresholds established in the permit for the sediment mixing zone represent the levels above which, and at any point, benthic impact conditions are unacceptable and may be unsuitable to support all designated uses for the waterbody. Hence, the Department reserves the right to require additional monitoring at specific locations observed in video records that represent obvious benthic impacts.)

6. Revising the warning level and impact limit thresholds for the sediment mixing zone (Special Condition F of this permit);

(During the development of the 4/28/08 draft permit, the Department consulted with the MeDMR specifically in the area of warning levels and impact limits. However, additional consideration and reflection on this area of the permit by the MeDMR and Department’s Division of Environmental Assessment (DEA) during and following the close of the draft review period resulted in significant changes in what the two agencies consider to be the most appropriate standards for Class SB and SC waters, respectively. Based on the comments received on the draft permit, new information, and the collective best professional judgment of the Department and MeDMR, the Department has made changes to Part II.F, Tables F.1 (sediment mixing zone impact thresholds) and F.2 (sediment impact thresholds beyond the mixing zone) of the 4/28/08 draft permit).

7. Revising the Department’s maximum review time from 14 days following receipt of a completed Notice of Intent to 30 days following receipt;

(The Department has determined that more time than was allotted in the 6/19/03 permit to review NOIs for completeness and approval is necessary given 1) the volume of information to review for each NOI submitted to the Department; 2) staff resources and workload; and 3) inter- and intra-departmental coordination.)

8. Revising the submission deadline for video records and schematic of the video track (Special Condition E.4 of this permit) from 90 days of the monitoring event to “as soon as possible following a reasonable opportunity to review data prior to submission, or within 45 days following the monitoring event, whichever period is sooner”;

(The intention of revising the video record submission deadline from 90 days in the 6/19/03 permit to 10 business days in the 4/28/08 draft was to improve the timeliness of visual review of conditions existing adjacent to and beneath the net pens. However, the Department concurs that MER raises a valid argument on this matter and is revising the 4/28/08 draft by changing Permit Section II.E.4. Footnote #1 to require submission of all

video record data as soon as possible following a reasonable opportunity to review data prior to submission. The Department is revising the 10-day deadline to 45 days and adding a provision allowing the Department to provide a written extension to the video submission deadlines due to extenuating circumstances beyond the control of the permittee.)

9. Revising the requirement to submit written reports of video/photographic monitoring events from every time a video record is created to only those times when benthic infauna measurements are made (Special Condition E.4 of this permit);
(Video/photographic monitoring events and associated written reports are most informative when combined with infauna evaluation reports.)

10. Revising the horizontal predator net minimum separation criterion (Special Condition J.7 of this permit) from 3 meters to 1 meter;
(Special Condition II.J of the General Permit, Best Management Practices for the Operation of the Facility, contains certain requirements and prohibitions intended to control impacts from permitted facilities. This condition is being carried forward from the 6/19/03 General Permit, with the exception that the horizontal predator net minimum separation criterion has been revised from 3 meters to 1 meter. The Department finds no compelling reason to require a minimum 3-meter separation standard in the General Permit. This criterion is unnecessarily excluding several facilities from coverage under the General Permit.)

11. Eliminating the requirement to notify the Department of changes in the mooring system configuration (previous Special Condition J.8) as this information is reported to the Army Corps of Engineers and available upon request;
(The Department has considered TNS' request to eliminate the specific provision for notification of termination, addition to or significant reorientations of, existing mooring systems and finds that the requirements contained in the MEPDES Standard Conditions and General Condition I.D.8 of the General Permit are adequate to address this issue. Therefore, the Department is revising the 4/28/08 draft permit by eliminating Special Condition II.J.8. The Department reserves the right to require submission of information pertaining to mooring system configuration to determine whether cause exists for modifying, revoking and reissuing, or terminating coverage under the general permit or to determine compliance with the General Permit.

