



STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI  
GOVERNOR

DAVID P. LITTELL  
COMMISSIONER

Mr. Greg Lambert  
Freshwater Production Manager  
Atlantic Salmon of Maine  
P.O. Box 380  
Oquossoc, Maine 04964

September 18, 2006

RE: Maine Pollutant Discharge Elimination System (MEPDES) Permit #ME0110132  
Maine Waste Discharge License (WDL) Application # W007608-5Q-D-R  
**Final Permit/License**

Dear Mr. Lambert:

Enclosed please find a copy of your **final** MEPDES permit and Maine WDL which was approved by the Department of Environmental Protection. Please read the permit/license and its attached conditions carefully. You must follow the conditions in the order to satisfy the requirements of law. Any discharge not receiving adequate treatment is in violation of State Law and is subject to enforcement action.

Any interested person aggrieved by a Department determination made pursuant to applicable regulations, may appeal the decision following the procedures described in the attached DEP FACT SHEET entitled "*Appealing a Commissioner's Licensing Decision.*"

If you have any questions regarding the matter, please feel free to call me at 207-287-7693 or contact me via email at [gregg.wood@maine.gov](mailto:gregg.wood@maine.gov).

Sincerely

Gregg Wood  
Division of Water Quality Management  
Bureau of Land and Water Quality

Enc.

cc: Robert Stratton, DEP/CMRO  
Matt Young, DEP/EMRO  
Jim Sohns, DEP/EMRO  
Sandy Lao, USEPA

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STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
STATE HOUSE STATION 17      AUGUSTA, MAINE 04333

DEPARTMENT ORDER

**IN THE MATTER OF**

ATLANTIC SALMON OF MAINE	)	MAINE POLLUTANT DISCHARGE
EMBDEN, SOMERSET COUNTY, MAINE	)	ELIMINATION SYSTEM PERMIT
FISH HATCHERY/REARING FACILITY	)	AND
#ME0110132	)	WASTE DISCHARGE LICENSE
#W007608-5Q-D-R <b>APPROVAL</b>	)	<b>RENEWAL</b>

Pursuant to the provisions of the Federal Water Pollution Control Act, Title 33 USC, Section 1251, et. seq. and Maine Law 38 M.R.S.A., Section 414-A et seq., and applicable regulations the Department of Environmental Protection (Department hereinafter) has considered the application of ATLANTIC SALMON OF MAINE (ASM hereinafter), with its supportive data, agency review comments, and other related materials on file and FINDS THE FOLLOWING FACTS:

**APPLICATION SUMMARY**

ASM has applied for a renewal of combination Waste Discharge License (WDL) #W007608-5Q-B-R/W007608-5Q-C-T, that was issued by the Department on August 26, 1999 and expired on August 26, 2001. The WDL approved the discharge of up to a daily maximum of 17.28 million gallons per day (MGD) of fish hatchery waste water from a commercial Atlantic salmon hatchery and rearing facility to the Kennebec River, Class A, in Embden Maine.

**PERMIT SUMMARY**

On January 12, 2001, the Department received authorization from the U.S. Environmental Protection Agency (USEPA) to administer the National Pollutant Discharge Elimination System (NPDES) permit program in Maine, excluding areas of special interest to Maine Indian Tribes. On October 30, 2003, after consultation with the U.S. Department of Justice, USEPA extended Maine's NPDES program delegation to all but tribally owned lands. The extent of Maine's delegated authority is under appeal at the time of this permitting action. From this point forward, the program will be referred to as the Maine Pollutant Discharge Elimination System (MEPDES) program and permit #ME0110132 will be utilized as the primary reference number for the Embden facility.

**PERMIT SUMMARY (cont'd)**

**This permitting action is similar to the August 26, 1999 WDL in that it is carrying forward the:**

1. reporting requirement for mass of fish on hand; and
2. pH limit of 6.0-8.5 standard units.

**This permitting action is different from the August 26, 1999 in that it is:**

1. eliminating the previous 17.28 MGD daily maximum discharge flow limit and establishing a monthly average discharge flow limit of 15.43 MGD;
2. establishing BOD and TSS monthly average and daily maximum concentration limits with a provision for the Department to establish new limits in the future based on technology performance analyses of the industry as a whole;
3. establishing BOD and TSS monthly average and daily maximum mass limits derived from previous license effluent limits;
4. establishing a seasonal monthly average phosphorus mass limit derived from a previous license effluent limit, a monthly average water quality based concentration limit, and daily maximum monitoring requirements;
5. establishing seasonal monthly average and daily maximum orthophosphate mass and concentration monitoring requirements for one year following commencement of operations;
6. establishing a Department best practicable treatment (BPT) based daily maximum mass and concentration limits for formalin and monthly average mass and concentration reporting requirements;
7. establishing minimum monitoring frequency and sample type requirements based on Department best professional judgment (BPJ);
8. eliminating seasonal monitoring and reporting requirements for dissolved oxygen in the facility effluent;
9. eliminating ammonia nitrogen effluent limits and reporting requirements;
10. eliminating nitrate nitrogen monitoring and reporting requirements;
11. eliminating the previously established seasonal receiving water study requirements;
12. requiring a current facility Operation and Maintenance Plan;
13. requiring submittal of an Alternative Discharge Study report six months prior to permit expiration;
14. modifying requirements for settling basin cleaning;
15. requiring compliance with existing state salmonid fish health rules;
16. modifying requirements related to proper use and record keeping of therapeutic agents;
17. establishing record keeping requirements for disinfecting/sanitizing agents;
18. establishing BPJ derived minimum treatment technology requirements;
19. requiring a fish Containment Management System with provisions for auditing and reporting; and
20. establishing procedures for genetic testing of Atlantic salmon kept at the facility to ensure that they are of North American origin.
21. establishing a requirement to notify and meet with the Department prior to commencing operations at the facility.
22. limiting the term of the permit to two (2) years.

## CONCLUSIONS

BASED on the findings in the attached Fact Sheet dated August 17, 2006, and subject to the Conditions listed below, the Department makes the following conclusions:

1. 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.
2. 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 Department expects to adopt in accordance with state law.
3. The provisions of the State's antidegradation policy, 38 MRSA Section 464(4)(F), will be met, in that:
  - (a) Existing in-stream water uses and the level of water quality necessary to protect and maintain those existing uses will be maintained and protected;
  - (b) Where high quality waters of the State constitute an outstanding national resource, that water quality will be maintained and protected;
  - (c) The standards of classification of the receiving water body are met or, where the standards of classification of the receiving water body are not met, the discharge will not cause or contribute to the failure of the water body to meet the standards of classification;
  - (d) Where the actual quality of any classified receiving water body exceeds the minimum standards of the next highest classification, that higher water quality will be maintained and protected;  
and
  - (e) Where a discharge will result in lowering the existing quality of any water body, the Department has made the finding, following opportunity for public participation, that this action is necessary to achieve important economic or social benefits to the State.
4. The discharge will be subject to effluent limitations that require application of best practicable treatment.
5. The discharge is necessary and there are no other practical alternatives available.

**ACTION**

THEREFORE, the Department APPROVES the above noted application of ATLANTIC SALMON OF MAINE to discharge up to a monthly average flow of 15.43 MGD of fish hatchery waste water to the Kennebec River, Class A, SUBJECT TO THE ATTACHED CONDITIONS, and all applicable standards and regulations including:

1. "Maine Pollutant Discharge Elimination System Permit Standard Conditions Applicable To All Permits," revised July 1, 2002, copy attached.
2. The attached Special Conditions, including any effluent limitations and monitoring requirements.
3. **This permit expires two (2) years from the date of signature below.**

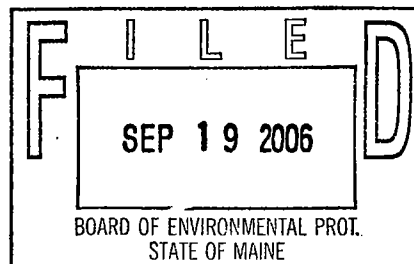
DONE AND DATED AT AUGUSTA, MAINE, THIS 16<sup>TH</sup> DAY OF SEPTEMBER, 2006.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY:   
 \_\_\_\_\_  
 DAVID P. LITTELL, Commissioner

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: August 13, 2001  
 Date of application acceptance: August 13, 2001



Date filed with Board of Environmental Protection \_\_\_\_\_

This Order prepared by GREGG WOOD, BUREAU OF LAND & WATER QUALITY

**SPECIAL CONDITIONS**

**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS**

- The permittee is authorized to discharge fish hatchery waste water from **Outfall #001A** to the Kennebec River. Such discharges shall be limited and monitored by the permittee as specified below:

Monitoring Parameter	Reporting Requirements				Minimum Monitoring Requirements		
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type	
Flow [50050]	as specified 15.43 MGD [03]	as specified ---	as specified ---	as specified ---	as specified Daily [01/01]	as specified Estimated [ES]	
BOD [00310]	257 lbs/day [26]	288 lbs/day [26]	6 mg/L [19]	10 mg/L [19]	1/week [01/07]	Composite <sup>2</sup> [CP]	
TSS [00530]	257 lbs/day [26]	288 lbs/day [26]	6 mg/L [19]	10 mg/L [19]	1/week [01/07]	Composite <sup>2</sup> [CP]	
Total Phosphorus <sup>3</sup> (June 1 - Sept 30) [00665]	22 lbs/day [26]	report lbs/day [26]	1.9 mg/L [19]	report mg/L [19]	1/week [01/07]	Composite <sup>2</sup> [CP]	
Orthophosphate (as P) <sup>3,4</sup> (June 1 - Sept 30) [04175]	report lbs/day [26]	report lbs/day [26]	report mg/L [19]	report mg/L [19]	1/week [01/07]	Composite <sup>2</sup> [CP]	
Fish on Hand [45604]	report lbs/day [26]	report lbs/day [26]	---	---	1/week [01/07]	Calculated [CA]	
Formalin <sup>5</sup> [51064]	report lbs/day [26]	228 lbs/day [26]	report mg/L [19]	13.5 mg/L [19]	1/week [01/07]	Calculated [CA]	
pH [00400]	---	---	---	6.0-8.5 S.U. [12]	1/week [01/07]	Grab [GR]	

The italicized numeric values bracketed in the table above and in subsequent text are code numbers that Department personnel utilize to code the monthly Discharge Monitoring Reports (DMRs). Footnotes are found on Page 6.

## SPECIAL CONDITIONS

### A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

#### Footnotes:

All sampling and analysis must be conducted in accordance with: (a) methods approved by 40 Code of Federal Regulations (CFR) Part 136, (b) alternative methods approved by the Department in accordance with the procedures in 40 CFR Part 136, or (c) as otherwise specified by the Department. Samples that are sent out for analysis shall be analyzed by a laboratory certified by the State of Maine's Department of Health and Human Services unless otherwise approved by the Department. **All effluent limits are gross, end of pipe limits, unless otherwise specified.**

1. Effluent Monitoring: Effluent values shall be determined through sampling of Outfall #001A following all means of wastewater treatment. All monitoring shall be conducted so as to capture conditions representative of wastewater generating processes at the facility, such as flow-through and cleaning discharge flows, use of therapeutic and disinfecting/sanitizing agents, etc. and in consideration of settling pond detention times. Any change in sampling location must be approved by the Department in writing.
2. Composite Samples: Samples shall consist of 24-hour composites collected with an automatic composite sampler. Alternatively, when weather conditions and/or equipment prevents automatic compositing and upon Department approval, the permittee may manually composite a minimum of four grab samples collected at two-hour intervals during the working day at the facility.
3. Total Phosphorus and Orthophosphate: The concentration and mass effluent limits and monitoring requirements shall consist of gross, end-of-pipe values. Phosphorus limits and monitoring requirements are seasonal and are only in effect from June 1 through September 30 each year. Laboratory analysis shall be conducted on the same sample and shall consist of a low-level phosphorus analysis with a minimum detection limit of 1 part per billion (1 ug/L). See Attachment A of this permit for total phosphorus and orthophosphate protocols.
4. Orthophosphate: Monitoring requirements are only applicable for the first June 1<sup>st</sup> – September 30<sup>th</sup> period following the commencement of operations at the facility. The Department reserves the right to require additional orthophosphate monitoring for said period each year thereafter.
5. Formalin: Formalin monitoring shall be conducted only when in use at the facility and shall consist of a calculated effluent value. The permittee shall calculate the effluent formalin concentration through accurate determinations of the formalin concentration administered in each facility use, the volume of water to which the formalin is added, and dilutions provided from administration to end-of-pipe. The effluent mass shall be calculated by multiplying the gallons of formalin used by a 9.13 lbs / gallon conversion formula based on the specific gravity of formalin. The permittee shall provide this information and calculations to the Department in a document accompanying the monthly DMR.

## **SPECIAL CONDITIONS**

### **B. NARRATIVE EFFLUENT LIMITATIONS**

1. The effluent shall not contain a visible oil sheen, foam or floating solids at any time which would impair the usages designated by the classification of the receiving waters.
2. The effluent shall not contain materials in concentrations or combinations which are hazardous or toxic to aquatic life, or which would impair the usages designated by the classification of the receiving waters.
3. The discharges shall not cause visible discoloration or turbidity in the receiving waters which would impair the usages designated by the classification of the receiving waters.
4. Notwithstanding specific conditions of this permit the effluent must not lower the quality of any classified body of water below such classification, or lower the existing quality of any body of water if the existing quality is higher than the classification.

### **C. UNAUTHORIZED DISCHARGES**

The permittee is authorized to discharge only in accordance with the terms and conditions of this permit and only from Outfall #001A. Discharges of wastewater from any other point source are not authorized under this permit, and shall be reported in accordance with Standard Condition B(5)(*Bypass*) of this permit.

### **D. NOTIFICATION REQUIREMENT**

In accordance with Standard Condition D, the permittee shall notify the Department of the following:

1. Any substantial change in the volume or character of pollutants being introduced into the wastewater collection and treatment system.
2. For the purposes of this section, adequate notice shall include information on:
  - a. The quality or quantity of waste water introduced to the waste water collection and treatment system; and
  - b. Any anticipated impact of the change in the quantity or quality of the wastewater to be discharged from the treatment system.



