UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND - REGION I
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MASSACHUSETTS 02109

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES

NPDES PERMIT NO: **MA0100897**

NAME AND ADDRESS OF APPLICANT:

The City of Taunton
Department of Public Works
90 Ingell Street
Taunton, MA 02780-3507

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Taunton Wastewater Treatment Plant (WWTP)
825 West Water Street
Taunton, MA 02780

The municipalities of Raynham and Dighton are co-permittees for specific activities required by the permit, as set forth in Section VIII of this Fact Sheet and Sections 1.B and 1.C. of the Draft Permit. The responsible municipal departments are:

Town of Raynham Sewer Dept 416 Titicut Road Raynham, MA 02767	Town of Dighton Sewer Dept P.O. Box 229 North Dighton, MA 02764

RECEIVING WATER: **Taunton River** (Taunton River Basin - MA62-02)

CLASSIFICATION: **Class SB – Shellfishing (R) and CSO**

TABLE OF CONTENTS

Fact Sheet Attachments:

I. PROPOSED ACTION, TYPE OF FACILITY AND DISCHARGE LOCATION

The above named applicant has applied to the U.S. Environmental Protection Agency for the re-issuance of its National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated receiving water. The current permit became effective on March 27, 2001. The permit expired on March 27, 2006 and has been administratively continued pursuant to 40 C.F.R. 122.6.

A draft permit was placed on public notice in 2007. Upon reviewing the public comments received on the draft permit, EPA determined that substantial new questions had been raised regarding the need for nutrient limits in the permit. EPA has conducted further research and analysis regarding the setting of nutrient limits for this facility, and has developed a new draft permit for the Taunton Wastewater Treatment Plant (WWTP) containing nutrient limits as well as new collection system operation and maintenance requirements, changes to the indicator organism for bacteria limits, and other changes. Given the need to update a number of provisions to reflect changes in standard permit language, as well as the time that has passed since the first draft, EPA is issuing a complete new draft permit and is accepting public comment on all aspects of the draft permit. This new draft permit supersedes the 2007 draft and all comments on the 2007 draft are also superseded. New comments must be filed during this public comment period for those comments to be addressed in the issuance of the Final Permit.

The Taunton WWTP is an advanced secondary treatment plant that is currently authorized to discharge a flow of 8.4 mgd. The treatment plant discharges to the Taunton River (Outfall 001). There is one combined sewer overflow (CSO) that also discharges to the Taunton River (Outfall 004). The locations of the outfalls are shown on Figure 1.

The treatment plant and Taunton collection system are owned by the City of Taunton and are currently operated under contract by Veolia Water (formerly PSG/USFilter). Veolia submitted the application for renewal of the NPDES permit as required by 40 CFR §122.22(b). The City shall be the sole permittee for the treatment plant and CSO discharge, as of this permit reissuance, consistent with other contract operated publicly owned treatment works (POTWs). The Towns of Raynham and Dighton shall be co-permittees for their collection systems that discharge to the Taunton WWTP.

II. DESCRIPTION OF DISCHARGE

Quantitative descriptions of the discharge in terms of significant effluent parameters based on recent discharge monitoring reports (DMRs) for June 2010 through June 2012 may be found in Fact Sheet Table 1 (attached).

III. RECEIVING WATER DESCRIPTION

The Taunton WWTP discharges to segment MA62-02 of the Taunton River, extending from the Rte 24 Bridge to the Berkley Bridge in Dighton/Berkley. The Massachusetts Surface Water Quality Standards (MA SWQS) at 314 CMR 4.06 – Table 18 classify this segment of the River as Class SB-Shellfishing (R) and CSO.

Class SB - These waters are designated as a habitat for fish, other aquatic life and wildlife and for primary and secondary contact recreation. In approved areas they shall be suitable for shellfish harvesting with depuration (Restricted Shellfish Areas). These waters shall have consistently good aesthetic value. (314 CMR 4.05(4)(b))

Restricted shellfishing areas are designated as "(R)". These waters are subject to more stringent regulation in accordance with the rules and regulations of the Massachusetts Division of Marine Fisheries pursuant to M.G.L. c. 130, § 75. These include applicable criteria of the National Shellfishing Sanitation Program. (314 CMR 4.06(1)(d)5)