12. Revising the 24-hour reporting requirements at Special Condition J.9 of this permit;
(Condition D.1.(f) of Maine Pollutant Discharge Elimination System Permit Standard Conditions Applicable To All Permits, revised July 1, 2002, specifies the mandatory 24-hour reporting requirements for facilities subject to these conditions. Although these

conditions are applicable to facilities covered under this General Permit, they were developed for typical discharges from a physical outfall pipe rather than for the type of discharge that occurs from net pen facilities. Thus, the general permit contains certain provisions, such as Permit Section II.J.9 in the 4/28/08 draft permit, that build upon the intent of MEPDES Standard Conditions. In consideration of this comment, the Department acknowledges that the reporting requirement established in the 4/28/08 draft permit may result in duplicative reporting (unusual event management is a requirement of the CMS Plan) and reporting of information that is not substantive to compliance evaluations or significant in terms of potential to adversely affect water quality. Therefore, the Department is revising the 4/28/08 draft permit at Section II.J.9 to be consistent with the requirements of the 24-hour reporting requirements contained in MEPDES Standard Conditions and to report to the Department any unusual events that pose a threat to the environment and that are not required to be reported to the MeDMR.)

13. Eliminating the NOI requirement to identify activities within 1,000 meters of a reference site;

(Part II.F of the 6/19/03 permit required facilities to identify sources within 1,000 meters of a proposed reference site that could potentially influence water quality. The Department has considered this request and believes it is reasonable to eliminate this required NOI information given that proposed reference sites must be reviewed and approved by the Department before data will be utilized for comparison purposes and compliance evaluations. The 4/28/08 draft permit is being revised by eliminating the aforementioned NOI requirement.)

14. Eliminating the narrative condition specifying that discharges shall not produce or result in harmful algae blooms (previous Special Condition D.5 of this permit) as this is otherwise covered in the permit.

(The issue of algae blooms was debated before the Board during development of the 6/19/03 permit. In its response to comments in the fact sheet associated with the 6/19/03 permit, the Department stated, "testimony offered evidence that the occurrence of green slime was documented in years prior to the significant development of the aquaculture industry. There is no information to demonstrate that the industry has caused or contributed to a worsening of these growths. The Department will, of course, continue to monitor ongoing studies in this area to determine if aquaculture or any other discharges needs further regulation to prevent contributing to harmful algal blooms." The Department does not have compelling information that marine aquaculture activities are causing or significantly contributing to harmful algae blooms in Maine. Further, the narrative conditions established in the General Permit specify that the discharges shall not cause or contribute to violations of water quality standards; thus, the permit is

protective of water quality without the aforementioned narrative limitation. In consultation with the MeDMR, the Department is revising the 4/28/08 draft permit by eliminating the narrative condition pertaining to harmful algal blooms. It is noted that MEPDES permits issued for other marine dischargers do not contain a narrative effluent limitation specifically addressing harmful algae blooms and that this revision is consistent with the MEPDES permitting program.)

2014 Permit Renewal:

The 2014 renewal of the Department's General Permit for Net Pen Aquaculture contained the following summary of changes to the permit.

PERMIT SUMMARY

The Department is making the following significant changes, or is carrying forward previously established terms and conditions of the September 22, 2008 General Permit and March 2, 2011 General Permit Modification. This is a general summary not intended to identify all changes made to the previous permits.

1. Expanding applicability from only Atlantic salmon to all finfish species that may legally be cultivated in net pens in Maine.
*(The previous aquaculture general permits authorized only one species of fish to be reared at approved facilities – Atlantic salmon (*Salmo salar*) of North American origin. This renewed General Permit, however, is not limiting coverage to Atlantic salmon based on a determination that the type of discharge from a net pen facility and the methods by which the Department regulates is not species-dependent.)*
2. Carrying forward exclusions on area of coverage, current velocity and stratification.
3. Carrying forward the 30-meter mixing zone.
4. Eliminating video/photographic monitoring and reporting requirements.
(The previous General Permit required the permittee to conduct video or photographic monitoring of the sea floor under and adjacent to each net pen system to identify potential water quality or sediment impacts caused by the operation of the facility. This requirement was initially established in the June 19, 2003 Board Order and was generally thought that it would serve as a useful compliance tool for regulatory purposes. Since 2003, the video records have been proven to result in highly subjective determinations of permit compliance and interpretation, and have utilized a disproportionate amount of staff resources when compared to compliance evaluations made for other categories of discharges in Maine. Although the Department believes video surveys are a useful tool for operations and facility control purposes, it does not