## SPECIAL CONDITIONS

### E. MONITORING AND REPORTING

Monitoring results obtained during the previous month shall be summarized for each month and reported on separate Discharge Monitoring Report (DMR) forms provided by the Department and **postmarked on or before the thirteenth (13<sup>th</sup>) day of the month or hand-delivered to a Department regional office such that the DMR's are received by the Department on or before the fifteenth (15<sup>th</sup>) day of the month following the completed reporting period.** A signed copy of the DMR and all other reports required herein shall be submitted to the Department assigned compliance inspector (unless otherwise specified) at the following address:

Department of Environmental Protection  
Bureau of Land and Water Quality, Division of Water Quality Management  
106 Hogan Road  
Bangor, Maine 04401

### F. OPERATION & MAINTENANCE (O&M) PLAN

**On or before commencement of operations at the facility,** the permittee shall submit to the Department a current written comprehensive Operation & Maintenance (O&M) Plan [*PCS Code 09699*]. The plan shall provide a systematic approach by which the permittee shall at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit.

The O&M Plan shall establish Best Management Practices (BMP) to be followed in operating the facility, cleaning tanks, screens, and other equipment and disposing of any solid waste. The purpose of the BMP portion of the plan is to identify and to describe the practices which minimize the amounts of pollutants (biological, chemical, and medicinal) discharged to surface waters. Among other items, the plan shall describe in detail efficient feed management and feeding strategies to minimize discharges of uneaten feed and waste products, how and when the accumulated solids are to be removed, dewatered, and methods of disposal. The plan shall also describe where the removed material is to be placed and the techniques used to prevent it from re-entering the surface waters from any onsite storage. The plan shall document the recipients and methods of any offsite waste disposal.

**By December 31 of each year, or within 90 days of any process changes or minor equipment upgrades,** the permittee shall evaluate and modify the O&M Plan including site plan(s) and schematic(s) for the wastewater treatment facility to ensure that it is up-to-date. The O&M Plan shall be kept on-site at all times and made available to Department and EPA personnel upon request.

**Within 90 days of completion of new and or substantial upgrades of the wastewater treatment facility,** the permittee shall submit the updated O&M Plan to their Department inspector for review and comment.

## **SPECIAL CONDITIONS**

### **G. ALTERNATIVE DISCHARGE STUDY**

**On or before six-months prior to expiration of this permit [PCS Code 34099],** the permittee is required to submit to the Department for review, an Alternative Discharge Study (ADS) report for the Embden facility to determine if practical alternatives to the discharge exist. The ADS report shall evaluate wastewater treatment infrastructure, technologies, practices or other modifications that will result in the elimination of the discharge to the receiving water or improvement in the effluent quality, pursuant to guidance in Fact Sheet Section 8.

### **H. SETTLING BASIN CLEANING**

Settling basins shall be cleaned when accumulated materials occupy 20% of a basin's capacity, when material deposition in any area of the basins exceeds 50% of the operational depth, or at any time that said materials in or from the basins are contributing to a violation of permit effluent limits. The permittee is responsible for reporting effluent violations pursuant to Standard Conditions D(1)(f) and (g).

### **I. DISEASE AND PATHOGEN CONTROL AND REPORTING**

The permittee must comply with Maine Department of Inland Fisheries and Wildlife and Maine Department of Marine Resources salmonid fish health rules (12 MRSA, §6071; 12 MRSA, §§7011, 7035, 7201, and 7202, or revised rules). The cited rules include requirements for notification to the appropriate agency within 24-hours of pathogen detection. In the event of a catastrophic pathogen occurrence, the permittee shall submit to the Department for review, information on the proposed treatment including materials/chemicals to be used, material/chemical toxicity to aquatic life, the mass and concentrations of materials/chemicals as administered, and the concentrations to be expected in the effluent. The Department will address such occurrences through administrative modifications of the permit.

### **J. THERAPEUTIC AGENTS**

All medicated fish feeds, drugs, and other fish health therapeutants shall be registered with USEPA as appropriate, approved by the US Food and Drug Administration (USFDA), and applied according to USFDA accepted guidelines and manufacturer's label instructions. Records of all such materials used are to be maintained at the facility for a period of five years. This permitting action does not authorize routine off-label or extra-label drug use. Such uses shall only be permitted in emergency situations when they are the only feasible treatments available and only under the authority of a veterinarian. **The permittee shall notify the Department in writing 24-hours within such use.** This notification must be provided by the veterinarian involved and must include the agent(s) used, the concentration and mass applied, a description of how the use constitutes off-label or extra-label use, the necessity for the use in terms of the condition to be

**J. THERAPEUTIC AGENTS (cont'd)**

treated and the inability to utilize accepted drugs or approved methods, the duration of the use, the likely need of repeat treatments, and information on aquatic toxicity. If, upon review of information regarding the use of a drug pursuant to this section, the Department determines that significant adverse effects are likely to occur, it may restrict or limit such use.

**K. DISINFECTING/SANITIZING AGENTS**

Records of all disinfectants and/or sanitizing agents used that have the potential to enter the waste stream or receiving water, their volumes and concentrations as used and concentrations at the point of discharge, shall be maintained at the facility for a period of five years. This permitting action only authorizes the discharge of those materials applied for, evaluated by the Department, and either regulated or determined to be *de minimus* in this permitting action or in subsequent Department actions.

**L. MINIMUM TREATMENT TECHNOLOGY REQUIREMENT**

Between 2000 and 2002, eleven Maine fish hatcheries were evaluated to identify potential options for facility upgrades. All nine Maine Department of Inland Fisheries and Wildlife hatcheries were evaluated by FishPro Inc., while the two USFWS hatcheries were evaluated by the Freshwater Institute. Recommended wastewater treatment upgrades for each of the facilities included microscreen filtration of the effluent. Based on the information provided and Department BPJ, the Department is specifying that minimum treatment technology for the Embden facility shall consist of treatment equal to or better than 60-micron microscreen filtration of the effluent, wastewater settling/clarification, removal of solids. ASM shall provide treatment equal to or better than the BPJ minimum treatment technology and shall comply with all effluent limitations, monitoring requirements, and operational requirements established in this permitting action. Additional treatment may be necessary to achieve specific water quality based limitations.

**M. SALMON GENETIC TESTING AND ESCAPE PREVENTION**

The US Fish and Wildlife Service and the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) formally listed the Atlantic salmon as an endangered species on November 17, 2000. Two significant issues of concern regarding the rearing of salmon in Maine involve the genetic integrity of the salmon and escape prevention to avoid impacts on native fish. As described in Section 14 of the attached Fact Sheet, these issues have been raised by USEPA Region 1, the US Fish and Wildlife Service and NOAA Fisheries as significant concerns for the Gulf of Maine Distinct Population Segment of Atlantic salmon (DPS). ASM discharges effluent to a non-DPS designated segment of the Kennebec River, however portions of the river downstream of the Embden facility are designated as an identified DPS river.

## SPECIAL CONDITIONS

### M. SALMON GENETIC TESTING AND ESCAPE PREVENTION (cont'd)

Maine's Aquaculture General Permit (#MEG130000, Part II, Section I) and individual MEPDES Permits for marine aquaculture facilities contain requirements to address the genetic integrity of **The use of Atlantic salmon eggs or fish originating from non-North American stock is prohibited at the Embden facility.** In the event the permittee intends to keep Atlantic salmon eggs or fish at the facility that are not intended for marine aquaculture, or are otherwise not included in the above described genetic testing requirements, the permittee shall comply with the requirements specified in Permit Attachment B, *Genetic Testing Requirements for non-Marine Aquaculture Atlantic Salmon*.

Maine's Aquaculture GP and individual MEPDES Permits for marine aquaculture facilities contain requirements for containment of salmon at the marine facilities, but no such provisions for hatcheries and rearing facilities. Based on requirements established in the referenced aquaculture permitting actions and guidance developed by the Maine Aquaculture Association, in this permitting action, the Department requires the permittee to have a functional Containment Management System (CMS). **On or before six months prior to the commencement of operations at the facility,** the permittee shall submit the CMS plan [*PCS Code 53799*] to the Department for review and approval

**Prior to the commencement of operations** the permittee shall employ a fully functional CMS at the facility designed, constructed, and operated so as to prevent the accidental or consequential escape of fish to open water. The CMS plan shall include a site plan or schematic with specifications of the particular system. The permittee shall develop and utilize a CMS consisting of management and auditing methods to describe or address the following: site plan description, inventory control procedures, predator control procedures, escape response procedures, unusual event management, severe weather procedures and training. The CMS shall contain a facility specific list of critical control points (CCP) where escapes have been determined to potentially occur. Each CCP must address the following: the specific location, control mechanisms, critical limits, monitoring procedures, appropriate corrective actions, verification procedures that define adequate CCP monitoring, and a defined record keeping system.

The CMS site specific plan shall describe the use of effective containment barriers appropriate to the life history of the fish. The facility shall have in place both a three-barrier system for fish up to 5 grams in size and a two barrier system for fish 5 grams in size or larger. The three-barrier system shall include one barrier at the incubation/rearing unit, one barrier at the effluent from the hatch house/fry rearing area and a third barrier placed inline with the entire effluent from the facility. Each barrier shall be appropriate to the size of fish being contained. The two-barrier system shall include one barrier at the individual rearing unit drain and one barrier inline with the total effluent from the facility. Each barrier shall be appropriate to the size of fish being contained. Barriers installed in the system may be of the screen type or some other similarly effective device used to contain fish of a specific size in a designated area. Barriers installed in the system for compliance with these requirements shall be monitored daily. Additional requirements include:

## SPECIAL CONDITIONS

### M. SALMON GENETIC TESTING AND ESCAPE PREVENTION (cont'd)

1. The CMS shall be audited **at least once per year and within 30 days of a reportable escape** (more than 50 fish) by a party other than the facility operator or owner qualified to conduct such audits and approved by the Department. *[PCS Code 63899]* A written report of these audits shall be provided to the facility and the Department for review and approval **within 30 days of the audit being conducted.** *[PCS Code 43699]* If deficiencies are identified during the audit, the report shall contain a corrective action plan, including a timetable for implementation and re-auditing to verify deficiencies are addressed. Additional third party audits to verify correction of deficiencies shall be conducted in accordance with the corrective action plan or upon request of the Department. The facility shall notify the Department upon completion of corrective actions.
2. Facility personnel responsible for routine operation shall be properly trained and qualified to implement the CMS. **Prior to any containment system assessment** associated with this permit, the permittee shall provide to the Department documentation of the employee's or contractor's demonstrated capabilities to conduct such work. *[PCS Code 21599]*
3. The permittee shall maintain complete records, logs, reports of internal and third party audits and documents related to the CMS on site for a period of 5 years.
4. For new or rehabilitated/modified facilities, a CMS shall be prepared and submitted to the Department for review and approval prior to fish being introduced into the facility.

**The facility shall report any known or suspected escapes of more than 50 fish within 24 hours to the Maine Atlantic Salmon Commission at 207-287-9973 or 287-9972 (currently Pat Keliher), Maine Department of Inland Fisheries and Wildlife at 207-287-5202 (Commissioner's office), USFWS Maine Field Office at 207-827-5938, and NOAA Fisheries Maine Office at 207-866-7379.**

### N. REOPENING OF PERMIT FOR MODIFICATIONS

Upon evaluation of the tests results or monitoring requirements specified in Special Conditions of this permitting action, new site specific information, new water quality monitoring data or modeling information, or any other pertinent test results or information obtained during the term of this permit, the Department may, at anytime and with notice to the permittee, modify this permit to;

- 1) include effluent limits necessary to control specific pollutants or whole effluent toxicity where there is a reasonable potential that the effluent may cause water quality criteria to be exceeded,
- (2) require additional monitoring if results on file are inconclusive; or (3) change monitoring requirements or limitations based on new information.

## SPECIAL CONDITIONS

### O. COMMENCEMENT OF OPERATIONS/TRANSFER OF THE PERMIT

Prior to the permittee or any new owner/operator seeking authorization to discharge under the terms and conditions of this permit, the applicable party must meet with the Department's permitting and compliance inspection staff **at a minimum of ninety (90) days prior to commencing production/operations** to review applicability of the permit limitations, monitoring requirements and reporting requirements. Should the Department determine the proposed production/operations are significantly different than what has been presented in the 8/13/01 application materials, the Department may require an application to modify the permit or to file an application for a new permit. In addition, pursuant to Department Rule Chapter 2, *Rules Concerning the Processing of Applications and Other Administrative Matters*, Section 21, *License Renewals, Amendments and Transfers*, sub-section C, *Transfers*, a transferee must make application to the Department no later than two (2) weeks after transfer of ownership or entering into a lease agreement to conduct business on said property. Pending determination on the application for approval of transfer, the transferee shall abide by all of the conditions of this permit, and is jointly or severally liable with the permittee for any violation of the terms and conditions thereof.

### P. SEVERABILITY

In the event that any provision, or part thereof, of this permit is declared to be unlawful by a reviewing court, the remainder of the permit shall remain in full force and effect, and shall be construed and enforced in all aspects as if such unlawful provision, or part thereof, had been omitted, unless otherwise ordered by the court.

## Attachment A

### Protocol for Total P Sample Collection and Analysis for Waste Water and Receiving Water Monitoring Required by Permits

Approved Analytical Methods: EPA 365.2, SM 4500-P B.5 E

**Sample Collection:** The Maine DEP is requesting that total phosphorus analysis be conducted on composite effluent samples, unless a facility's Permit specifically designates grab sampling for this parameter. Facilities can use individual collection bottles or a single jug made out of glass or polyethylene. Bottles and/or jugs should be cleaned prior to each use with dilute HCL. This cleaning should be followed by several rinses with distilled water. The sampler hoses should be cleaned, as needed.

**Sample Preservation:** During compositing the sample must be at 0-4 degrees C. If the sample is being sent to a commercial laboratory or analysis cannot be performed the day of collection then the sample must be preserved by the addition of 2 mls of concentrated H<sub>2</sub>SO<sub>4</sub> per liter and refrigerated at 0-4 degrees C. The holding time for a preserved sample is 28 days.

**Note:** Ideally, Total P samples are preserved as described above. However, if a facility is using a commercial laboratory then that laboratory may choose to add acid to the sample once it arrives at the laboratory. The Maine DEP will accept results that use either of these preservation methods.

**QA/QC:** Run a distilled water blank and at least 2 standards with each series of samples. If standards do not agree within 2% of the true value then prepare a new calibration curve.

Every month run a blank on the composite jug and sample line. Automatically, draw distilled water into the sample jug using the sample collection line. Let this water set in the jug for 24 hours and then analyze for total phosphorus. Preserve this sample as described above.

Finalized May 2006

## **Protocol for Orthophosphate Sample Collection and Analysis for Waste Water and Receiving Water Monitoring Required by Permits**

Approved Analytical Methods: EPA 365.2, SM 4500-P.E

**Sample Collection:** The Maine DEP is requesting that orthophosphate analysis be conducted on composite effluent samples unless a facility's Permit specifically indicates grab sampling for this parameter. Facilities can use individual collection bottles or a single jug made out of glass or polyethylene. Bottles and/or jugs should be cleaned prior to each use with dilute HCL. This cleaning should be followed by several rinses with distilled water. The sampler hoses should be cleaned, as needed.