CSO - (314 CMR 4.06(1)(d)11) These waters are identified as impacted by the discharge of combined sewer overflows in the classification tables in 314 CMR 4.06(3). Overflow events may be allowed by the permitting authority without a variance or partial use designation provided that:

a. an approved facilities plan under 310 CMR 41.25 provides justification for the overflows;
b. the Masssachusetts Department of Environmental Protection (MassDEP or the Department) finds through a use attainability analysis, and EPA concurs, that achieving a greater level of CSO control is not feasible for one of the reasons specified at 314 CMR 4.03(4);
c. existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected; and
d. public notice is provided through procedures for permit issuance and facility planning under M.G.L. c. 21, §§ 26 through 53 and regulations promulgated pursuant to M.G.L.c. 30A. In addition, the Department will publish a notice in the *Environmental Monitor*. Other combined sewer overflows may be eligible for a variance granted through permit issuance procedures. When a variance is not appropriate, partial use may be designated for the segment after public notice and opportunity for a public hearing in accordance with M.G.L. c. 30A.

No variance or use attainability analysis has been submitted or approved, so CSO discharges must comply with all applicable water quality standards.

The current permit incorrectly lists the Taunton River segment at the point of discharge as Class B (freshwater). The draft permit corrects this error. Effluent limitations for fecal coliform and total copper have been made more stringent based on the SB criteria.

The Massachusetts 2010 303(d) list (Category 5 of the Year 2010 Integrated List of Waters) lists this segment of the Taunton River, Segment MA62-02, as impaired due to pathogens. The segments of the River downstream of this segment, to the mouth of the River at the Braga Bridge in Fall River, are listed as impaired for pathogens and organic enrichment/low dissolved oxygen. Mount Hope Bay, which receives the discharge of the Taunton River, is listed as impaired for fishes bioassessments, total nitrogen, dissolved oxygen, temperature, fecal coliform and chlorophyll-a.

IV. LIMITATIONS AND CONDITIONS

The effluent limitations and monitoring requirements may be found in the draft NPDES permit.

V. PERMIT BASIS: STATUTORY AND REGULATORY AUTHORITY

The Clean Water Act (the "CWA") prohibits the discharge of pollutants to waters of the United States without an NPDES permit unless such a discharge is otherwise authorized by the Act. A NPDES permit is used to implement technology-based and water quality-based effluent limitations as well as other requirements including monitoring and reporting. This draft NPDES permit was developed in accordance with statutory and regulatory authorities established pursuant to the Act. The regulations governing the NPDES program are found in 40 CFR Parts 122, 124 and 125.

Under Section 301(b)(1)(B) of the CWA, POTWs are required to achieve technology-based effluent limitations based upon secondary treatment. The secondary treatment requirements are set forth in 40 CFR Part 133 and define secondary treatment as an effluent achieving specific limitations for biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH.

Under Section 301(b)(1)(C) of the CWA, discharges are subject to effluent limitations based on water quality standards. The MA SWQS, 314 CMR 4.00, include requirements for the regulation and control of toxic constituents and also require that EPA criteria, established pursuant to Section 304(a) of the CWA, shall be used unless a site specific criteria is established. Massachusetts regulations similarly require that its permits contain limitations which are adequate to assure the attainment and maintenance of the water quality standards of the receiving waters as assigned in the MA SWQS, 314 CMR 4.00. See 314 CMR 3.11(3). Additionally, under 40 CFR. § 122.44 (d)(1)(i), "Limitations must control all pollutants or pollutant parameters which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard."

VI. EXPLANATION OF THE PERMIT'S EFFLUENT LIMITATIONS

A. TREATMENT PROCESS AND COLLECTION SYSTEM DESCRIPTION

The Taunton WWTP is engaged in the collection and treatment of municipal wastewater, including industrial wastewater from 12 non-categorical significant industrial users and 10 categorical industrial users (including a semiconductor manufacturer, battery manufacturer and metal finishers). This is a smaller number than noted in the previous draft permit as a number of industrial users have closed since the last draft permit was issued, including several metal finishers. The facility provides advanced treatment and single stage ammonia-nitrogen removal. Figure 2. The wastewater treatment processes are as follows:

At the headworks, wastewater passes through one of two mechanically cleaned bar screens or a bypass bar rack. Lime is added for pH control and flocculation. After screening, the wastewater passes through a distribution structure and then to one of three primary settling tanks. Grit is removed by pumping primary sludge to a cyclone degritter. After settling, the flow continues on through one of two parallel treatment trains. Each treatment train, or "Battery," consists of a bank of three aeration tanks and two secondary settling tanks. Battery 2 is twice the size of Battery 1 and the flow is split approximately 2/3 to 1/3, with adjustments depending on treatment performance. After settling, the recombined flow is sent to the chlorine contact chamber where it is disinfected with the flow paced addition of liquid hypochlorite and dechlorinated with bisulfate. Defoamer is added for suppression of foam at the discharge. The effluent passes through a reaeration cascade to a 36-inch pipe leading to a headwall on the bank of the Taunton River. Sludge is dewatered by centrifuge and is sent for co-disposal at the Taunton Municipal Sanitary Landfill.