*believe subjective interpretation of observed conditions on varying quality video records under highly variable oceanic conditions is an appropriate regulatory tool for permit compliance demonstration purposes. Many facility operators will continue to utilize photo surveys to assist in optimal management of the facility; however, this permitting action eliminates the requirement to conduct video surveys for permit compliance demonstration purposes. Consequently, permit limitations for *Beggiatoa* coverage have been eliminated as this was assessed based on visual interpretation of video records and historically an extremely difficult metric to accurately assess for both the permittees and Department compliance staff.)*

5. Restructuring and revising sediment and benthic monitoring requirements and limitations within and outside the sediment mixing zone based on new information that relies on Shannon-Wiener Diversity Index, total abundance composed of *Capitella capitata* and sulfide.

*(The sediment and benthic monitoring structure of the new General Permit has been revised based on years of experience administering this regulatory mechanism and an improved approach of to achieve the two main objectives of permitting: 1) that the discharge receives best practicable treatment; and 2) that the discharge does not cause or contribute to non-attainment of water quality standards outside any mixing zone. The previous General Permit required mandatory benthic infauna sample collection and analysis regardless of site condition status determined through video surveys and sulfide monitoring. This resulted in many expensive benthic monitoring surveys being conducted at sites with very low or no measurable impact to the benthic community. This permitting action revises the default monitoring scheme by establishing a three-tiered approach. The permittee must conduct Screening Monitoring outside the mixing zone when fish are at the maximum biomass. If the mean sulfide result is $> 750 \mu\text{M}$, the permittee must then conduct Exceedance Monitoring outside the mixing zone for benthic infauna to obtain results for Shannon Wiener diversity index and percent *Capitella capitata*. The third tier is restocking monitoring within the mixing zone if the permittee exceeds an Exceedance Limit for Shannon Wiener diversity index, percent *Capitella capitata*, or sulfide. Fish may only be restocked if the sulfide level within the mixing zone is less than $1,500 \mu\text{M}$, and the permittee provides a restocking plan for approval. This monitoring structure achieves three objectives: 1) it requires and promotes careful operation and maintenance of the facility by the permittee to ensure compliance with permit limitations when samples are collected at the end of a fish growout cycle so as to avoid more costly and intensive benthic infauna sampling and delays in restocking; 2) it establishes a clear, consistent and objective method for evaluating compliance with the General Permit; and 3) when there is impact beyond the mixing zone, it requires that the permittee demonstrate that benthic conditions within the*

mixing zone have recovered to levels that are considered normal to avoid cumulative, long-term impacts within the mixing zone.)

6. Eliminating the requirement to maintain reference sites based on the revised sediment and benthic monitoring structure.

(The 2008 general permit and 2011 general permit modification contain sediment and benthic standards that compare changes in certain metrics to reference site data. The Department is shifting away from this concept of comparing compliance data from a net pen facility to reference site for three main reasons: 1) the diversity and variability of bottom conditions makes comparison of compliance station data to reference station data subjective; 2) the aquaculture industry has had difficulty locating appropriate reference sites for all of the permitted facilities; and 3) perhaps most importantly, the Department is establishing absolute numeric standards for the benthic community rather than relying on a comparison to reference site data. This revised approach establishes an objective standard up front and eliminates subjectivity and uncertainty associated with evaluating each data set on a case-by-case basis to determine compliance with applicable water quality standards.)

7. Establishing a requirement to demonstrate compliance with sulfide standards prior to restocking a facility.

(The purpose of a mixing zone is to allow a reasonable opportunity for dilution, diffusion or mixture of pollutants with the receiving waters before the receiving waters below or surrounding a discharge will be tested for classification violations. Within the mixing zone, the General Permit allows some changes in fauna and physical characteristics of the sediment, but does not contemplate unlimited changes or the loss of all types of organisms. The purpose of restocking monitoring within the mixing zone is to ensure benthic conditions are still capable of supporting marine life and to prevent a cumulative and unchecked impact on habitat. The 2008 general permit established an impact limit of 6,000 uM for sulfide within the mixing zone. The Department is revising the sulfide restocking threshold in the draft general permit from > 750 uM to < 4,000 uM based on best professional judgment of a level, above which, impacts to the benthic community could be excessive and inconsistent with the intent of the mixing zone.)