**Sample Preservation:** During compositing the sample must be at 0-4 degrees C. The sample must be filtered immediately (within 15 minutes) after collection using a pre-washed 0.45-um membrane filter. Be sure to follow one of the pre-washing procedures described in the approved methods. Also, be aware that you will likely want to use a designated suction hose and collection container for the orthophosphate filtering process. If the sample is being sent to a commercial laboratory or analysis cannot be performed within 2 hours after collection then the sample must be kept at 0-4 degrees C. There is a 48-hour holding time for this sample although analysis should be done sooner, if possible.

**QA/QC:** Run a distilled water blank and at least 2 standards with each series of samples. If standards do not agree within 2% of the true value then prepare a new calibration curve.

Every month run a blank on the composite jug and sample line. Automatically, draw distilled water into the sample jug using the sample collection line. Let this water set in the jug for 24 hours and then analyze for total phosphorus. Preserve this sample as described above.

Finalized May 2006



## ATTACHMENT B

### Genetic Testing Requirements for Non-Marine Aquaculture Atlantic Salmon

Maine's Aquaculture general permit and individual MEPDES Permits for marine aquaculture facilities contain requirements to address the genetic integrity of Atlantic salmon raised in Maine for aquaculture. The genetic requirements are implemented at the marine sites as well as at the hatchery and rearing facilities that raise and supply salmon for marine aquaculture. In the event the permittee intends to keep Atlantic salmon eggs or fish at the Embden facility that are not intended for marine aquaculture, or are otherwise not included in the above described genetic testing requirements, the permittee shall comply with the following requirements.

1. a. **The use of Atlantic salmon eggs or fish** (hereinafter referred to as Atlantic salmon) **originating from non-North American stock are prohibited at the Embden facility.** Non-North American stock is defined as any Atlantic salmon (*Salmo salar*) that possess genetic material derived partially (hybrids) or entirely (purebreds) from any Atlantic salmon stocks of non-North American heritage, regardless of the number of generations that have passed since the initial introduction of the non-North American genetic material. For the purposes of this permit, classification of brood fish as either North American or non-North American stock will be based on genetic evaluation of each fish's DNA in accordance with the Atlantic Salmon Microsatellite Analysis Protocol (salmon testing protocol) below. The Microsatellite Protocol shall be used to classify each brood fish and only the progeny of brood fish classified as North American stock will be allowed at the facility.

If sub-samples of a population are to be used to demonstrate compliance with the salmon testing protocol, the sub-samples shall be demonstrated to be a statistically valid representation of the population and the sampling scheme shall be approved by NOAA Fisheries and/or the U.S. Fish and Wildlife Service.

- b. Only fish determined to be North American, according to the salmon testing protocol, can be used to produce offspring to be placed at the facility.
- c. **Prior to January 1 of each year [PCS Code 53799],** beginning the effective date of this permit, genetic evaluation information developed pursuant to the salmon testing protocol shall be submitted to NOAA Fisheries and/or the US Fish and Wildlife Service, with confirmation sent to the Department.

## **Genetic Testing Requirements for Non-Marine Aquaculture Atlantic Salmon (cont'd)**

- d. **Prior to March 1 of each year** [PCS Code 53799],, beginning the effective date of this permit, the facility shall submit to the Department a letter from NOAA Fisheries and/or the US Fish and Wildlife Service certifying the results of the genetic evaluation information submitted pursuant to section 1.c, above. In the event any fish or gametes are found to be non-North American pursuant to the salmon testing protocol, the facility shall also report to the Department the disposition of those fish or gametes.
  - e. **At least 30 days prior** to bringing any Atlantic salmon to the facility that are not destined for marine aquaculture and are thus not subject to the salmon testing protocol through other permit requirements, the permittee shall provide the Department with written confirmation regarding compliance with these conditions.
2. Transgenic salmonids are prohibited. Transgenic salmonids are defined as species of the genera *Salmo*, *Oncorhynchus* and *Salvelinus* of the family Salmonidae and bearing, within their DNA, copies of novel genetic constructs introduced through recombinant DNA technology using genetic material derived from a species different from the recipient, and including descendants of individuals so transfected.
  3. Personnel from the Department, the Department of Marine Resources, the US Environmental Protection Agency, NOAA Fisheries, the US Fish and Wildlife Service and the Maine Atlantic Salmon Commission shall be allowed to inspect the facility during normal operation hours. These personnel will provide credentials attesting to their position and will follow the site's biosecurity procedures and may, at market value, purchase random samples of salmon from the facility to monitor compliance with these conditions. Operational records regarding compliance with this permitting action shall be made available to these personnel for their inspection upon request.
  4. The intentional release of Atlantic salmon to the receiving waters is prohibited.

### **Atlantic Salmon Microsatellite Analysis Protocol (salmon testing protocol)**

This protocol will be used to determine which Atlantic salmon can be used for breeding and production stock pursuant to the requirements of this permitting action. The protocol describes a standardized procedure to classify fish as either North American or non-North American stock and is largely based on the procedures used by King et al. (2001; Molecular Ecology, 10: 807-821). The permittee shall be responsible for providing genotype data to the US Fish and Wildlife Service and the National Marine Fisheries Service (the "Services") for data analysis and fish classification as described herein.

## **Atlantic Salmon Microsatellite Analysis Protocol (salmon testing protocol)**

### DNA isolation

Genomic DNA will be isolated from tissue, fin clip or scale samples from each fish intended for use as broodstock employing either a commercially available DNA extraction, such as PureGene (Gentra Systems) or DNeasy tissue kit (Qiagen Inc.) or a phenol/chloroform based extraction system such as used in Patton et al. (1997; Can. J. Fish. Aquat. Sci., 54: 1548-1556) or, particularly for scales, a Chelex-resin based protocol such as given in King et al. (2001). Quality and quantity of DNA will be visualized on 0.8 percent agarose gels, which will include a commercially available DNA standard for quantification and size determination.

### Microsatellite analysis

The loci used to classify brood fish as either North American or non-North American stock will be: Ssa85, Ssa171, Ssa197, and Ssa202 (O'Reilly et al. 1996); SSOSL311 and SSOSL438 (Slettan et al. 1995, 1996) and Ssa289 (McConnel et al. 1995).

PCR conditions for the selected loci will essentially follow that of King et al. (2001) and Patton et al. (1997) with possible minor modifications for optimization of products of individual loci. The loci will be labeled with the dyes, Ned, Hex, and 6-Fam by ABI or any other comparable commercial supplier of labeled oligonucleotides. The size standard to be used will be 400 HD Rox (ABI). Microsatellite analysis will be performed using the ABI 3100 autosequencer or any other commercial system providing equivalent results. Fragment analysis will be accomplished using a combination of GENESCAN and GENOTYPER software packages from ABI, or any other commercial system providing equivalent results. The facility will present electronic data tables from the GENOTYPER program to the Services in spreadsheet format in Excel or any other commercially available program providing equivalent results that allow the data to be easily reformatted for subsequent analyses. The output files (gel tracings) from GENESCAN and GENOTYPER will also be provided by the facility at the same time to help the Services assure data quality. Data provided must be complete at all loci for all fish.

### Size verification of allelic products

To ensure accurate sizing of allelic products from the fish relative to the designations developed in the King laboratory (see King et al. 2001), Dr. King will provide samples for use as controls. The Services will provide an adequate supply of DNA samples from representative fish of known genotypes to enable calibration of equipment throughout the term of the controlling permit conditions. Control samples will be used at the inception of the study to set the automated allele designation/binning parameters of the GENOTYPER software so that all subsequent calls made for aquaculture fish will be automatically sized relative to the standards originally provided by Dr. King.

## **Atlantic Salmon Microsatellite Analysis Protocol (salmon testing protocol)**

### ***Genetic screening***

Identification of North American stock will be based on assignment tests performed with GeneClass, [www.montpellier.inra.fr/URLB/geneclass/geneclass.html](http://www.montpellier.inra.fr/URLB/geneclass/geneclass.html). Atlantic salmon for the facility will be compared to two reference groups. The first group will be comprised of samples from North America (Dennys, Ducktrap, East Machias, Machias, Narraguagus, Penobscot mainstem, Pleasant, Sheepscot, Conne, Gold, Gander, Miramichi, Saguenay, and Stewiacke rivers and aquaculture stocks derived from St John and Penobscot populations). The second group will be comprised of non-North American samples from at least 2 rivers each from Iceland, Norway, Finland, Scotland, Ireland, and Spain and the Landcatch aquaculture strain. Genetic data for the two reference groups are available upon request from the Northeast Fishery Center of the USFWS, (570) 726-4247.

The likelihood for assigning any given fish to each reference population will be calculated using the program GeneClass. If the ratio of the likelihood scores indicates that North American origin is at least twice as likely as non-North American origin, then that fish will be considered to be of North American origin. All other fish will be classified as non-North American stock. The Services will promptly report the results to the facility.



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

**FACT SHEET**

Date: August 17, 2006

MEPDES PERMIT NUMBER: #ME0110132  
WASTE DISCHARGE LICENSE: #W007608-5Q-D-R

NAME AND ADDRESS OF APPLICANT:

**Atlantic Salmon of Maine  
P.O. Box 380  
Oquossoc, ME. 04630**

COUNTY: **Somerset County**

NAME AND ADDRESS WHERE DISCHARGE OCCURS:

**Atlantic Salmon of Maine  
Embden Hatchery  
138 Levee Drive  
Embden, Maine**

RECEIVING WATER / CLASSIFICATION: **Kennebec River / Class A**

COGNIZANT OFFICIAL AND TELEPHONE NUMBER: **Mr. Greg Lambert  
Production Manager  
(207) 864-3664**

**1. APPLICATION SUMMARY**

ASM has applied for a renewal of combination Waste Discharge License (WDL) #W007608-5Q-C-R/W007608-5Q-C-T, that was issued by the Department on August 26, 1999 and expired on August 26, 2001. The WDL approved the discharge of up to a daily maximum of 17.28 million gallons per day (MGD) of fish hatchery waste water from a commercial Atlantic salmon hatchery and rearing facility to the Kennebec River, Class A, in Embden Maine.

## 2. PERMIT SUMMARY

- a. Regulatory – On January 12, 2001, the Department received authorization from the U.S. Environmental Protection Agency (USEPA) to administer the National Pollutant Discharge Elimination System (NPDES) permit program in Maine, excluding areas of special interest to Maine Indian Tribes. On October 30, 2003, after consultation with the U.S. Department of Justice, USEPA extended Maine's NPDES program delegation to all but tribally owned lands. The extent of Maine's delegated authority is under appeal at the time of this permitting action. From that point forward, the program has been referred to as the Maine Pollutant Discharge Elimination System (MEPDES) program and permit #ME0110132 will be utilized as the primary reference number for the Embden facility.
- b. Terms and conditions – This permitting action is similar to the August 24, 1999 WDL in that it is carrying forward the:

**This permitting action is similar to the August 26, 1999 WDL in that it is carrying forward the:**

1. reporting requirement for mass of fish on hand; and
2. pH limit of 6.0-8.5 standard units.

**This permitting action is different from the August 26, 1999 in that it is:**

1. eliminating the previous 17.28 MGD daily maximum discharge flow limit and establishing a monthly average discharge flow limit of 15.43 MGD;
2. establishing BOD and TSS monthly average and daily maximum concentration limits with a provision for the Department to establish new limits in the future based on technology performance analyses of the industry as a whole;
3. establishing BOD and TSS monthly average and daily maximum mass limits derived from previous license effluent limits;
4. establishing a seasonal monthly average phosphorus mass limit derived from a previous license effluent limit, a monthly average water quality based concentration limit, and daily maximum monitoring requirements;
5. establishing seasonal monthly average and daily maximum orthophosphate mass and concentration monitoring requirements for one year following commencement of operations;
6. establishing a Department best practicable treatment (BPT) based daily maximum mass and concentration limits for formalin and monthly average mass and concentration reporting requirements;
7. establishing minimum monitoring frequency and sample type requirements based on Department best professional judgment (BPJ);
8. eliminating seasonal monitoring and reporting requirements for dissolved oxygen in the facility effluent;
9. eliminating ammonia nitrogen effluent limits and reporting requirements;
10. eliminating nitrate nitrogen monitoring and reporting requirements;
11. eliminating the previously established seasonal receiving water study requirements;

**2. PERMIT SUMMARY (cont'd)**

12. requiring a current facility Operation and Maintenance Plan;
13. requiring submittal of an Alternative Discharge Study report six months prior to permit expiration;
14. modifying requirements for settling basin cleaning;
15. requiring compliance with existing state salmonid fish health rules;
16. modifying requirements related to proper use and record keeping of therapeutic agents;
17. establishing record keeping requirements for disinfecting/sanitizing agents;
18. establishing BPJ derived minimum treatment technology requirements;
19. requiring a fish Containment Management System with provisions for auditing and reporting; and
20. establishing procedures for genetic testing of Atlantic salmon kept at the facility to ensure that they are of North American origin.
21. establishing a requirement to notify and meet with the Department prior to commencing operations at the facility.
22. limiting the term of the permit to two (2) years.

c. History: The most recent licensing/permitting actions include the following:

*August 31, 1988* – Kennebec Aquaculture submitted an application to the USEPA for the discharge of up to a daily maximum of 17.28 MGD of waste water from a proposed salmon hatchery and rearing facility located in Embden, Maine. The proposed discharge was to be to the Kennebec River, Class B, located approximately ½ mile below the Williams Dam. The USEPA assigned a permit number of ME0110132 to the project/permit.

*October 11, 1988* – The Department issued WDL #W007608-67-A-N to Kennebec Aquaculture for the discharge of up to a monthly average of 17.3 MGD of fish hatchery and rearing facility waste water to the Kennebec River in Embden. The WDL was issued for a five-year term.

*September 30, 1989* – The Maine legislature amended the water classification statute found at 38 MRSA, Section 467§(4)(A)(7), P.L. 1989 Chapter 228 to reclassify a portion of the Kennebec River from Class B to Class A. The reclassified segment of the river included the point at which the Embden hatchery discharges its effluent.

*January 24, 1996* - The Department interpreted the Legislature's intent in its September 30, 1989 reclassification of the Kennebec River in Bingham and Embden to "grandfather" the discharge existing at that time from the Class A requirement that the effluent be of equal or better quality than the receiving water. See Fact Sheet Section 6 for clarification of this grandfathering.