The treatment process described reflects a treatment plant rehabilitation and upgrade project completed in 2004. The rehabilitation and upgrade included the construction of increased pumping capacity, conversion of the activated sludge aeration facilities from pure oxygen to air, addition of two new aeration tanks, replacement of the influent screens, and rehabilitation of the primary clarifiers.

The sewage collection system is partially combined, with over 150 miles of sewer and 20 pump stations in the municipalities of Taunton, Raynham, Dighton and Norton. Table 2 below shows the number of households served in each municipality.

Table 2. Communities served

Town	Households served by WWTP
Taunton	13,000
Raynham	4,120
Dighton	560
Norton	40

Some of the collection system is over 100 years old, and is subject to large amounts of inflow and infiltration. As of 2006, at least 300 manhole covers in the system had holes drilled in them so that they act as catch basins during storm events, and an additional 33 manholes had combined drainage and sanitary pipelines in the same structure (August 28, 2006 letter from Veolia Water). This results in high peak flows under wet weather conditions. The highest maximum daily flow reported by the facility since 2001 is 21.8 million gallons per day (MGD), recorded in October 2005; the facility also exceeded 20 MGD in maximum daily flow in April 2010 (20.7 MGD).

Pursuant to an Administrative Order (AO) issued by EPA (EPA AO Docket No. 08-042) in September, 2008 and a MassDEP Administrative Consent Order from April 2005, the permittee has undertaken a seven phase program to address high priority improvements required for the collection system, including manhole repairs and rehabilitation, sewer and service lateral line replacement and/or relining, and private inflow source elimination. According to the permittee's 2010 Inflow/Infiltration Report, the City has removed 4.49 MGD of inflow and infiltration from the system from 2005 to 2010. An overall reduction in flows is confirmed by the facility's DMR data: twelve month average flow ranged between 7.4 and 9.1 MGD in 2004-05 as compared to a range of 6.5 to 7.6 MGD in 2010-11. Work remains to be done, however, as indicated by continued high peak flows in wet weather (e.g April 2010 maximum daily flow of 20.7 mgd).

There is one remaining combined sewer overflow (CSO) on West Water Street, Outfall 004. Pursuant to the 2008 AO, the City is required to continue working on improving its collection system and to evaluate its ability to eliminate the CSO outfall through the collection system improvements. If the collection system improvements by themselves will not eliminate the CSO outfall, the AO requires that the City submit a plan and schedule for additional options; the target elimination date set in the AO is October 2013.

The City has also prepared a comprehensive wastewater management plan (CWMP) as required by the 2005 MassDEP order, and has submitted a Draft Environmental Impact Report (DEIR). The Secretary of the Executive Office of Environmental Affairs (EOEA) issued a Certificate on the DEIR on October 30, 2009 (EOEA No. 13897), and the City is currently completing the Final Environmental Impact Report. As described in the DEIR, the City proposes to expand its sewer system to encompass an additional 14 priority needs areas throughout the city that are currently served by on-site wastewater disposal systems, involving the expansion of the wastewater collection system, an upgrade of the WWTP for nutrient control and future flow capacity, and implementation of a plan to eliminate the CSO. The project would require the expansion of the wastewater treatment plant to a design flow of 10.2 MGD to handle the wastewater from the priority needs areas, future infill development within existing areas and projected additional inter-municipal flows.

B. DERIVATION OF EFFLUENT LIMITATIONS

1. Available Dilution

Water quality based limitations are established with the use of a calculated available dilution. Title 314 CMR 4.03(3)(a) requires that effluent dilution be calculated based on the receiving water 7Q10. The 7Q10 is the lowest observed mean river flow for 7 consecutive days, recorded over a 10 year recurrence interval. Additionally, the plant design flow is used to calculate available effluent dilution.

The plant design flow used to calculate the dilution factor for the current permit was 8.4 mgd (13.0 cfs). The City in its application requested that a design flow of 9 MGD be used, consistent with estimates made by its consultant that the current upgraded treatment plant capacity would be 9 MGD. Because this design flow has not received final state approval, and because such an increase would not be consistent with MassDEP's antidegradation regulations, we have used 8.4 MGD in our calculations. A further discussion of this decision follows in the Flow section.