8. Carrying forward conditions for protection of Atlantic salmon.

9. Restructuring several components of the previous General Permit under a new condition entitled, Best Practicable Treatment, for consistency with federal requirements and improved organization.

(These conditions are consistent with effluent limitations attainable by the application of the best practicable control technology currently available (BPT) prescribed by 40 CFR

Part 451.21. Feed management, Waste collection and disposal, Transport or harvest discharge, Carcass removal, Materials storage, Maintenance, Recordkeeping, Training.

10. Carrying forward terms and conditions for use of drugs for disease control.

11. Establishing a requirement to maintain a current comprehensive operations and maintenance plan for each facility.

(40 CFR 451.21 establishes effluent limitations attainable by the application of the best practicable control technology currently available (BPT). Conditions established in the general permit incorporate the requirements of these best management practices, one of which is that the permittee employ efficient feeding strategies that limit feed input to the minimum amount reasonably necessary to achieve production goals and sustain targeted rates of aquatic animal growth. The Department has revised the Operations and Maintenance Plan requirements to, in pertinent part, "The O&M Plan must include provisions to maintain and implement all best management practices prescribed by this General Permit. The O&M Plan must identify the existence of and date of a feed management plan detailing the permittee's feeding strategies and practices for each growing cycle. The feed management plan must be made available to Department personnel for review upon request." A description of the system(s) proposed for use at the facility to dispense and monitor the consumption of feed and to detect the loss of uneaten feed is also required as part of the NOI information.)

V. Recommendations

The Resolve requires that, "The department shall also develop recommendations for the establishment of minimum criteria or standards for waste discharge modeling required as part of a license application for a finfish aquaculture facility, which must be based on the department's knowledge of current best management practices for those facilities."

Waste Discharge Modeling Requirements or Standards

Surface water quality models are important tools for managing the waters of the state. Water quality models help the applicant and the Department better understand how surface waters may change in response to a proposed discharge and how to regulate a discharge so that water quality standards are attained. Water quality models have been used by the Department for many years as part of the MEPDES/WDL process for a variety of licensing actions. They are generally required when the Department believes they are needed to accurately predict the potential impact of a new discharge, or where water quality monitoring has indicated non-attainment of water quality standards from an existing discharge or discharges. Models may be developed by Department staff or by the applicant and have a wide range of complexities.

There are a variety of water quality models that are supported by the Environmental Protection Agency. The Department has two Professional Engineers in the Bureau of Water Quality who are trained and experienced in the use of water quality models. These staff are an important part of the MEPDES/WDL process. Models are sometimes used as a predictive tool during the license application process. If a MEPDES/WDL is issued, effluent and ambient water quality monitoring may be used to verify the accuracy of the predictive model. MEPDES/WDL conditions can be modified as needed should monitoring data indicate changes are warranted.

Specific to the finfish aquaculture MEPDES/WDL process, water quality models have been used as part of the application process for the three land-based finfish MEPDES/WDL, and one large proposed net pen facility, listed in Appendix A.

These models were primarily used to predict the relative influence of the proposed discharge on the ambient concentration of total nitrogen. There are a variety of water quality transformations associated with nitrogen and other pollutants that take place in the ambient marine environment, but the most important aspect of characterizing the impact of a discharge is the conservative hydrodynamic component of pollutant transport. For new large discharges, hydrodynamic models are an important assessment tool, because there may be no other data available for evaluating impacts. For smaller discharges, it may be possible to assess potential impacts without the use of a water quality model.