## 2. PERMIT SUMMARY (cont'd)

*January 30, 1997* – The USEPA issued a letter to Atlantic Salmon of Maine that it was transferring the application materials submitted by Kennebec Aquaculture on 8/31/88 to ASM. It is noted the EPA never acted on said application therefore, a NPDES permit has never been issued for the facility.

*August 26, 1999* – The Department issued combination WDL renewal #W007608-5Q-B-R and transfer W007608-5Q-C-T to Atlantic Salmon of Maine for the discharge of up to a daily maximum of 17.28 MGD of fish hatchery and rearing facility waste water. The WDL was issued for a two-year term.

*July 10, 2000* – The Department issued a letter to ASM stating the in-stream monitoring requirements as specified in Special Condition B, *Receiving Water Study*, of the 8/26/99 WDL were being suspended for the duration of the license.

*January 12, 2001 & October 30, 2003* – The Department received authorization from the EPA to administer the NPDES program in Maine.

*August 13, 2001* – ASM submitted a timely and complete application to the Department to renew the WDL last issued by the Department on 8/26/99.

- d. Source Description/ Facility Operation: The Embden facility experience a fire in calendar year 2003 which resulted in operations at the facility being shutdown. The facility has not commenced operations as of the date of this permitting action. (See Special Condition N of this permit). The text that follows describes the operations and waste water treatment facility infrastructure in place just prior to the fire.
1. Influent Water: The permittee co-mingles surface water from the Kennebec River and ground water extracted from on-site wells located near the river having yields of up to 3,500 gallons per minute (gpm). The ground water temperature stays constant throughout the year at a range of approximately 7-11° Celsius (44-52° Fahrenheit), but is heated at various times to facilitate fish development.
  2. Hatchery and rearing operations: The permittee's hatchery facility (see Attachment B of this Fact Sheet) has a climate controlled building containing stacks of egg trays. Influent water is disinfected through ultraviolet (UV) light bulbs. The facility also contains 115, 1.5-meter diameter fiberglass tanks, designed to provide space for egg incubation and space for fry development in the tanks upon hatching. The permittee incubates eggs in both the egg trays and tanks. The eggs hatch in 6-8 weeks in late December - January as alevin (with yolk sacs). The facility also contains 108, 3.7-meter diameter x 2.5-foot deep circular fiberglass tanks, and 5, 10-meter diameter metal frame tanks with liners used for grow-out of fish. After having consumed their yolk sacs, the permittee begins manually feeding the fish. The maximum feeding takes place between July and October of each year. The 8/13/01 application for permit renewal states that the monthly average quantity of food delivered to the fish was 729 lbs/day with a maximum amount

## 2. PERMIT SUMMARY (cont'd)

of approximately 1,689 lbs/day. The number of first year class fish on-site has been as high as 841,000 fish totaling 262,000 pounds of biomass.

Wastewater Treatment: Wastewater treatment at the facility consists of a 60-micron microscreen drum filter with a capacity of at least 4,000 gpm per drum and a biofilter to enhance recirculation and reuse of waters at the facility. All waste water generated at the facility is conveyed to two treatment lagoons, each measuring approximately 90 feet x 225 feet x 10 feet for a total capacity of 2.7 million gallons (maintaining a minimum of one foot of freeboard) which are operated in parallel. The sludge ponds are checked for sludge depth annually and cleaned on an as needed basis. Sludge excavated from the ponds are applied to agricultural fields in the area.

Outfall #001 as depicted on Attachment A of this Fact Sheet is capable of discharging a monthly average of 15.43 MGD and a daily maximum of 17.28 MGD.

Outfall #001 is a 24-inch diameter PVC pipe that extends out into the thread of the Kennebec River and has approximately ten foot over the crown of the pipe at the mean low water level of the Kennebec River. The Department has made the determination the discharge from Outfall #001 receives rapid and complete mixing with Kennebec River at the point of discharge.

Use of agents for therapeutic and disinfecting/sanitizing purposes are addressed in subsequent Fact Sheet sections titled accordingly.

## 3. CONDITIONS OF PERMITS

Maine law, 38 M.R.S.A. Section 414-A, requires that the effluent limitations prescribed for discharges, including, but not limited to, effluent toxicity, require 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, 38 M.R.S.A., Section 420 and Department rule 06-096 CMR Chapter 530, *Surface Water Toxics Control Program*, require the regulation of toxic substances not to exceed levels set forth in Department rule 06-096 CMR Chapter 584, *Surface Water Quality Criteria for Toxic Pollutants*, 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

Maine law, 38 M.R.S.A., Section 467§4(A)(7) classifies the Kennebec River at the point of discharge as a Class A water. Maine law, 38 M.R.S.A., Section 465§2, describes the standards for Class A waters.

On January 24, 1996, regarding three commercial fish hatcheries / rearing facilities in like situation, the Department interpreted the Legislature's intent to "grandfather" the discharge existing at that time from the Class A requirement that the effluent be of equal or better quality than the receiving water. See Fact Sheet Section 6 for clarification of this grandfathering.

On September 30, 1989, the Maine Legislature amended the water classification statute to reclassify the portion of the Kennebec River including the segment of the river above and below the Embden hatchery's point of discharge from Class B to Class A.

#### 5. RECEIVING WATER QUALITY CONDITIONS

A document entitled, State of Maine, Department of Environmental Protection, 2004 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 a 23.1 mile Class A segment of the Kennebec River main stem (Segment ID#337R) from the Wyman Dam to the Carrabassett River, in a section entitled, *Category 2: Rivers and Streams Attaining Some Designated Uses – Insufficient Information for Other Uses*. The document states that this segment of the river was previously included in a section entitled, *Category 4C, Rivers and Streams with Impairment Not Caused by a Pollutant*, of the 2002 305(b) report due to the fact aquatic life standards were not being met due to fluctuating flow regimes caused by the operation of hydroelectric facilities above the Embden hatchery facility, more specifically the Wyman Dam in Bingham. The Department issued a Section 401 Water Quality Certification for the Wyman Dam in calendar year 1995 that resulted in additional flow being passed from Wyman Dam during natural low flow conditions. It is noted the 2004 305b report indicates macro-invertebrate sampling in 2001 and 2002 indicate the new flow regime required by said water quality certification has resulted in attainment of aquatic life standards.

A section entitled, *Category 4-B-3, Waters Impaired By Atmospheric Deposition of Mercury, Regional or National TMDL May be Required* in the 2004 305b report states that all freshwaters in Maine are listed as only partially attaining the designated use of recreational fishing due to a fish consumption advisory. The advisory was established in response to elevated levels of mercury in some fish caused by atmospheric deposition. The Department has no information that the discharge from ASM's Embden facility is causing or contributing to the non-attainment conditions.

## 6. EFFLUENT LIMITATIONS & MONITORING REQUIREMENTS

On June 30, 2004, USEPA finalized the Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category (National Effluent Guidelines). The earlier September 12, 2002 proposed National Effluent Guidelines (NEGs) and subsequent working draft NEGs established numerical limitations for the discharge of TSS and requirements for facilities to develop and implement best management practices (BMP) plans for control of other pollutants.

In the final NEGs, EPA expressed effluent limitations in the form of narrative standards, rather than as numerical values. The final NEGs require facilities to develop and implement BMPs regarding operation and maintenance of the facility, as does this permitting action. EPA stated that it determined it more appropriate to promulgate limits “...that could better respond to regional and site-specific conditions and accommodate existing state programs in cases where these appear to be working well.” The final NEGs reference a section of the federal Clean Water Act inclusive of 40 CFR, Part 125.31(f), which states, “Nothing in this section shall be construed to impair the right of any State or locality under section 510 of the Act to impose more stringent limitations than those required by Federal law.” Section 510 states, “Except as expressly provided in this Act, nothing in this Act shall (1) preclude or deny the right of any State...to adopt or enforce...any standard o(r) limitation respecting discharges of pollutants, or...any requirement respecting control or abatement of pollution; except that if an effluent limitation...or standard of performance is in effect under this Act, such State...may not adopt or enforce any effluent limitation...or standard of performance which is less stringent than the effluent limitation...or standard of performance under this Act; or (2) be construed as impairing or in any manner affecting any right or jurisdiction of the States with respect to the waters...of such States ”.

Pursuant to Maine Law (38 M.R.S.A., §414-A.1), the Department shall only authorize discharges to Maine waters when those discharges, either by themselves or in combination with other discharges, “will not lower the quality of any classified body of water below such classification”. Further, “the discharge will be subject to effluent limitations that require application of the best practicable treatment”. “Best practicable treatment (BPT) 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 available, 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” (40 CFR). “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 judgement...” considering “...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...”. Pursuant to 38 M.R.S.A., §414-A.1 and §464.4, the Department regulates wastewater discharges through establishment of effluent limitations and monitoring requirements that are protective of Maine waters.

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

Between calendar years 2000 and 2002, eleven Maine fish hatcheries were evaluated to identify potential options for facility upgrades. All nine Maine Department of Inland Fisheries and Wildlife hatcheries were evaluated by FishPro Inc., while the two USFWS hatcheries were evaluated by the Freshwater Institute. Recommended wastewater treatment upgrades for each of the facilities included microscreen filtration of the effluent. Based on the information provided and Department best professional judgement (BPJ), the Department is specifying that minimum treatment technology for the permittee's facility shall consist of treatment equal to or better than 60-micron microscreen filtration of the effluent, wastewater settling/clarification, and removal of solids (Permit Special Condition K). The permittee shall provide treatment equal to or better than the BPJ minimum treatment technology and shall comply with all effluent limitations, monitoring requirements, and operational requirements established in this permitting action. Additional treatment may be necessary to achieve specific water quality based limitations.

In a January 24, 1996 letter, the Department addressed the issue of applicable effluent and water quality standards for those licensed discharges existing when a receiving water classification is upgraded from Class B to Class A, as was the case for the permittee's facility. Class A water standards [38 MRSA, Section 465(2)(C)] require that the effluent from direct discharges licensed after January 1, 1986, must "be equal to or better than the existing water quality of the receiving waters" and that discharges licensed before January 1, 1986, "are allowed to continue only until practical alternatives exist". Based on the Department's 1996 letter and as clarified in 2004, for those existing licensed discharges the Department will apply the more stringent of the previous discharge license effluent limits or newly calculated BPT or water quality based effluent limits, taking into consideration past demonstrated effluent performance, in lieu of the "equal to or better" standard. The aquatic life, bacteria, and dissolved oxygen standards applicable to the previous discharge license (Class B standards) will be carried forward until the receiving water is able to meet Class A standards. The licensee/permittee must conduct an Alternative Discharge Study at least prior to each relicensing to determine if the discharge can be eliminated or if there is treatment technology and/or practices available that will result in improved effluent and receiving water quality, ultimately resulting in attainment of Class A standards. All new discharges of pollutants or increases in pollutants in a licensed/permitted facility's existing discharge, excluding flow, must meet all Class A standards.

- a. Flow: The previous licensing action established a daily maximum discharge limit of 17.28 MGD and a requirement to monitor and report the monthly average discharge flow. Monitoring was required to be conducted twice per month from July 1 through September 30 and once per month from October 1 through June 30 each year. A review of the DMR data for the summer period July 2000 through September 2003 indicates the monthly average flow has ranged from 1.49 MGD to 6.71 MGD with an arithmetic mean of 4.92 MGD. As for the non-summer months, a review of the DMR data from October 2000 to May 2003 indicates the monthly average flow has ranged from 4.1 MGD to 6.94 MGD with an arithmetic mean of 5.39 MGD.

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

In an 8/31/88 application submitted to the USEPA for a NPDES permit, Kennebec Aquaculture indicated the monthly average design flow for the facility was to be 15.43 MGD and the daily maximum flow was to be 17.28 MGD. Due to the uncertainty of future operations at the facility, the Department is establishing a monthly average flow limitation of 15.43 MGD based on the 8/31/88 application.

- b. Dilution Factors: Dilution factors associated with the discharge from ASM's Embden's waste water treatment facility were derived in accordance with freshwater protocols established in Department Regulation Chapter 530, Surface Water Toxics Control Program, October 2005 and methods for low flow calculation contained in Estimating Monthly, Annual, and Low 7-day, 10-year Streamflows for Ungaged Rivers in Maine (Scientific Investigations Report 2004-5026, US Department of Interior, US Geological Service). With a monthly average flow limitation of 15.43 MGD, dilution calculations are as follows:

$$\text{Mod. Acute: } \frac{1}{4} \text{ 1Q10} = 127 \text{ cfs} \quad \Rightarrow \frac{(127 \text{ cfs})(0.6464) + 15.43 \text{ MGD}}{15.43 \text{ MGD}} = 6.3:1$$

$$\text{Acute: } \text{1Q10} = 508 \text{ cfs} \quad \Rightarrow \frac{(508 \text{ cfs})(0.6464) + 15.43 \text{ MGD}}{15.43 \text{ MGD}} = 22.3:1$$

$$\text{Chronic: } \text{7Q10} = 1,280 \text{ cfs} \quad \Rightarrow \frac{(1,280 \text{ cfs})(0.6464) + 15.43 \text{ MGD}}{15.43 \text{ MGD}} = 54.6:1$$

$$\text{Harmonic Mean} = 2,777 \text{ cfs} \quad \Rightarrow \frac{(2,777 \text{ cfs})(0.6464) + 15.43 \text{ MGD}}{15.43 \text{ MGD}} = 117.3:1$$

Chapter 530(4)(B)(1) states that analyses using numeric acute criteria for aquatic life must be based on  $\frac{1}{4}$  of the 1Q10 stream design flow to prevent substantial acute toxicity within any mixing zone. The regulation goes on to say that where it can be demonstrated that a discharge achieves rapid and complete mixing with the receiving water by way of an efficient diffuser or other effective method, analyses may use a greater proportion of the stream design, up to including all of it. The Department has made a best professional judgment that the discharge receives rapid and complete mixing with the receiving waters given the outfall pipe for the facility is reported to be in the thread of the Kennebec River with 10 feet of water over the crown of the pipe.