The nearest USGS river gage station to the discharge is located near Bridgewater (USGS Station No. 01108000). The 7Q10 flow at the Taunton Treatment Plant has been calculated using the 7Q10 flow at the Bridgewater gage and adjusting it based on drainage area. The 7Q10 for the Taunton River at the Bridgewater gaging station is 22.9 cfs, using daily flow data from 1931 to 2002. The drainage area at the gage is 261 square miles. The drainage area at the Taunton WWTP is about (360) square miles, per the USGS Taunton River Gazetteer.

Using drainage area ratios the 7Q10 at the POTW is 22.9 x 360/261 = 31.6 cfs.

The dilution factor for the Taunton WWTP can then be calculated using the following equation.

$$\text{Dilution Factor} = \frac{\text{Daily average design effluent flow + river flow (7Q10)}}{\text{Daily average design effluent flow}}$$

(13.0 cfs + 31.6 cfs) / 13.0 cfs = 3.4

2. Flow

The draft permit continues the flow limit in the current permit of 8.4 mgd. Flow is to be measured continuously. The permittee shall report the annual average monthly flow using the annual rolling average method (See Permit Footnote 2). The monthly average and maximum daily flow shall also be reported.

As described earlier, the permittee has requested that the flow limit be increased to 9 MGD based in the estimate of design flow made by its consultant. EPA will not consider that request until the State has approved a design flow pursuant to its antidegradation policy. As the permittee is subject to the SRF process, the State does not anticipate approving any increase in design flow until the permittee has completed the Environmental Impact Report (EIR) for its CWMP and received an EOEA certificate. Mass DEP, *Implementation Procedures for the Antidegradation Provisions of the Massachusetts Surface Water Quality Standards*, 314 CMR 4.00 (10/21/09). The permittee has completed a draft EIR and is currently preparing a final EIR.

Additionally, any increase in authorized flow and increase in pollutant discharge can only be authorized in compliance with water quality standards, including antidegradation. As has been shown previously, the Taunton River and Mount Hope Bay are not currently attaining water quality standards. The reach of the Taunton River immediately below the Taunton WWTP discharge is impaired for pathogens, and the lower reaches of the Taunton River are impaired for pathogens and organic enrichment/low dissolved oxygen. Mount Hope Bay is impaired for fishes bioassessments, total nitrogen, dissolved oxygen, temperature, fecal coliform and chlorophyll-a.

The Taunton WWTP discharge is only one source of pollutants to a waterbody receiving numerous municipal discharges, industrial discharges, and nonpoint source discharges, which all contribute to the noted water quality violations. In the absence of a TMDL or other water quality information, EPA does not believe that an increase in any pollutant loads to this watershed can be authorized, particularly for pollutants causing the noted water quality impairments. Table 3 lists the wastewater discharges to the Taunton River and its tributaries.

Table 3. Wastewater Treatment Plants discharging to Taunton River Watershed

Discharger	River or Tributary	Flow in MGD*
SOMERSET WPCF	TAUNTON RIVER	4.2
TAUNTON WWTP	TAUNTON RIVER	8.4
OAK POINT HOMES	TAUNTON RIVER	0.185
EAST BRIDGEWATER SCHOOLS	TRIBUTARY BROOK TO TAUNTON	0.012
DIGHTON-REHOBOTH SCHOOL	SEGREGANSET RIVER	0.01
MCI-BRIDGEWATER WPCF	SAW MILL BROOK TO TAUNTON	0.55
MIDDLEBOROUGH WPCF	NEMASKET RIVER	2.16
WHEATON COLLEGE	RUMFORD RIVER	0.12
BRIDGEWATER WWTF	TOWN RIVER	1.44
BROCKTON AWTF	SALISBURY PLAIN RIVER	18.0
MANSFIELD WPCF	THREE MILE RIVER	3.14
	Total	≈ 40. MGD

*MGD-million gallons per day – design flow

As noted earlier, the 7Q10 flow of the Taunton River upstream of the Taunton WWTP is 31.6 cfs (20 MGD). Design flows for facilities upstream of Taunton total approximately 27MGD (total design flows in Table minus Taunton and Somerset). While the actual wastewater discharge volume during critical low flow periods will be lower than the design discharge volume, it is clear that this is an effluent dominated watershed.

3. Conventional Pollutants

Biochemical Oxygen Demand (BOD_5) and Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) – Limits for BOD_5 and $CBOD_5$ are the same as in the current permit. POTWs are subject to the secondary treatment requirements set forth at 40 CFR Part 133. The permit alternates BOD_5 and $CBOD_5$ limits seasonally.