There are many potential levels of complexity in hydrodynamic water quality models ranging from purely statistical to process-based models that simulate hydrodynamic and water quality processes explicitly. The specific complexity and resolution of hydrodynamic modeling for new large marine finfish aquaculture facilities is important, due to the inherent complexity of marine resources. For this reason, the Department recommends the following application requirement for hydrodynamic modeling associated with the MEPDES/WDL process for new large marine finfish aquaculture facility discharges. As part of the MEPDES/WDL application submittal, the applicant shall provide a hydrodynamic model that specifically solves for the equations that govern water movement, such as, but not limited to the following models:

- Structured Grid Models: e.g., Estuarine Coastal Ocean Model (ECOM) and Regional Ocean Modeling System (ROMS)
- Unstructured Grid Models: e.g., Finite Volume Community Ocean Model (FVCOM), Environmental Fluid Dynamics Code (EFDC), or Semi-implicit Cross-scale Hydroscience Integrated System Model (SCHISM)

- Other comparable grid type models specifically approved by the DEP during pre-application consultation.

These types of models reliably predict tide height, water level, temperature, salinity, and current speed and direction as long as they are informed by high resolution bathymetry, freshwater flow, and offshore boundary conditions. Ultimately, for the purposes of predicting the impact of nutrients, these models can provide necessary estimates of residence time, a parameter that estimates the amount of time a pollutant, in this case nitrogen, spends inside an estuary.

Hydrodynamic models that assume pollutants are conservative (that is, they are not consumed or produced in the receiving water) are important to evaluating the potential spatial extent of effluent impacts. Hydrodynamic models can be two dimensional (2-D) or three dimensional (3-D) and that determination should largely be based on known physical aspects of the receiving waters. Determination of the necessity for 2-D versus 3-D modeling is best made by the Department during MEPDES/WDL pre-application proceedings. Key considerations include the following:

- Temperature and salinity profiles that characterize spatial and temporal aspects of the receiving water.
- Continuous hydrodynamic monitoring sufficient to characterize the spatial and temporal variability of currents in receiving water.
- Bathymetry and other confining physical features that could directly influence hydrodynamics.
- Spatial extent of the far field area.

Current state laws and rules do not contain specific modeling requirements or standards. However, Department Regulation, Chapter 2, *Rules Concerning the Processing of Applications and Other Administrative Matters*, Section 11.F, states:

Burden of Proof and Governing Law. An applicant for a license has the burden of proof to affirmatively demonstrate to the Department that each of the licensing criteria in statute or rule has been met. Unless otherwise provided by law, all license applications, including renewal, amendment and transfer applications, are subject to the substantive laws and rules in effect on the date the application is accepted as complete for processing. For those matters that are not disputed, the applicant shall present sufficient evidence that the licensing criteria are satisfied. For those matters relating to licensing criteria that are disputed by evidence the Department determines is credible, the applicant has the burden of

proving by a preponderance of the evidence that the licensing criteria are satisfied.

Water quality models are one of the ways an applicant can meet this requirement and the Department may require the submission of a water quality model as part of the MEPDES/WDL application process on the basis of this authority.

Summary Recommendation:

As noted above, there are many variables that influence the most appropriate model for a specific MEPDES/WDL application. A variety of water quality models have been used in previous finfish aquaculture facility MEPDES/WDL processes. Authority to require the submittal of water quality models as part of a MEPDES/WDL process is provided via Department Regulation Chapter 2, *Rules Concerning the Processing of Applications and Other Administrative Matters*.

It is also noted that the Department is in the process of developing a draft rule to establish nitrogen water quality criteria for marine waters. Formal rulemaking via the Board of Environmental Protection is planned for late 2024. This rulemaking is likely to be a forum to evaluate various aspects of licensing discharges to marine waters in regard to nitrogen, including assessment of new discharges via modeling.

Therefore, the Department recommends that new legislation specific to water quality modeling for the finfish aquaculture facility MEPDES/WDL process is not necessary as this issue is best addressed on a case-by-case basis during the MEPDES/WDL preapplication stage, and this issue may be evaluated in more detail via rulemaking.