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

- c. BOD and TSS: The previous licensing action contained monthly average mass reporting requirements expressed in pounds of pollutant per 100 pounds of fish on hand for biochemical oxygen demand (BOD) and total suspended solids (TSS). For concentration, the previous licensing action established a monthly average limit of 2 mg/L for TSS but did not establish any concentration limitations or reporting requirements for BOD. Composite samples were required at frequencies of twice per month from July 1 through September 30 and once per month from October 1 through June 30 of each year. The previous licensing action stated, limitations "*for BOD and TSS (July-Sept. portion only) were net based on effluent minus influent values. The licensee shall report the influent, effluent, and net value for each parameter.*"

In licensing actions for twelve state and commercially owned fish hatcheries in 1999 and 2000, the Department established monthly average concentration limits for BOD and TSS of 2 mg/L based on the Department's best professional judgement of best practicable treatment limits. The BPT limits were developed based on the Department's analysis of effluent data from licensed fish hatcheries in Maine supplied through Discharge Monitoring Reports (DMRs). Based on this analysis, the Department determined that the concentration limits of 2 mg/L constituted achievable levels of these pollutants in fish hatchery wastewater. The Department also required that the BOD and TSS effluent mass be monitored and reported in pounds per 100 pounds of fish on hand. Through extensive facility inspections in 2002, the Department discovered significant variability in facility effluent sampling procedures, calling into question the validity of submitted DMR data, the previous data analysis, and the Department's previous assumptions and conclusions.

In the 2002 proposed NEG, EPA recommended national TSS effluent limitations for recirculating and flow-through hatcheries of various designs and levels of production. The most restrictive recommended limits were based on a secondary level of fish hatchery wastewater treatment and consisted of a monthly average limit of 6 mg/L and a daily maximum limit of 10 mg/L. The 2002 proposed draft NEG did not propose to regulate BOD as EPA believed it would be managed through best management practices at the hatcheries and treatment for TSS.

According to EPA's final NEG, effluent from fish hatcheries and rearing facilities can contain "...*high concentrations of suspended solids and nutrients, high BOD and low dissolved oxygen levels. Organic matter is discharged primarily from feces and uneaten feed*". As stated in the 2002 proposed NEG, "*elevated levels of organic compounds contribute to eutrophication and oxygen depletion.*" This is expressed as BOD "*...because oxygen is consumed when microorganisms decompose organic matter*". "*The greater the BOD, the greater the degree of pollution and the less oxygen available.*" The discharge of high BOD wastewater to small receiving waters with insufficient dilutions can result in formation of oxygen deficient areas known as sag points. Oxygen sag points

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

represent both localized impacts to habitat and aquatic life as well as barriers to migration throughout the receiving water. Based on this premises and a long standing practice of regulating effluent BOD, the Department considers BOD a significant pollutant and therefore is establishing effluent limitations and monitoring requirements.

In this permitting action the Department is establishing a BPJ of minimum treatment technology for the Embden facility (Permit Special Conditions L, Fact Sheet Section 13). BOD and TSS concentration limits of 6 mg/L for monthly average and 10 mg/L for daily maximum, as well as mass limits based on the Department's upgrade "grandfathering" determination described in Fact Sheet Section 6, shall be in effect for Outfall #001A. These concentration numbers are based on fish hatchery wastewater secondary treatment projections and the Department's judgment that effluent BOD should also be regulated. The Department has evaluated actual and projected post-facility upgrade effluent quality data for a significant number of fish hatcheries in Maine and determined that facilities incorporating the minimum treatment technology outlined can be expected to consistently meet the BOD and TSS concentration limits established in this permitting action. It is the Department's intent to re-evaluate and potentially revise limits in the future based on statistical evaluations of demonstrated performance of consistently and properly utilized treatment technology for the industry. The Department reserves the right to reopen facility discharge permits to establish these limits pursuant to Special Condition N of this permit.

Pursuant to 38 M.R.S.A., § 465.2(C), discharges into Class A waters "*...licensed after January 1, 1986, are permitted only if...the discharged effluent will be equal to or better than the existing water quality in the receiving water. Discharges ...licensed prior to January 1, 1986, are allowed to continue only until practical alternatives exist*". Pursuant to this and the Department's upgrade "grandfathering" determination described in Fact Sheet Section 6, any new or increased discharges of pollutants beyond those and their levels included in the previous licensing action are considered as new discharges. Thus, effluent mass limits are being held to prior licensed levels. Therefore, the Department is establishing effluent mass limits based on the more stringent of the technology based limitations originally proposed in the federal NEGs or discharge levels established in the previous licensing action. The Department has reviewed the monthly DMR data for calendar years 2000-2003 for the Embden hatchery. The data indicates BOD and TSS (gross values) have been discharged at less than or equal to 2 mg/L. This permitting action establishes mass limitations equivalent to limitations established in the previous licensing action but expressed in terms of lbs/day rather than lbs/100 lbs of fish on hand in lieu of the "equal to or better" standard for Class A waters. Therefore, the Department is establishing monthly average and daily maximum mass limitations for both BOD and TSS of 257 lbs/day and 288 lbs/day respectively. The calculations are as follows:

$$\text{Monthly average:} \quad (15.43 \text{ MGD})(8.34)(2 \text{ mg/L}) = 257 \text{ lbs/day}$$

$$\text{Daily Maximum:} \quad (17.28 \text{ MGD})(8.34)(2 \text{ mg/L}) = 288 \text{ lbs/day}$$



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

All new proposed discharges of pollutants or increases in pollutants in the existing discharge, excluding flow, must meet all Class A standards. Therefore, as the number and mass of fish on station increases, the permittee may need to provide additional wastewater treatment that will hold effluent quality constant. This permitting action establishes once per week effluent BOD and TSS monitoring on a year-round basis based on the Department's BPJ of monitoring frequencies necessary to more accurately characterize facility effluent conditions.

- d. Total Phosphorus and Orthophosphate: Phosphorus is a nutrient that encourages the growth of plants such as planktonic algae and macrophytes in northern waters. Oxygen levels in the water are reduced in the early morning hours due to extended nighttime respiration of algae. The decomposition of excess plant material further reduces the amount of available oxygen in the water through biochemical oxygen demand. Lowering oxygen levels in a receiving water impacts the aquatic life in that water, making it unfit for some forms of life. Further, enrichment from excess nutrients, such as phosphorus, can result in reductions in aquatic macro-invertebrate species diversity, an indicator of the overall health of a receiving water. Excess phosphorus can also result in undesirable aesthetic conditions in a receiving water, impacting that water's ability to meet standards for maintaining recreational use, a designated use by law. Therefore, any increase in the phosphorus content in a receiving water has the potential to cause or contribute to non-attainment of classification standards. Orthophosphate is the portion of total phosphorous that is readily available for uptake by aquatic plants. It is important to be able to characterize the facility effluent in terms of the relationship between orthophosphate and total phosphorus in order to better understand the effects on the receiving water. Maine law (38 MRSA § 464.4.A.4) states that "*...the Department may not issue a water discharge license for...the...discharge of pollutants to waters of the State that...cause those waters to be unsuitable for the designated uses and characteristics ascribed to their class*". Further, pursuant to 38 M.R.S.A., § 465.2(C), discharges into Class A waters "*...licensed after January 1, 1986, are permitted only if...the discharged effluent will be equal to or better than the existing water quality in the receiving water. Discharges...licensed prior to January 1, 1986, are allowed to continue only until practical alternatives exist*". Pursuant to this and the Department's upgrade "grandfathering" determination described in Fact Sheet Section 6, any new or increased discharges of pollutants beyond those and their levels included in the previous licensing action are considered as new discharges. Thus, effluent mass limits are being held to no more than prior licensed levels.

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

The previous licensing action contained a year-round monthly average total phosphorus concentration limit of 0.15 mg/L and a year-round monthly average mass reporting requirement in pounds of phosphorus per 100 pounds of fish on hand. Composite samples were required at frequencies of twice per month from July 1 through September 30 and once per month from October 1 through June 30 each year. The previous licensing action stated, limitations “for BOD (July-Sept. portion only), total suspended solids, ammonia nitrogen, nitrate, and total phosphorus are net based on effluent minus influent values. The licensee shall report the influent, effluent, and net value for each parameter.”

The Department has reviewed the most recent four years (July 2000 – September 2003) of total phosphorus data as reported on the DMRs for the Embden facility. The data revealed arithmetic mean ambient levels of phosphorus were 0.004 mg/L and the arithmetic mean net discharge concentrations were 0.17 mg/L for a gross value of 0.174 mg/L.

The previously established net effluent concentration limit of 0.15 mg/L equates to a gross limit of 0.154 mg/L taking into consideration the mean ambient total phosphorus levels were measured to be 0.004 mg/L. Using the gross value of 0.154 mg/L and the previously established maximum discharge flow of 17.28 MGD would yield a gross mass limit of 22 lbs/day of phosphorus. The calculation is as follows;

$$(17.28 \text{ MGD})(8.34)(0.154 \text{ mg/L}) = 22 \text{ lbs/day}$$

The Department has historically utilized an ambient water quality concentration threshold range of 0.035 mg/L – 0.055 mg/L for total phosphorus when assessing water quality impacts and calculating permit limitations. Based on Department research, the threshold range corresponds to the levels at which algae blooms will not typically occur in a receiving waterbody under normal circumstances. As phosphorus is typically of concern under chronic discharge conditions, the 7Q10 dilution of 54.6:1 described in Fact Sheet Section 6b, Dilution Factors, is being utilized in calculating a water quality based effluent limit of 1.9 mg/L ( $0.035 \text{ mg/L} \times 54.6 = 1.9 \text{ mg/L}$ ). Comparatively, utilizing the 1.9 mg/L water quality based value and the monthly average flow of 15.43 MGD flow limitation established in this permitting action, would yield a water quality based monthly average gross mass limit of 245 lbs/day. The calculation is as follows:

$$(15.43 \text{ MGD})(8.34)(1.9 \text{ mg/L}) = 245 \text{ lbs/day}$$

Pursuant to allowable exceptions under the “anti-backsliding” provisions of the Clean Water Act (Fact Sheet Section 7, Anti-backsliding), the Department finds that the earlier concentration limit was established in error and that information is now available which was not available at the time of the previous licensing action, which justifies the application of a less stringent effluent limitation. Therefore, this permitting action establishes the water quality based monthly average effluent concentration limit of

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

1.9 mg/L. However, in terms of mass limits, pursuant to the Department's upgrade "grandfathering" determination described in Fact Sheet Section 6, the Department will apply the more stringent "converted" previous discharge license effluent limit in lieu of the "equal to or better" standard for Class A waters. Based on the calculations above, this permitting action establishes a monthly average gross mass limit of 22 lbs/day for total phosphorus.

All new proposed discharges of pollutants or increases in pollutants in the existing discharge, excluding flow, must meet all Class A standards. Therefore, as the number and mass of fish on station increases, the permittee may need to provide additional wastewater treatment that will hold effluent quality constant

Further, this permitting action is establishing monitoring and reporting requirements for the daily maximum phosphorus concentration and mass discharged. Limits and monitoring requirements are expressed in gross end-of-pipe values. In free flowing rivers and streams, phosphorus is typically a summer time concern for water quality. Therefore, in this permitting action the Department is revising the phosphorus limits and monitoring requirements (previously year-round) so that they are in effect from June 1 through September 30 each year. This permitting action establishes a once per week monitoring requirement based on the Department's BPJ of monitoring frequencies necessary to more accurately characterize facility effluent conditions.

This permitting action also establishes seasonal orthophosphate monitoring requirements from June 1<sup>st</sup> through September 30<sup>th</sup> beginning the first full season following the commencement of operations. Analyses are to be conducted on the same sample as collected for the total phosphorous monitoring. Reported values shall be expressed in gross end-of-pipe values and phosphorous and orthophosphate analysis shall be conducted on the same sample collected. Laboratory analysis shall consist of a low-level phosphorus analysis with a minimum detection limit of 1 part per billion (1 ug/L), equivalent to the previous 0.001 mg/L detection limit. Based on the results of monitoring, the Department may reopen the permit in the future pursuant to Special Condition N to address facility specific effluent limitations, monitoring and operational requirements.

- e. Fish on Hand: The reporting requirement for monthly average and daily maximum mass of fish on hand is being carried forward from the previous licensing action. This parameter is intended to enable both the Department and the permittee in evaluating management practices at the facility and trends in effluent quality and receiving water impacts. The previous licensing action required monitoring of fish on hand at frequencies of twice per month from July 1 through September 30 and once per month from October 1 through June 30 each year. This permitting action establishes once per week monitoring on a year round basis based on the Department's BPJ of monitoring frequencies necessary to more accurately characterize facility effluent conditions.

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

f. Formalin: Fish hatcheries commonly use formalin based biocides for therapeutic treatment of fungal infections and external parasites of finfish and finfish eggs. Formalin products (Paracide-F, Formalin-F, or Parasite-S) contain approximately 37 percent by weight formaldehyde gas. USEPA Region 1 provided information related to formaldehyde concerns and limitations in hatchery permitting in Massachusetts specifying that formalin use should be consistent with U.S. Food and Drug Administration (FDA) labeling instructions (21CFR 1 § 529.1030).

However, toxicity data indicates that formalin is toxic to aquatic organisms at concentrations below FDA labeling guidelines. There are currently no ambient water quality criteria for formalin or formaldehyde established in Maine's Surface Water Criteria For Toxic Pollutants, November 2005. Therefore, the Department is evaluating potential effects, effluent limitations, and monitoring requirements based on currently available information and best professional judgement.

EPA's hatchery permitting program in Massachusetts (EPA/MA) establishes acute and chronic water quality based effluent limits and requires Whole Effluent Toxicity testing in any calendar quarter in which formalin is used at a hatchery. EPA/MA's limits were developed based on work by Gerald Szal, Aquatic Ecologist, Massachusetts Department of Environmental Protection (October 24, 1990). Szal's methodology is based on review of a U.S. Fish and Wildlife document (Bills et al. 1977) which lists lethal concentrations (LC<sub>50</sub>s) of formalin for a variety of fingerling fish. Two species of *Ictalurid* common to Massachusetts waters were selected as appropriate indicator species. Black bullhead had a 96-hour LC<sub>50</sub> of 62.1 ul/l (mg/L) and Channel Catfish had a 96-hour LC<sub>50</sub> of 65.8 ul/l (mg/L).

In addition to the Szal information, the Department reviewed studies provided by EPA's hatchery permitting program in New Hampshire (EPA/NH): Environmental Impact Assessment for the Use of Formalin in the Control of External Parasites on Fish, January 1995 (Dr. Stanley Katz, Rutgers University), a 1995 amendment for review of its use as a fungicide on eggs (Katz), and a 1981 Environmental Assessment titled Use of Formalin in Fish Culture as a Parasiticide and Fungicide (John Matheson, USDA, Bureau of Veterinary Medicine). The most conservative results indicate an LC<sub>50</sub> of 1.15 mg/L of formalin for ostracods from a study by Bells, Marking, and Chandler (1977) included in the 1995 and 1981 studies above.

The Department also reviewed the results of formalin toxicity testing on EPA's ECOTOX database. Published toxicity data contained LC<sub>50</sub> values ranging by several orders of magnitude for the same species in the same studies.