For November through March the standard secondary treatment requirements for BOD_5 (30 mg/l avg monthly; 45 mg/l avg weekly) apply based on the requirements set forth at 40 CFR §§ 133.102(a)(1), (2), (3), and 40 CFR § 122.45(f).

For April through October, the permit contains more stringent water quality based limitations for $CBOD_5$. The limits are an average monthly concentration of 15 mg/l, and a weekly average concentration of 15 mg/l, with accompanying mass limitations. These were established by the MassDEP as a wasteload allocation for BOD_5. These limits are more stringent than those required in 40 CFR § 133.102(a)(4).

The permit utilizes $CBOD_5$ seasonally as the measure of oxygen demand due to high nitrogenous oxygen demand in the effluent during the summer nitrifying season, as allowed under 40 CFR § 133.102(a)(4). The $CBOD_5$ test reduces the interference from nitrogenous compounds that would otherwise make accurate assessment of the organic (carbonaceous) oxygen demand impossible. The use of $CBOD_5$ instead of BOD_5 is not necessary in the colder season as the facility discontinues the nitrifying process, making the use the $CBOD_5$ tests unnecessary.

Total Suspended Solids (TSS) - Limits for TSS are the same as in the current permit. The draft permit includes average monthly and average weekly TSS limitations that are based on secondary treatment requirements set forth at 40 CFR §§ 133.102(b)(1), (2), and (3), and 40 CFR § 122.45(f) for November through March. For April through October, the TSS limits are based on the wasteload allocation. The maximum daily concentration shall continue to be reported.

The mass limitations for BOD_5, $CBOD_5$, and TSS are based on the 8.4 mgd design flow. Average monthly and average weekly TSS mass limits (lbs per day) are required under 40 CFR §122.45(f).

$CBOD_5$, BOD_5, and TSS Mass Loading Calculations:

Calculations of maximum allowable loads for average monthly BOD_5 and TSS are based on the following equation:

$$L = C \times 8.4 \times 8.34$$

L = Maximum allowable load in lbs/day.
C = Maximum allowable effluent concentration for reporting period in mg/l.
Reporting periods are average monthly and weekly and daily maximum.
8.4 = Design flow of facility
8.34 = Factor to convert effluent concentration in mg/l and design flow in mgd to lbs/day.

(Concentration limit) [45] X 8.34 (Constant) X 8.4 (design flow) = 3,152 lb/day
(Concentration limit) [30] X 8.34 (Constant) X 8.4 (design flow) = 2,102 lb/day
(Concentration limit) [20] X 8.34 (Constant) X 8.4 (design flow) = 1,401 lb/day
(Concentration limit) [15] X 8.34 (Constant) X 8.4 (design flow) = 1,051 lb/day

Eighty-Five Percent (85%) BOD_5 and TSS Removal - the provisions of 40 CFR §133.102(a)(3), require that the 30 day average percent removal for BOD_5 and TSS be not less than 85%.

Eighty-Five Percent (85%) $CBOD_5$ Removal - the provisions of 40 CFR §133.102(a)(4)(iii), require that the 30 day average percent removal for $CBOD_5$ be not less than 85%.

pH - The draft permit includes pH limitations required as a condition of state certification, that are protective of pH standards set forth at 314 CMR 4.05(4)(b)(3), for Class SB waters.

The biological nitrification process uses alkalinity, which tends to lower the pH of wastewater leaving the activated sludge process. Lime is added to supplement alkalinity during the nitrification season, but there are still occasional periods when the pH is depressed below 6.5 SU. The MassDEP has stated that a permitted pH range of 6.0-8.5 SU is protective of State water quality standards, and this range has been included in the draft permit. These pH limits are more stringent than those required under 40 CFR § 133.102(c). The monitoring frequency remains once (1) per day.

Bacteria – The MA SWQS include criteria for two bacterial indicators for Class SB waters. Fecal coliform bacteria are applicable in water designated for shellfishing and enterococci criteria have been established to protect recreational uses. Criteria for enterococci were first promulgated for

Massachusetts coastal waters by EPA on November 16, 2004 (see 40 CFR 131.41). Massachusetts subsequently adopted enterococci criteria for marine waters into its water quality standards that were approved by EPA on September 19, 2007. Given the location of this discharge, the draft permit includes permit limitations for both bacterial indicators.

The fecal coliform criteria for SB water designated for shellfishing require that the median or geometric mean most probable number (MPN) not exceed 88 organisms/100 ml, and that no more than 10% of the samples may exceed an MPN of 260/100 ml. The draft permit includes a monthly average (geometric mean) effluent limit of 88 MPN and a maximum daily limit of 260 MPN.