Appendix A

Large Scale Finfish Aquaculture Facilities Approved or Proposed

	Name	Location	Size	Status	Date Licensed
1	Whole Oceans	Bucksport	18.6 MGD Land based recirculating aquaculture system (RAS)	Not built.	11/21/18
2	Nordic Aquafarms, Inc	Belfast	7.7 MGD Land based recirculating aquaculture system (RAS)	Not built.	11/19/20
3	Kingfish Maine	Jonesport	28.7 MGD – Land based recirculating aquaculture system (RAS)	Not built.	6/25/21
4	American Aquafarms	Frenchman's Bay	Net Pens Primary discharge 2.05 billion Secondary discharge 0.18 MGD	Not built. Application returned to applicant due to lack of pending lease application at DMR. No longer under review.	NA

MGD = million gallons per day

Appendix B

Atlantic Salmon Aquaculture Facilities Approved Under General Permit

LICENSEE	LOCATION	LICENSE #	MEPDES #	NOTES
Cooke Aquaculture USA, Inc.	Beals	W-009116	MEG130029	Sand Cove
Cooke Aquaculture USA, Inc.	Beals	W-009117	MEG130030	Spectacle Island
Cooke Aquaculture USA, Inc.	Cutler	W-008228	MEG130017	Cutler West
Cooke Aquaculture USA, Inc.	Cutler	W-009112	MEG130025	Cross Island
Cooke Aquaculture USA, Inc.	Cutler	W-009114	MEG130027	Cross Island North
Cooke Aquaculture USA, Inc.	Eastport	W-009040	MEG130018	Deep Cove
Cooke Aquaculture USA, Inc.	Eastport	W-009115	MEG130028	Broad Cove
Cooke Aquaculture USA, Inc.	Frenchboro	W-009065	MEG130023	Black Island South
Cooke Aquaculture USA, Inc.	Frenchboro	W-009113	MEG130026	Black Island
Cooke Aquaculture USA, Inc.	Jonesport	W-009147	MEG120032	Calf Island
Cooke Aquaculture USA, Inc.	Lubec	W-009042	MEG130020	South Bay
Cooke Aquaculture USA, Inc.	Machiasport	W-008165	MEG130001	Starboard Island
Cooke Aquaculture USA, Inc.	Swans Island	W-009066	MEG130024	Scrag Island

Number of Facilities = 13

General Permit MEG130000/W009020.

Appendix C

Aquaculture Waste Discharge Licenses

LOCATION	LICENSEE	LICENSE #	MEPDES #	TYPE	NOTES
Beals	Down East Institute for Applied Marine Research & Educ	W-009188	ME0037451	5S	72,000 GPD flow through sea water, clean up wastewater and wastewater from reverse osmosis treatment system.
Waldoboro	Amercian Unagi	W-009202	ME0002780	6E	96,480 GPD wastewater associated with fish rearing (eels)
New Gloucester	Dept. of Inland Fisheries & Wildlife	W-002030	ME0001040	6F	New Gloucester Fish Rearing Ponds; 3.0 MGD process water discharge
Phillips*	Dept. of Inland Fisheries & Wildlife	W-002036	ME0001058	6F	Phillips Fish Rearing Station; 0.36 MGD process water discharge. Inactive.
Casco	Dept. of Inland Fisheries & Wildlife	W-002038	ME0001066	6F	Casco Fish Hatchery; 2.9 MGD process waste water discharge
Palermo	Dept. of Inland Fisheries & Wildlife	W-002035	ME0001074	6F	Palermo Fish Rearing Station; 4.75 MGD process water discharge
Grand Lake Stream Pt.	Dept. of Inland Fisheries & Wildlife	W-002037	ME0001082	6F	Grand Lake Stream Fish Hatchery; 2.9 MGD process water discharge
Augusta	Dept. of Inland Fisheries & Wildlife	W-002034	ME0001091	6F	Governor Hill Fish Hatchery; 1.2 MGD process water discharge
Enfield	Dept. of Inland Fisheries & Wildlife	W-002032	ME0001104	6F	Cobb State Fish Hatchery; 4.75 MGD process water discharge
Gray	Dept. of Inland Fisheries & Wildlife	W-002031	ME0001121	6F	Dry Mills Fish Hatchery; 1.92 MGD process water discharge
Embden	Dept. of Inland Fisheries & Wildlife	W-002029	ME0001139	6F	Ela Fish Rearing Station; 4.75 MGD process water discharge
Orland	Craig Brook Nat'l Hatchery	W-001285	ME0002437	6F	Federal salmonid hatchery; 3.5 MGD process water discharge
Ellsworth	Green Lake National Fish Hatchery	W-000721	ME0002623	6F	Federal salmonid hatchery; 19.4 MGD process water discharge