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

Maine's toxics rules (Chapter 530.1.B) state, "*No person may discharge any toxic substance in any amount or concentration...that may cause or contribute to the failure of any classified body of surface water to attain its existing and designated uses or to meet narrative or numeric water quality criteria.*". Further, Chapter 530.3 states, "*the Department shall establish appropriate discharge prohibitions, effluent limits and monitoring requirements in waste discharge licenses...*" as needed to ensure compliance with water quality criteria, existing and designated uses. The Department found a large range of toxicity data for formalin with significant variation between studies. The Department typically uses the most conservative data in order to ensure protection of aquatic life in Maine, however the range of published toxicity data was so extensive and inconclusive that the Department determined that a more focused study specific to Maine waters was warranted. Using methods similar to those specified in Chapter 530 for establishing site specific criteria, the Department contracted with a commercial laboratory (Lotic Inc., Unity, Maine) in October 2003 to provide information on the acute toxicity of formalin to the water flea (*Ceriodaphnia dubia*), a species commonly used in freshwater toxicity testing. All testing was performed by a certified laboratory according to standard methods. According to Katz (1995), formalin undergoes oxidation to formic acid followed by metabolic oxidation by microorganisms to form carbon dioxide and water. The half-life of formalin in water is estimated at 36 hours. Considering the nature of formalin and its intermittent use, the Department determined that acute criteria would be most applicable for comparison.

As reported by the testing laboratory, Lotic Inc., dosing rates in the Department's testing "*were initially established for a range-finding evaluation bracketed by (formalin) concentrations between 4.05 and 500 mg/L using 5 dilutions (0.3 dilution factor)*". Pursuant to standard practices, the dosing ranges were modified downward "*in subsequent tests to more accurately bracket appropriate endpoint determinations (A-NOEC (acute no-effect concentration), LC50)*". A total of four series of tests were conducted with the final two test series (tests) consisting of duplicate "definitive" tests utilizing a 0.5 dilution factor. Lotic reported that trend analyses revealed clear concentration-response relationships for the final three tests. Based on Lotic's experience, differences in survival for the two definitive tests "*are within the realm of normal variability for the testing of dilute organic pollutants*". "*For the two definitive tests, the A-NOECs (IC10s) ranged between 0.62 and 2.5 mg/L; LC50s ranged between 5.13 and 20 mg/L*". "*The A-NOEC for formalin (Parasite S) for C. dubia could be as low as 0.62 mg/L*". However, based on the limited number of tests performed and "*given the test variability in the data for the two definitive tests*", Lotic recommended that "*it would be prudent to average the A-NOEC values from these two evaluations (1.56 mg/L)*". "*This value will still be well below the most conservative LC50 value reported (5.13 mg/L)*". USEPA'S National Exposure Research Laboratory reviewed the testing results and found the variances observed to be appropriate. Further, USEPA found utilization of the 1.56 mg/L value as the A-NOEC to be a reasonable approach supported by test results in formulating an agency best professional judgement determination. Therefore, based on the Department's best professional judgement, this A-NOEC is being utilized as the acute criteria for evaluating

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

a facility water quality based effluent threshold. The Department notes that a permittee is free to undertake site specific and water specific toxicity analyses to provide additional information on the toxicity of formalin.

Multiplying the acute criteria by the low flow dilution factor of 22.3:1 described in Fact Sheet Section 6b, Dilution Factors, yields the following acute water quality based effluent threshold:

$$1.56 \text{ mg/L (acute criteria)} \times 22.3 \text{ (dilution)} = 34.8 \text{ mg/L acute formalin limit}$$

Comparatively, the previous licensing action established a requirement stating, "*at no time shall the discharge of Formaldehyde exceed 5 milligrams per liter*". This limit was based on the Department's best professional judgement at the time. As formaldehyde constitutes 37% of formalin, the 5 mg/L limit would equate to a 13.5 mg/L formalin limit.

Permits issued by the Department impose the more stringent of the calculated water quality based or best practicable treatment (BPT) based limits. Although no formal BPT based limit has been developed for formalin, the Department considers a facility's discharge under best management practices to correspond to BPT. As the previous licensing action's BPT limit of 13.5 mg/L is more stringent than the 34.8 mg/L water quality based threshold calculated, it is being established as the daily maximum formalin concentration limit. The Department has not determined an appropriate chronic limit for formalin use at this time.

This permitting action also establishes effluent mass limits pursuant to Department Rules, Chapter 523.6(f). The daily maximum mass limit is calculated based on the permittee's projected maximum amount of formalin used per day (25 gallons) times the weight of formalin (9.13 lbs/gal), resulting in a value of 228 lbs/day. This method was used to provide for flexibility in management of necessary treatments and to ensure that formalin is not discharged in toxic amounts. Throughout the term of the permit, the permittee shall report the monthly average effluent formalin mass and concentration.

- g. pH – The previous licensing action contained the requirement, "the pH shall not be less than 6.0 or greater than 8.5 at any time unless as naturally occurs in the receiving waters." Grab sampling was required at frequencies of twice per month from July 1 through September 30 and once per month from October 1 through June 30 each year. Review of five years of effluent data revealed no values outside of the 6.0-8.5 standard unit range. Therefore, this permitting action is revising the pH limit to consist of simply the range of 6.0 – 8.5 standard units, consistent with the pH limit established in discharge licenses for other fish hatcheries, which is considered by the Department as a best practicable treatment standard. This permitting action establishes once/week effluent pH monitoring on a year round basis based on the Department's BPJ of monitoring frequencies necessary to more accurately characterize facility effluent conditions.

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

- h. Dissolved Oxygen (effluent): The previous licensing action required the licensee to monitor and report the daily maximum and daily maximum average concentrations of dissolved oxygen in the facility effluent as well as to report the time of day the monitoring was conducted during the period of October 1 through June 30 of each year. The origin of, and value in, these requirements are unknown. Therefore, these requirements are being eliminated in this permitting action.
- i. Ammonia: The previous licensing action established a daily maximum effluent ammonia nitrogen concentration limit of 0.4 mg/L as well as monthly average and daily maximum effluent mass reporting requirements in pounds of ammonia per 100 pounds of fish on hand. Composite sampling was required at frequencies of twice per month from July 1 through September 30 and once per month from October 1 through June 30 each year. The previous licensing action stated, limitations “for BOD (July-Sept. portion only), total suspended solids, ammonia nitrogen, nitrate, and total phosphorus are net based on effluent minus influent values. The licensee shall report the influent, effluent, and net value for each parameter.”

The origin of the 0.4 mg/L limit is not documented and it does not correspond to either the 1974 draft EPA Best Available Technology Economically Achievable (BAT) guidelines for fish hatcheries with wastewater settling and sludge removal or to established acute or chronic ambient water quality criteria for ammonia.

Water quality based limits for ammonia are calculated pursuant to USEPA guidance (1993) for sensitivities of salmonids and other cold water species. Ammonia toxicity varies with pH and temperature, therefore, the Department and EPA evaluate criteria protective for both acute and chronic exposure at a pH of 7.0 and temperature of 25 degrees Celsius.

With dilution factors as calculated above (Fact Sheet Section 6b, Dilution Factors) and chronic and acute water quality based criterion shown below, monthly average (chronic) and daily maximum (acute) water quality based limits for ammonia are calculated as follows:

Chronic Criterion	Acute Criterion	Dilution Factors	Chronic Limit	Acute Limit
1.23 mg/L	16.4 mg/L	54.6:1 (c) 22.3:1 (a)	67.1 mg/L	365 mg/L

The Department reviewed effluent ammonia data for the Embden facility for the summer time period July 2000 – September 2003 to determine ambient, effluent, and net levels of pollutants and to determine whether the discharge exceeds or has a reasonable potential (RP) to exceed ambient water quality criteria (AWQC) for ammonia. The Department’s review indicated arithmetic mean ambient levels of ammonia were 0.06 mg/L and the

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

arithmetic mean net discharge concentrations were 0.75 mg/L. Adding the ambient value to the previously established net effluent limit of 0.4 mg/L yields a gross effluent limit of 0.46 mg/L. Comparatively, the data review indicated that the Embden facility has discharged an average of at or about 0.8 mg/L (gross), a value in excess of the converted previous license limit but only 0.12% of the chronic water quality limit above. Based on this data, the Department has determined that the Embden facility discharge does not exceed or have an RP to exceed AWQC for ammonia. In consideration of this and that the basis for the 0.4 mg/L limit has not been determined, the Department is eliminating ammonia effluent limitations and monitoring requirements in this permitting action.

- j. Nitrate Nitrogen: The previous licensing action established a monthly average reporting requirement of effluent nitrate nitrogen (NO<sub>3</sub>) in pounds per 100 pounds of fish on hand. Composite sampling was required at frequencies of twice per month from July 1 through September 30 and once per month from October 1 through June 30 each year. The previous licensing action stated, limitations "for BOD (July-Sept. portion only), total suspended solids, ammonia nitrogen, nitrate, and total phosphorus are net based on effluent minus influent values. The licensee shall report the influent, effluent, and net value for each parameter." According to the Department's Division of Environmental Assessment, nitrogen is not a limiting nutrient in freshwater environments. Therefore, the Department is eliminating nitrate nitrogen effluent monitoring requirements in this permitting action.
- k. Receiving Water Study: The previous licensing action required the licensee to monitor dissolved oxygen, BOD, TSS, ammonia nitrogen, total phosphorus, and pH in the Kennebec River at locations upstream and downstream of the outfall. Monitoring was required to be conducted in the mornings and afternoons between July 1 and September 30 for a period of two years. The intent of this requirement was to "*better quantify the characteristics of the hatchery effluent, the effectiveness of the various stages of treatment, and to determine effects on water quality...*". On July 10, 2000, the Department suspended requirements for instream water quality monitoring and biomonitoring established in the 1999 WDL based on review of river flow data and effluent discharge monitoring data for the months of July through September, 1997 through 1999. Given the Department's more current macro-invertebrate data for calendar years 2001 and 2002 ( Embden facility in full operation) indicating attainment of aquatic life criteria, the Department has made a best professional judgment that ambient water quality monitoring is not necessary at this time.



## 7. ANTI-DEGRADATION

Maine's anti-degradation policy is included in 38 M.R.S.A., 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 significant lowering of existing water quality. Increased discharge means a discharge that would add one or more new pollutants to an existing effluent, increase existing levels of pollutants in an effluent, or cause an effluent to exceed one or more of its current licensed discharge flow or effluent limits, after the application of applicable best practicable treatment technology. As revisions to previous effluent limitations for some pollutants may appear less stringent, the Department is addressing the implications under the anti-degradation policy.

This permitting action revises previously established effluent limitations and monitoring requirements for several pollutants including BOD and TSS and changes the discharge flow limit. The rationale for these actions is contained in Fact Sheet Section 6, *Effluent Limitations & Monitoring Requirements*. Based on the information provided in the referenced section, as well as anticipated improvements in effluent quality over previous facility discharges due to improved wastewater treatment infrastructure and operations, the Department does not consider these actions to result in increased discharges of pollutants and therefore does not consider the anti-degradation policy to be of issue.

## 8. ALTERNATIVE DISCHARGE STUDY

Maine Law, 38 M.R.S.A., § 465.2(C), states that discharges into Class A waters “...licensed prior to January 1, 1986, are allowed to continue only until practical alternatives exist”. Further, “...the department shall require the applicant to objectively demonstrate to the department's satisfaction that the discharge is necessary and that there are no other reasonable alternatives available.” The Kennebec River in the vicinity of the Embden facility's discharge was upgraded from Class B to Class A in 1989. The Embden facility's wastewater discharge is subject to “grandfathering” to the extent outlined in Fact Sheet Section 6. However, the Embden facility is still subject to the above cited requirements.

Alternative Discharge Studies (ADS) typically evaluate the technical feasibility, estimated costs, and potential environmental impact from alternatives that will result in elimination of a discharge to a receiving water. Such alternatives include, but are not limited to, piping the discharge to a less restrictive receiving water, connecting the discharge to a municipal wastewater treatment facility, and constructing storage capacity and land applying effluent. The study shall include a material and cost breakdown of each identified option, additional equipment necessary, any needed real estate purchases or easements, and other issues and expenses. If no practical alternative for elimination of the discharge exists, then the ADS shall also evaluate modifications to existing wastewater treatment infrastructure and practices that will result in improvement of the effluent quality, such as additional or alternative treatment technology or methods, operational changes, seasonal modifications, discharge reduction, etc.

## 8. ALTERNATIVE DISCHARGE STUDY (cont'd)

As prescribed in Permit Special Condition G of this permit, on or before six months prior to expiration of this permit, the permittee is required to submit to the Department an ADS report for the Embden facility to determine if practical alternatives to the discharge exist. The ADS report shall evaluate wastewater treatment infrastructure, technologies, practices or other modifications that will result in the elimination of the discharge to the receiving water or improvement in the effluent quality.

## 9. SETTLING BASIN CLEANING

Discharge of inadequately treated fish hatchery wastewater (excess feed and fish waste) contributes solids, BOD, and nutrients to receiving waters, which can contribute to eutrophication and oxygen depletion. This, in combination with other pollutant specific toxic effects, impacts the aquatic life and habitat value in the receiving water. Typical hatchery wastewater treatment practices include effluent filtration and settling with solids removal.

The previous licensing action required the licensee to clean its settling basins when accumulated materials occupy 20% of the basin capacity, or prior to this point if the facility is violating its TSS limits. Special Condition H of this permitting action requires the settling basins be cleaned when accumulated materials occupy 20% of a basin's capacity, when material deposition in any area of the basins exceeds 50% of the operational depth, or at any time that said materials in or from the basins are contributing to a violation of permit effluent limits.

## 10. DISEASE AND PATHOGEN CONTROL AND REPORTING

Maine Department of Inland Fisheries and Wildlife (MDIFW) Rules (Chapter 2.03-A) and Maine Department of Marine Resources (MeDMR) Rules (Chapter 24.21) state that "*the transfer and/or introduction of organisms fall within the jurisdiction of the Department of Marine Resources (12 MRSA, §6071) into coastal waters within the State of Maine and the Department of Inland Fisheries and Wildlife (12 MRSA, §§7011, 7035 and 7201, 7202) into public and/or private waters within the State of Maine. These rules are intended to protect wild and farmed salmonid fish populations and shall be applicable to all individuals involved in the culture and movement of live salmonids and gametes.*" Further, both agencies' rules define Diseases of Regulatory Concern as "*...infectious agents that have been demonstrated to cause a significant increase in the risk of mortality among salmonid populations in the State of Maine. Diseases of Regulatory Concern are classified by the Commissioner into three (3) disease categories: exotic, endemic (limited distribution) and endemic based on an annual review and analysis of epidemiological data.*" The previous licensing action required the licensee to notify the MeDMR of any diseases in the fish or eggs of regulatory concern.