The enterococci criteria require that no single sample exceed 104 colonies per 100 ml and that geometric mean of all samples taken within the most recent six months based on a minimum of five samples shall not exceed 35 colonies per 100 ml. MassDEP views the use of the 90% upper confidence level of 276 cfu/100ml as appropriate for setting the maximum daily limit for enterococci in the draft permit. Therefore EPA has established a monthly average (geometric mean) effluent limit of 35 cfu/100ml and daily maximum effluent limit of 276 cfu/100ml for enterococci in the draft permit in order to ensure that the discharge does not cause or contribute to exceedances of the MA SWQS found at 314 CMR 4.05 (4)(a)4b.

Sampling is required three times per week. Colony forming units (CFU) are determined by membrane filter methods and MPN units are determined by most probable number methods. Both methods and units are acceptable.

Disinfection is currently required year-round as determined by the MassDEP due to the designation of the receiving water for shellfishing and the location of the Aquaria desalinization plant in Dighton, downstream of the Taunton WWTP discharge. The year round disinfection requirement shall remain in the draft permit.

4. Dissolved Oxygen (DO) and Total Residual Chlorine

Dissolved Oxygen - The instantaneous minimum effluent DO limit of 6.0 mg/l or greater is carried forward from the current permit. The limit ensures that DO levels depleted during wastewater treatment process are restored prior to discharge to the Taunton River. The limit is established to protect the DO minimum Water Quality Criteria of 5.0 mg/l for waters designated by the State as Class SB.

Total Residual Chlorine (TRC) - Chlorine compounds resulting from the disinfection process can be extremely toxic to aquatic life. The instream chlorine criteria are defined in *National Recommended Water Quality Criteria: 2002*, EPA 822R-02-047 (November 2002), as adopted by the MassDEP into the state water quality standards at 314 CMR 4.05(5)(e). The criteria establish that the total residual chlorine in the receiving water should not exceed 7.5 ug/l (chronic) and 13 ug/l (acute). The following is a water quality based calculation of chlorine limits:

Acute Chlorine Salt Water Criteria = 13 ug/l

Chronic Chlorine Salt Water Criteria = 7.5 ug/l

(acute criteria * dilution factor) = Acute (Maximum Daily)
13 ug/l x 3.4 = 44.2 ug/l = **0.044 mg/l Maximum Daily**.

(chronic criteria * dilution factor) = Chronic (Average Monthly)
7.5 ug/l x 3.4 = 25.5 ug/l = **0.026 mg/l Average Monthly**

The permittee is required to have an alarm to system to warn of a chlorination system malfunction. This is a best management practice (BMP), and is being required under authority of 40 CFR § 122.44(k)(4). The permit requires the submission of the results to EPA of any additional testing done beyond that required in the permit, if it is conducted in accordance with EPA approved methods, consistent with the provisions of 40 CFR §122.41(l)(4)(ii).

5. Total Nitrogen

In their comments on the 2007 draft permit, several commenters contended that, among other things, the permit failed to ensure compliance with applicable state water quality standards and relevant provisions of the CWA because it lacked an effluent limitation for total nitrogen (TN).

Upon review, EPA concluded that the comments raise substantial new questions regarding the need to establish an effluent limit for total nitrogen under CWA Section 301(b)(1)(C), which requires, among other things, the imposition of effluent limitations to ensure that the discharge will not cause or contribute to a violation of state water quality standards, including narrative criteria for water quality. Based on an analysis of these comments and other relevant information, EPA decided to issue a new draft permit pursuant to 40 C.F.R. § 124.14(b)(1), containing a new effluent limit for nitrogen. The permit limit is 3.0 mg/l total nitrogen as a seasonal average, and a mass limit of 210 lbs/day based on the concentration limit and the design flow of the treatment facility, in effect for the months of May through October. In addition to this seasonally-applied numeric limit, the permit requires the permittee to optimize the treatment facility operations for the removal of total nitrogen during the months of November through April using all available treatment equipment at the facility. The basis for this determination is set forth below.

a. Ecological Setting: the Taunton River Estuary, Mount Hope Bay and Estuarine Systems Generally

The saltwater portions of the Taunton River (the “Taunton River Estuary”) and Mount Hope Bay are part of the greater Narragansett Bay Estuary system, which covers approximately 147 square miles within Massachusetts and Rhode Island (RI). The Narragansett Bay Estuary is one of only 28 “estuaries of national significance” under the National Estuary Program (NEP), which was established in 1987 by amendments to the CWA to identify, restore and protect estuaries along the coasts of the United States.