Belfast	Nordic Aquafarms, Inc	W-009200	ME0002771	6F	7.7 MGD Land based recirculating aquaculture system (RAS)
Hollis	Pierce Associates Inc.	W-008127	ME0036838	6F	Commercial fish hatchery; 1.5 MGD process waste water. Shy Beaver
Gouldsboro*	Palom Aquaculture	W-009080	ME0037311	6F	Atlantic Salmon fish rearing facility, 8.5 MGD, Sand Cove, Prospect Harbor. Inactive.
Bucksport	Whole Oceans	W-009190	ME0037478	6F	18.6 MGD Land based recirculating aquaculture system (RAS)
Jonesport	Kingfish Maine	W-009238	ME0037559	6F	28.7 MGD – RAS aquaculture
East Machias	Cooke Aquaculture USA, Inc	W-007149	ME0110086	6F	Commercial salmonid hatchery (Gardiner Lake); 10.08 MGD process water discharge
Rangeley	Cooke Aquaculture USA, Inc	W-004701	ME0110116	6F	Commercial salmon hatchery; 12 MGD process water discharge
Bingham	Cooke Aquaculture USA, Inc	W-007577	ME0110159	6F	Commercial salmon; 11.25 MGD process waste water discharge
Franklin	University of Maine—CCAR	W-007642	ME0110183	6F	Aquaculture research facility; 1.27 MGD process water discharge
Biddeford	University of New England	W-008109	ME0110434	6F	Marine science and research center; 0.72 MGD treated marine lab and marine mammal rehabilitation center waste water
Pierce Pond Township	Nestle Waters, N.A., Inc	W-000905	ME0110477	6F	Dead River Hatchery, commercial fish hatchery and rearing station; 1.5 MGD process water discharge
East Machias	Downeast Salmon Federation, EMARC	W-009088	ME0110523	6F	Fin Fish Hatchery & Fish rearing facility
Cutler	Dept of Marine Resources, Sea Run Habitat & Fisheries	W-009232	ME0002828	6G	4 acre Salmon restoration Net Pen operation
Harpwell	Running Tide Technologies, Inc	W-009203	ME0037524	6G	43,200 GPD wastewater associated with oyster culture

* = Inactive

TYPE:

6E Fish rearing facility, less than 100,000 GPD

6F Fish rearing facility, greater than 100,000 GPD

6G Marine aquaculture facility (individual permit

5S Industrial/Commercial source--miscellaneous or incidental non-process wastewater

APPENDIX D

LAW WITHOUT
GOVERNOR'S
SIGNATURE
JUNE 18, 2023CHAPTER
59
RESOLVES

STATE OF MAINE

IN THE YEAR OF OUR LORD

TWO THOUSAND TWENTY-THREE

S.P. 225 - L.D. 508

**Resolve, Directing the Department of Environmental Protection to Review
Regulation of Waste Discharge from Finfish Aquaculture Facilities****Sec. 1. Review of finfish aquaculture waste discharge regulation. Resolved:**

That the Department of Environmental Protection shall conduct a review of applicable state laws and rules regulating the licensing of waste discharge from proposed finfish aquaculture facilities, including any waste discharge modeling requirements or standards, and of prior and current waste discharge monitoring requirements imposed on licensed finfish aquaculture facilities in the State since 2004, including identification of any monitoring requirements imposed on those facilities that were subsequently removed and the basis for the removal. The department shall also develop recommendations for the establishment of minimum criteria or standards for waste discharge modeling required as part of a license application for a finfish aquaculture facility, which must be based on the department's knowledge of current best management practices for those facilities.

On or before January 15, 2024, the department shall submit to the Joint Standing Committee on Environment and Natural Resources a report summarizing its review under this section and providing any recommendations, including any proposed legislation, resulting from the review. After reviewing the report, the committee may report out legislation relating to the report to the Second Regular Session of the 131st Legislature.