## 10. DISEASE AND PATHOGEN CONTROL AND REPORTING (cont'd)

As a salmonid aquaculture facility, the permittee must comply with MDIFW and MeDMR salmonid fish health rules (12 MRSA, §6071; 12 MRSA, §§7011, 7035, 7201, and 7202, or revised rules). The cited rules include requirements for notification to the appropriate agency within 24-hours of pathogen detection. In the event of a catastrophic pathogen occurrence, the permittee shall submit to the Department for review, information on the proposed treatment including materials/chemicals to be used, material/chemical toxicity to aquatic life, the mass and concentrations of materials/chemicals as administered, and the concentrations to be expected in the effluent. The Department will address such occurrences through administrative modifications of the permit.

## 11. THERAPEUTIC AGENTS

In the June 30, 2004 final NEGs, EPA requires proper storage of drugs, pesticides and feed and requires facilities to report use of any investigational new animal drug (INAD), extra-label drug use, and spills of drugs, pesticides or feed that results in a discharge to waters of the U.S.

The previous licensing action required that all medicated fish feeds, drugs, and other fish health therapeutants shall be approved by the US Food and Drug Administration (USFDA) and applied according to USFDA acceptable guidelines. Further, records of all such materials used were to be maintained at the facility for five years. The Department is carrying forward these requirements in this permitting action with modifications that therapeutants be applied according to USFDA accepted guidelines and manufacturer's label instructions and that therapeutic agents must also be registered with USEPA, as appropriate.

This permitting action does not authorize routine off-label or extra-label drug use. Such uses shall only be permitted in emergency situations when they are the only feasible treatments available and only under the authority of a veterinarian. The permittee shall notify the Department in writing within 24-hours of such use. This notification must be provided by the veterinarian involved and must include the agent(s) used, the concentration and mass applied, a description of how the use constitutes off-label or extra-label use, the necessity for the use in terms of the condition to be treated and the inability to utilize accepted drugs or approved methods, the duration of the use, the likely need of repeat treatments, and information on aquatic toxicity. If, upon review of information regarding the use of a drug pursuant to this section, the Department determines that significant adverse effects are likely to occur, it may restrict or limit such use.

This permitting action does not authorize the discharge of drugs authorized by the USFDA pursuant to the Investigational New Animal Drug (INAD) program. As the INAD program typically involves the long-term study of drugs, their benefits and effects, the permittee is anticipated to be able to notify the Department of its intent to conduct, and provide information related to, such study. The permittee is required to provide notification to the Department for review and approval prior to the use and discharge of any drug pursuant to the INAD program. This notification must include information to demonstrate that the

## 11. THERAPEUTIC AGENTS (cont'd)

minimum amount of drug necessary to evaluate its safety, efficacy, and possible environmental impacts will be used. Notifications must also include an environmental monitoring and evaluation program that at a minimum describes sampling strategies, analytical procedures, evaluation techniques and a timetable for completion of the program. The program must consider the possible effects on the water column, benthic conditions and organisms in or uses of the surrounding waters. Review and approval of INAD related uses and discharges will be addressed through administrative modifications of the permit.

**Formaldehyde:** The previous licensing action established a requirement stating, "*at no time shall the discharge of Formaldehyde exceed 5 milligrams per liter*". The discharge of formaldehyde is addressed in Fact Sheet Section 6f, EFFLUENT LIMITATIONS & MONITORING REQUIREMENTS, Formalin, above. The Department is requiring the permittee to continue to report therapeutic agents used at the facility that have the potential to be discharged to the receiving water.

**Sodium Chloride:** The permittee has in past practice used sodium chloride (NaCl, salt) for treatment of fungal infections during egg incubation, fungal infections or external parasites on fish, and prophylactically on fish as they are moved.

For egg treatments, the industry generally administers the salt at a concentration of 3,000 ppm (3 parts per thousand (ppt)) twice per week for 15 minutes between November and December directly to the head tank of the egg trays in flow-through water, thus all egg trays are treated. The rate of water through the egg trays ranges from 2 - 4 gpm per stack for a total of 40-65 gpm which is blended with the flow through water for the facility and eventually to the waste treatment ponds. The discharge concentration from the waste treatment ponds can range from 4 – 8 ppm.

For treatment of fish, the industry generally administers the salt at a dose of 3,000 ppm (3ppt). The salt is administered in a bath in isolated tanks. Once the bath is complete the flow-through water is restored, the waste water exchanged and blended into the full facility waste water flow and eventually to the waste treatment ponds. The discharge concentration from the waste treatment ponds can range from 200 – 400 ppm.

The average concentration of NaCl in seawater is estimated at 35 ppt or 35,000 ppm. The Department's Division of Environmental Assessment (DEA) reports that sampling results in Maine marine waters indicate salinity levels of approximately 30 ppt or 30,000 ppm. The DEA further reports that instream NaCl levels of between 1 and 5 ppt (1,000 and 5,000 ppm) can potentially result in harm to freshwater aquatic life. The effluent concentrations calculated above would be subject to further dilution upon entering the receiving water. In that the effluent NaCl concentrations are anticipated to fall below the 1,000 ppm level of concern, the Department is not establishing specific limitations or monitoring requirements for NaCl in this permitting action. Instead, use of NaCl shall be consistent with the use and record keeping requirements for therapeutic agents specified above.

## **12. DISINFECTING/SANITIZING AGENTS**

The previous licensing action required the licensee to submit a list of all sanitizing agents and/or disinfectants used on rearing equipment, their concentrations as used and concentrations and masses at the point of discharge. Further, the previous licensing action required that at no time shall the concentration of chlorine in the receiving water exceed 11 parts per billion (ppb) for chronic and/or 19 ppb for acute toxicity concerns. Also, all footbath wastes were required to be disposed of by approved methods and not into the hatchery waste stream or receiving waters.

The permittee's 8/13/01 application states it only utilizes approximately 5 gallons of sodium hypochlorite per year to disinfect growout lines. The permittee states that sodium hypochlorite is neutralized by the use of thiosulfate. Therefore, the Department is eliminating chlorine effluent limits in this permitting action.

This permitting action only authorizes the discharge of those materials applied for, evaluated by the Department, and either regulated or determined to be de minimus in this permitting action or in subsequent Department actions. The discharges of any other agents or waste products not specifically included in this permitting action are considered unauthorized discharges pursuant to Permit Special Condition C.

## **13. MINIMUM TREATMENT TECHNOLOGY REQUIREMENT**

Between 2000 and 2002, eleven Maine fish hatcheries were evaluated to identify potential options for facility upgrades. All nine Maine Department of Inland Fisheries and Wildlife hatcheries were evaluated by FishPro Inc., while the two USFWS hatcheries were evaluated by the Freshwater Institute. Recommended wastewater treatment upgrades for each of the facilities included microscreen filtration of the effluent. Based on the information provided and Department BPJ, the Department is specifying that minimum treatment technology for the Embden facility shall consist of treatment equal to or better than 60-micron microscreen filtration of the effluent, wastewater settling/clarification, removal of solids. The permittee shall provide treatment equal to or better than the BPJ minimum treatment technology and shall comply with all effluent limitations, monitoring requirements, and operational requirements established in this permitting action. Additional treatment may be necessary to achieve specific water quality based limitations.

It is the Department's intent to evaluate effluent data and potentially revise technology based effluent limits in the future based on statistical evaluations of demonstrated performance of consistently and properly utilized treatment technology. The Department reserves the right to reopen facility discharge permits to establish these limits.

#### 14. SALMON GENETIC INTEGRITY AND HATCHERY ESCAPE PREVENTION

The US Fish and Wildlife Service and the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) formally listed the Atlantic salmon as an endangered species on November 17, 2000. Two significant issues of concern regarding the rearing of salmon in Maine involve the genetic integrity of the salmon and escape prevention to avoid impacts on native fish.

On December 4, 2000, in regard to the Department's pending delegation to administer the NPDES Permit Program, USEPA Region I informed the Department that *"permits issued to freshwater hatcheries raising salmon will require that the facility be designed or modified to achieve zero escapement of fish from the facility"*. The EPA also stated, *"The information contained in the (US Fish and Wildlife and NOAA Fisheries) Services' listing documents indicates that a remnant population of wild Atlantic salmon is present in..."* Maine waters *"...and that salmon fish farms and hatcheries are activities having a significant impact on the..."* Gulf of Maine Distinct Population Segment of Atlantic salmon (DPS) *"...through, among other things, the escape of farmed and non-North American strains of salmon which may interbreed with the wild Maine strains, compete for habitat, disrupt native salmon redds, and spread disease."* *"Based on this information, the Services have concluded that the escape of farm-raised salmon from fish farms and hatcheries is likely to significantly impair the growth, reproduction and habitat of wild salmon, thereby impairing the viability of the DPS."* *"EPA has analyzed current information, including these findings, and based on this information believes that this remnant population constitutes an existing instream use of certain Gulf of Maine rivers and considers that the above-described impacts to the population would be inconsistent with Maine's water quality standards. Assuming the information discussed above does not significantly change, EPA will utilize its authorities to ensure compliance with Maine water quality standards by ensuring that conditions to protect the remnant population of Atlantic salmon are included in NPDES permits for salmon fish farms and hatcheries, which are subject to regulation as concentrated aquatic animal production facilities."* *"In view of the substantial danger of extinction to the DPS described by the Services, it is EPA's view that proposed permits authorizing activities that would adversely affect the population, as described earlier in this letter, would be inconsistent with Maine's water quality standards and objectionable under the CWA."* The permittee discharges effluent to a non-DPS designated segment of the Kennebec River, however portions of the river downstream of the Embden facility are designated as an identified DPS river.

Maine's Aquaculture General Permit (#MEG130000, Part II, Section I) and individual MEPDES Permits for marine aquaculture facilities specify that *"no fish classified as non-North American...can be utilized to create progeny for stocking in net pens"*. The Aquaculture GP and individual MEPDES Permits also establish requirements for annual

#### 14. SALMON GENETIC INTEGRITY AND HATCHERY ESCAPE PREVENTION

certification of genetic evaluations, marking of fish to include the ability to identify the hatchery of origin, and employment of a fully functional Containment Management System (CMS) “...to prevent the accidental or consequential escape of fish to open water” at the marine facility. The marine facility CMS must be audited by a third party at least annually and a corrective action plan developed to address any identified deficiencies.

**A. Genetic Integrity:** The Embden facility hatches Atlantic salmon from eggs and rears them to smolt stage for stocking in their marine aquaculture net pens in the Downeast section of Maine. As stated above, Maine’s Aquaculture General Permit (#MEG130000, Part II, Section I) and individual MEPDES Permits for marine aquaculture facilities contain requirements to address the genetic integrity of Atlantic salmon raised in Maine for aquaculture. The genetic requirements are implemented at the marine sites as well as at the hatchery and rearing facilities that raise and supply salmon for marine aquaculture. The use of Atlantic salmon eggs or fish originating from non-North American stock is prohibited at the Embden facility. In the event the permittee intends to keep Atlantic salmon eggs or fish at the Embden facility that are not intended for marine aquaculture, or are otherwise not included in the above described genetic testing requirements, the permittee shall comply with the requirements specified in Permit Attachment A, *Genetic Testing Requirements for non-Marine Aquaculture Atlantic Salmon*, pursuant to Permit Special Condition L of this permit.

The USFWS and NOAA Fisheries have reviewed the permittee’s past broodstock testing procedure and schedule and believe that the threat of interaction between escaped untested broodstock and endangered native Atlantic salmon is low considering: (a) the geographic distance between the Embden facility and Maine rivers with endangered salmon; (b) the CMS requirements established in this permitting action; (c) the presence of hydroelectric facilities in the main stem of the Kennebec River without fish passage capabilities; and (d) that only North American eggs and fish will be allowed at the Embden facility. However, USFWS and NOAA Fisheries recommend an increased frequency of CMS audits until such time that all fish on station can be certified as being of North American origin and all non-North American origin fish removed.

**B. Escapement:** The permittee has raised Atlantic salmon from eggs to smolts over a 13 to 18 month cycle for use ultimately in human consumption. The permittee indicates that the Embden facility is designed to prevent escapement of fish. Any escapees would have to elude these measures and wastewater treatment infrastructure to make it to the receiving water.

#### **14. SALMON GENETIC INTEGRITY AND HATCHERY ESCAPE PREVENTION**

Maine's Aquaculture GP and individual MEPDES Permits for marine aquaculture facilities contain requirements for containment of salmon at the marine facilities, but no such provisions for hatcheries and rearing facilities. Based on requirements established in the referenced aquaculture permitting actions and guidance developed by the Maine Aquaculture Association, in this permitting action, the Department requires that the permittee shall employ a fully functional Containment Management System (CMS) at the facility designed, constructed, and operated so as to prevent the accidental or consequential escape of fish to open water. The CMS plan shall include a site plan or schematic with specifications of the particular system. The permittee shall develop and utilize a CMS consisting of management and auditing methods to describe or address the following: site plan description, inventory control procedures, predator control procedures, escape response procedures, unusual event management, severe weather procedures and training. The CMS shall contain a facility specific list of critical control points (CCP) where escapes have been determined to potentially occur. Each CCP must address the following: the specific location, control mechanisms, critical limits, monitoring procedures, appropriate corrective actions, verification procedures that define adequate CCP monitoring, and a defined record keeping system. The permittee shall submit the CMS plan to the Department for review and approval on or before six months prior to the commencement of operations.

The CMS site specific plan shall describe the use of effective containment barriers appropriate to the life history of the fish. The facility shall have in place both a three-barrier system for fish up to 5 grams in size and a two barrier system for fish 5 grams in size or larger. The three-barrier system shall include one barrier at the incubation/rearing unit, one barrier at the effluent from the hatch house/fry rearing area and a third barrier placed inline with the entire effluent from the facility. Each barrier shall be appropriate to the size of fish being contained. The two-barrier system shall include one barrier at the individual rearing unit drain and one barrier inline with the total effluent from the facility. Each barrier shall be appropriate to the size of fish being contained. Barriers installed in the system may be of the screen type or some other similarly effective device used to contain fish of a specific size in a designated area. Barriers installed in the system for compliance with these requirements shall be monitored daily. Additional requirements include:

1. The CMS shall be audited at least once per year and within 30 days of a reportable escape (more than 50 fish) by a party other than the facility operator or owner qualified to conduct such audits and approved by the Department. A written report of these audits shall be provided to the facility and the Department for review and approval within 30 days of the audit being conducted. If deficiencies are identified during the audit, the report shall contain a corrective action plan, including



#### 14. SALMON GENETIC INTEGRITY AND HATCHERY ESCAPE PREVENTION

a timetable for implementation and re-auditing to verify deficiencies are addressed. Additional third party audits to verify correction of deficiencies shall be conducted in accordance with the corrective action plan or upon request of the Department. The facility shall notify the Department upon completion of corrective actions.