Mt. Hope Bay (the Bay) is situated in the northeast corner of Narragansett Bay, lying within both

Rhode Island to the south and west and Massachusetts to the north and east. The Bay connects to the East Passage of Narragansett Bay to the southwest, via a deep, narrow channel where the Mt. Hope Bridge crosses over from Aquidneck Island to Bristol Point, and to Rhode Island Sound to the South via the Sakonnet River (actually an embayment) between Tiverton, RI and Aquidneck Island. The Bay covers an area of 13.6 square miles, and has a volume of 53.3 billion gallons at mean low water (MLW). http://www.smast.umassd.edu/MHBNL/report2003.php
The Bay has a tidal range averaging approximately 4.5 feet.

The Taunton River is the largest freshwater source to Mount Hope Bay. It discharges into the Bay from the north at Fall River. The Taunton River Estuary consists of the saltwater portions of the Taunton River, extending from the Braga Bridge at the confluence with Mount Hope Bay upstream to the Route 24 bridge (Taunton/Raynham), approximately four miles upstream of the Taunton WWTP discharge. (MassDEP, 2001). It is the longest river unobstructed by dams in New England, with tidal influence extending upriver approximately 20 miles. (Horsley Witten, 2007).

Estuaries are extremely significant aquatic resources. An estuary is a partially enclosed coastal body of water located between freshwater ecosystems (lakes, rivers, and streams; freshwater and coastal wetlands; and groundwater systems) and coastal shelf systems where freshwater from the land measurably dilutes saltwater from the ocean. This mixture of water types creates a unique transitional environment that is critical for the survival of many species of fish, birds, and other wildlife. Estuarine environments are among the most productive on earth, creating more organic matter each year than comparably sized areas of forest, grassland, or agricultural land (EPA, 2001).

Maintaining water quality within an estuary is important for many reasons. Estuaries provide a variety of habitats such as shallow open waters, freshwater and saltwater marshes, sandy beaches, mud and sand flats, rocky shores, oyster reefs, tidal pools, and seagrass beds. Tens of thousands of birds, mammals, fish, and other wildlife depend on estuarine habitats as places to live, feed, and reproduce. Many species of fish and shellfish rely on the sheltered waters of estuaries as protected places to spawn.

Moreover, estuaries also provide a number of recreational values such as swimming, boating, fishing, and bird watching. In addition, estuaries have an important commercial value since they serve as nursery grounds for two thirds of the nation's commercial fish and shellfish, and support tourism drawing on the natural resources that estuaries supply. (EPA, 1998). Consequently, EPA believes sound environmental policy reasons favor a pollution control approach that is both protective and undertaken expeditiously to prevent degradation of these critical natural resources. Because estuaries are the intermediary between oceans and land, both of these geographic features influence their physical, chemical, and biological properties. In the course of flowing downstream through a watershed to an estuary, tributaries pick up materials that wash off the land or are discharged directly into the water by land-based activities.

Eventually, the materials that accumulate in the tributaries are delivered to estuaries. The types of materials that eventually enter an estuary largely depend on how the land is used. Undisturbed land, for example, will discharge considerably fewer pollutants than an urban center or areas with large amounts of impervious cover. Accordingly, an estuary's overall health can be heavily impacted by surrounding land uses.

Unlike free-flowing rivers, which tend to flush out sediments and pollutants relatively quickly, an estuary will often have a lengthy retention period as up-estuary saltwater movement interacts with down-estuary freshwater flow (EPA, 2001). Estuaries are particle-rich relative to coastal systems and have physical mechanisms that tend to retain particles. These suspended particles mediate a number of activities (e.g., absorbing and scattering light, or absorbing hydroscopic materials such as phosphate and toxic contaminants). New particles enter with river flow and may be resuspended from the bottom by tidal currents and wind-wave activity. Many estuaries are naturally nutrient-rich because of inputs from the land surface and geochemical and biological processes that act as "filters" to retain nutrients within estuaries (EPA, 2001). Consequently, waterborne pollutants, along with contaminated sediment, may remain in the estuary for a long time, magnifying their potential to adversely affect the estuary's plants and animals.

b. Effects of Nutrients on Estuarine Water Quality

The basic cause of nutrient problems in estuaries and nearshore coastal waters is the enrichment of freshwater with nitrogen (N) and phosphorus (P) on its way to the sea and by direct inputs within tidal systems (EPA, 2001). EPA defines nutrient overenrichment as the anthropogenic addition of nutrients, in addition to any natural processes, causing adverse effects or impairments to beneficial uses of a waterbody. (EPA, 2001).