2. Facility personnel responsible for routine operation shall be properly trained and qualified to implement the CMS. Prior to any containment system assessment associated with this permit, the permittee shall provide to the Department documentation of the employee's or contractor's demonstrated capabilities to conduct such work.
3. The permittee shall maintain complete records, logs, reports of internal and third party audits and documents related to the CMS on site for a period of 5 years.
4. For new facilities, a CMS shall be prepared and submitted to the Department for review and approval prior to fish being introduced into the facility.

The facility shall report any known or suspected escapes of more than 50 fish within 24 hours to the Maine Atlantic Salmon Commission at 207-287-9973 or 287-9972 (Pat Keliher), Maine Department of Inland Fisheries and Wildlife at 207-287-5202 (Commissioner's office), USFWS Maine Field Office at 207-827-5938, and NOAA Fisheries Maine Office at 207-866-7379.

#### 15. SAMPLE CALCULATIONS FOR EFFLUENT FORMALIN

To calculate the effluent formalin concentration, the permittee shall utilize the concentration administered, the volume of water to which the formalin is added, and dilutions provided from administration to end-of-pipe. Parts per million (ppm) and milligrams per liter (mg/L) are equivalent measurements. The Department's method of calculating effluent formalin levels at the Embden facility are contained in Fact Sheet Section 6.f. The following are examples of alternate methods to calculate effluent formalin levels.

For egg treatments, this example involves administration of 1,720 ppm of formalin for 15 minutes in flow-through water. It assumes a rate of water through the egg trays of 150 gallons per minute times the 15-minute treatment period yielding 2,250 gallons of initial wastewater. The total facility wastewater flow during the same 15-minute period can be calculated by taking a current discharge flow of 8,300 gpm times 15 minutes yielding 124,500 gallons. The formalin would receive an initial dilution of  $124,500 \text{ gal.} / 2,250 \text{ gal} = 55.3:1$ . The 124,500 gallons of wastewater flows to the facility settling ponds, which have a total capacity of 969,000 gallons. The formalin would receive a second dilution of  $969,000 \text{ gal} / 124,500 \text{ gal} = 7.8:1$ . The end of pipe concentration can be calculated as follows:

$$1,720 \text{ ppm formalin} / 55.3 / 7.8 = 4 \text{ ppm formalin discharged}$$

## 15. SAMPLE CALCULATIONS FOR EFFLUENT FORMALIN

For external parasite treatments on fish, the example facility administers formalin at a dose of 225 ppm. In this example, two 7,700 gallon pools are treated simultaneously (15,400 gal). The volumes of the two pools are gradually exchanged with fresh water and discharged into the 8,300 gpm facility waste stream over 112 minutes providing an initial dilution. The facility wastewater flows to the settling ponds, which provide a small second dilution. The effluent concentration can be calculated as follows:

$$\begin{aligned} 8,300 \text{ gpm} \times 112 \text{ minutes} &= 929,600 \text{ gal facility wastewater during pool discharge} \\ 929,600 \text{ gal facility wastewater} / 15,400 \text{ gal pool volume} &= 60.3:1 \text{ initial dilution} \\ 969,000 \text{ gal settling pond} / 929,600 \text{ gal facility wastewater} &= 1.04:1 \text{ second dilution} \\ 225 \text{ ppm formalin} / 60.3 / 1.04 &= 3.6 \text{ ppm formalin discharged} \end{aligned}$$

For broodstock external parasite treatments, the example facility administers formalin to new broodstock fish at a dose of 25 ppm in flow-through water. This example assumes a flow through rate of 80 gpm times a treatment period of 6-hours (360 minutes) per day yielding 28,800 gallons of initial wastewater. The wastewater then flows to the 969,000 gallon capacity settling ponds. The effluent concentration can be calculated as follows:

$$\begin{aligned} 969,000 \text{ gal settling pond} / 28,800 \text{ gal. waste stream} &= 33.6:1 \text{ dilution} \\ 25 \text{ ppm formalin} / 33.6 &= 0.74 \text{ ppm formalin discharged} \end{aligned}$$

The effluent mass shall be calculated by multiplying the actual gallons of formalin used at the facility in a 24-hour period by a 9.13 lbs/gallon conversion factor based on the specific gravity of formalin. The conversion factor is derived by multiplying the weight of water (8.34 lbs/gal) times the specific gravity of formalin as compared to water (1.095). If a facility administers 1.04 gallons of formalin in a day, the formalin mass can be calculated as follows:

$$1.04 \text{ gal formalin} \times 9.13 \text{ lbs/gallon} = 9.5 \text{ lbs formalin discharged}$$

In these examples, the various types of formalin treatments are not administered or discharged at the same time. If multiple discharges of formalin were to occur simultaneously, the facility would have to consider the cumulative formalin concentration and mass. These examples illustrate end-of-pipe (EOP) concentrations, which would be further diluted depending upon the facility's effluent dilution in the receiving water. If a facility receives a 3:1 effluent dilution in the receiving water, the calculated EOP concentration should be divided by three to provide the concentration in the receiving water after mixing.

## 16. DISCHARGE IMPACT ON RECEIVING WATER QUALITY

As permitted, the Department has determined the existing water uses will be maintained and protected and the discharge will not cause or contribute to the failure of the Kennebec River to meet standards for Class A classification.

## **17. PUBLIC COMMENTS**

Public notice of this application was made in the Morning Sentinel newspaper on or about August 14, 2001. The Department receives public comments on an application until the date a final agency action is taken on that application. Those persons receiving copies of draft permits shall have at least 30 days in which to submit comments on the draft or to request a public hearing, pursuant to Chapter 522 of the Department's rules.

## **18. DEPARTMENT CONTACTS**

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

Gregg Wood  
Division of Water Quality Management  
Bureau of Land and Water Quality  
Department of Environmental Protection  
17 State House Station  
Augusta, Maine 04333-0017

Telephone: (207) 287 -7693  
email: [gregg.wood@maine.gov](mailto:gregg.wood@maine.gov)

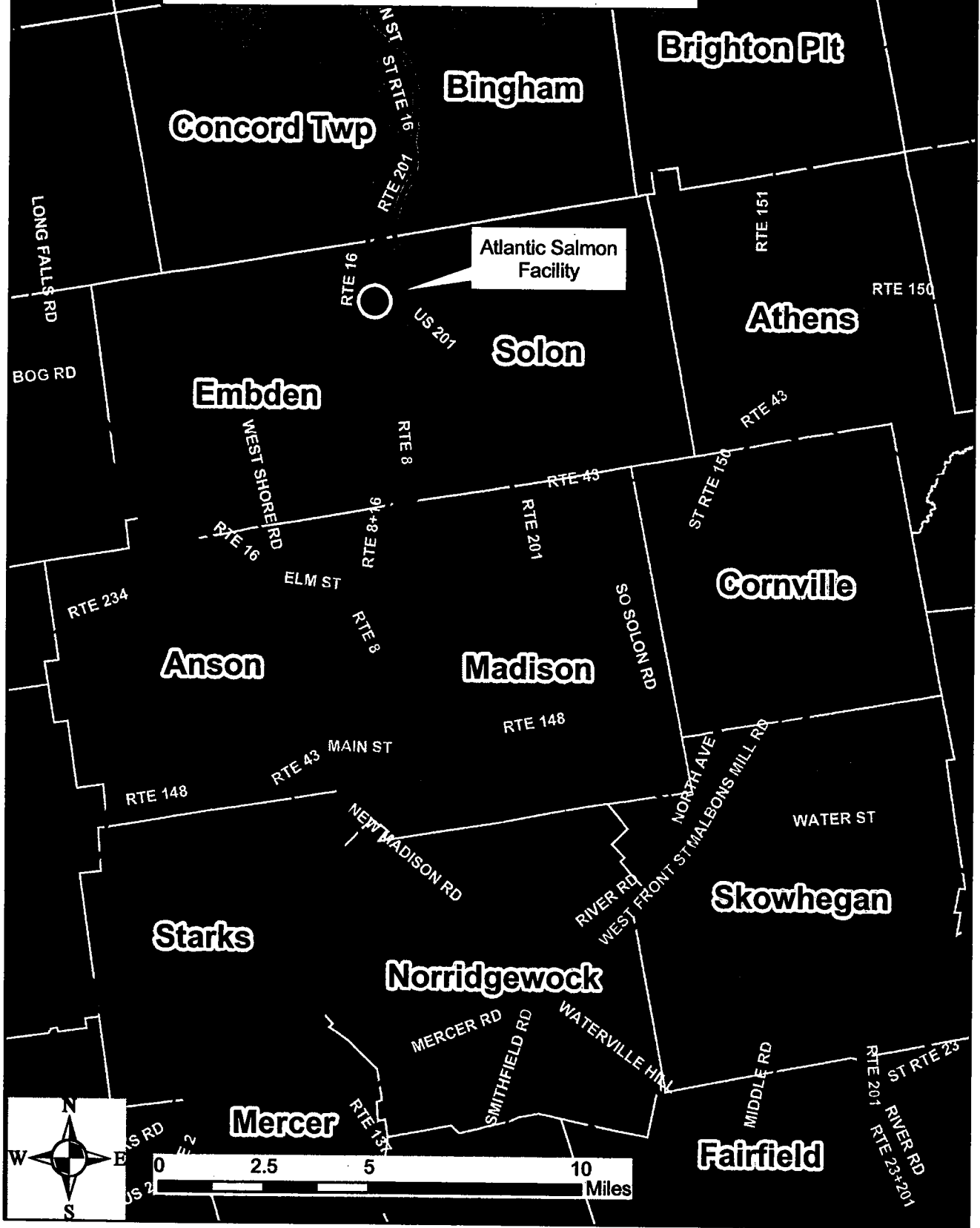
## **19. RESPONSE TO COMMENTS**

During the period August 17, 2006 through issuance of this permit, the Department solicited comments from permittee, state and federal agencies as well as parties that expressed interest in the proposed draft permit for the ASM Embden fish rearing facility. The Department did not receive any written or verbal comments on the draft permit. Therefore, no Response to Comments has been prepared.

# **ATTACHMENT A**

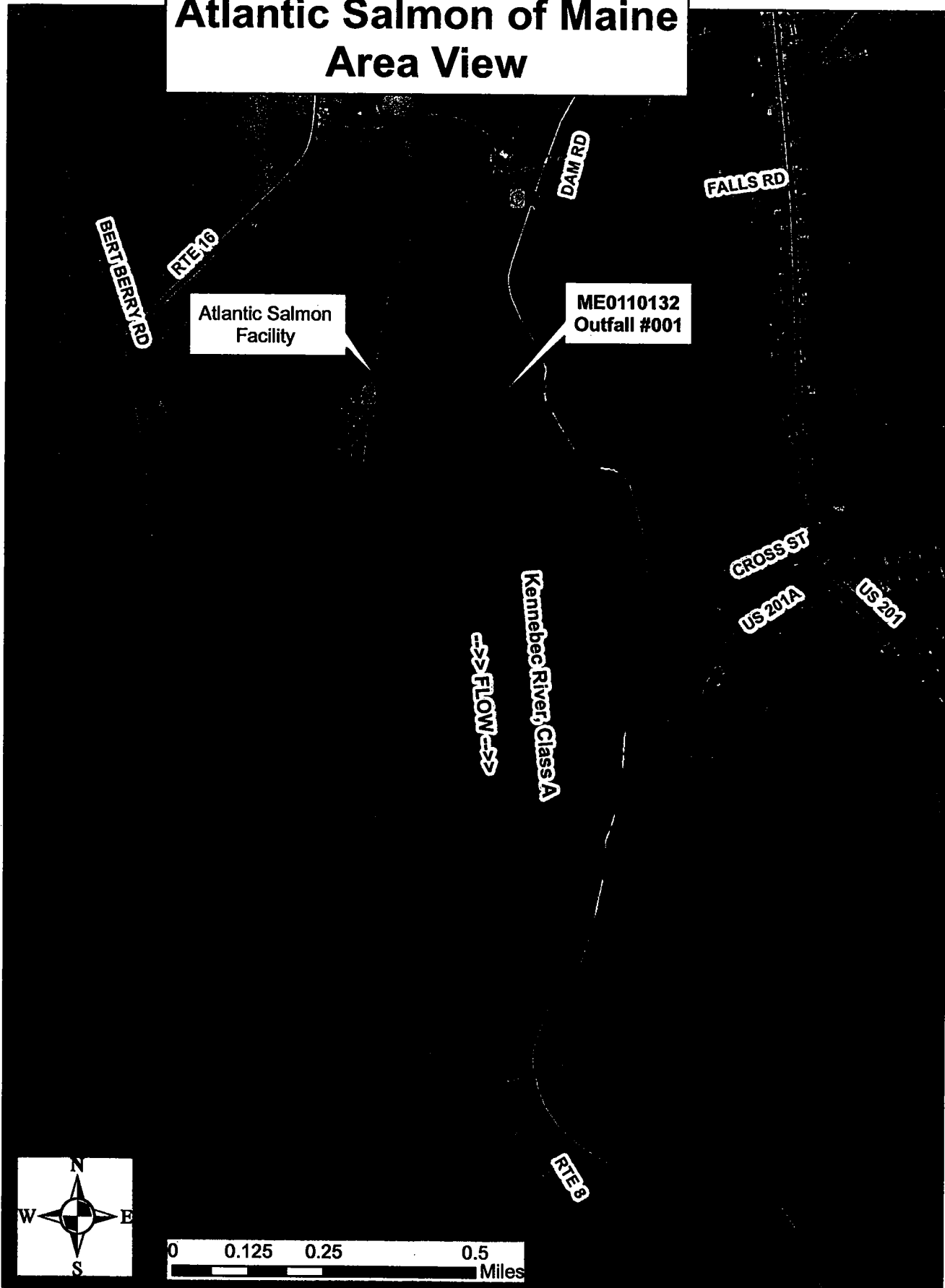


# Atlantic Salmon of Maine Regional View





# Atlantic Salmon of Maine Area View







# Atlantic Salmon of Maine Detailed View

Kennebec River, Main Stem

Atlantic Salmon  
Facility

ME0110132  
Outfall #001