Eutrophication is an aspect of nutrient overenrichment and is defined as an increase in the rate of supply of organic matter to a waterbody (EPA, 2001). Increased nutrient inputs promote a progression of symptoms beginning with excessive growth of phytoplankton and macroalgae to the point where grazers cannot control growth (NOAA, 2007). Phytoplankton is microscopic algae growing in the water column and is measured by chlorophyll-a. Macroalgae are large algae, commonly referred to as "seaweed." The primary symptoms of nutrient overenrichment include an increase in the rate of organic matter supply, changes in algal dominance, and loss of water clarity and are followed by one or more secondary symptoms such as loss of submerged aquatic vegetation, nuisance/toxic algal blooms and low dissolved oxygen. (EPA, 2001). In U.S. coastal waters, nutrient overenrichment is a common thread that ties together a diverse suite of coastal problems such as red tides, fish kills, some marine mammal deaths, outbreaks of shellfish poisonings, loss of seagrass and bottom shellfish habitats, coral reef destruction, and hypoxia and anoxia now experienced as the Gulf of Mexico's "dead zone." (EPA, 2001). Figure 1 shows the progression of nutrient impacts on a waterbody.

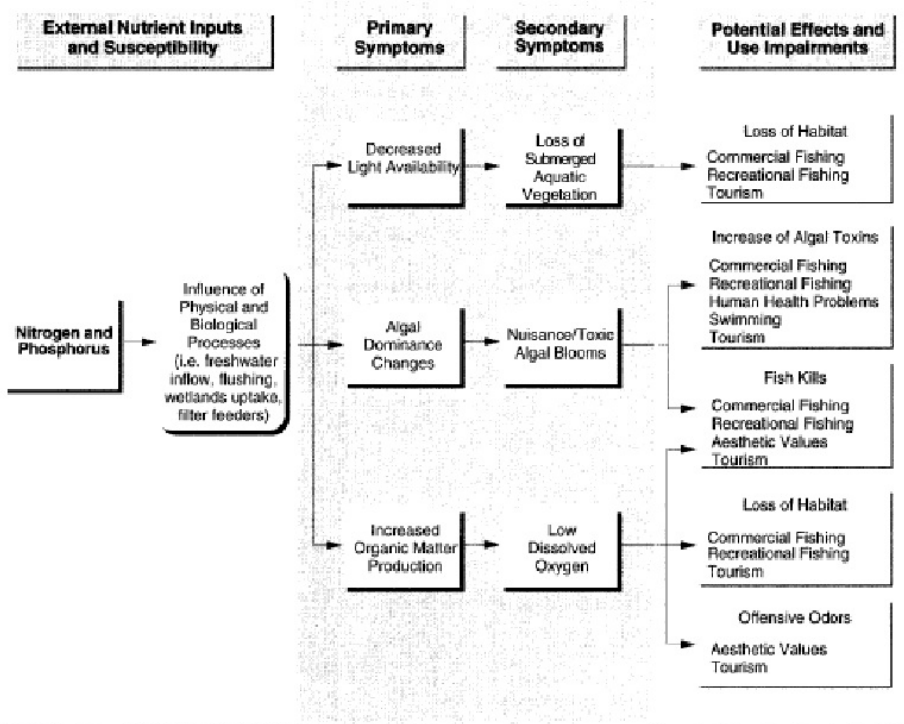


Figure 1
Source: EPA, 2001

Estuarine nutrient dynamics are complex and are influenced by flushing time, freshwater inflow and stratification, among other factors. The deleterious physical, chemical, and biological responses in surface water resulting from excessive plant growth impair designated uses in both receiving and downstream waterbodies. Excessive plant growth can result in a loss of diversity and other changes in the aquatic plant, invertebrate, and fish community structure and habitat.

Nutrient-driven impacts on aquatic life and habitat are felt throughout the eutrophic cycle of plant growth and decomposition. Nutrient-laden plant detritus can settle to the bottom of a water body. In addition to physically altering the benthic environment and aquatic habitat, organic materials (*i.e.*, nutrients) in the sediments can become available for future uptake by aquatic plant growth, further perpetuating and potentially intensifying the eutrophic cycle.

Excessive aquatic plant growth, in addition, degrades aesthetic and recreational uses. Unsightly algal growth is unappealing to swimmers and other stream users and reduces water clarity. Decomposing plant matter also produces unpleasant sights and strong odors. Heavy growths of algae on rocks can make streambeds slippery and difficult or dangerous to walk on. Algae and macrophytes can interfere with angling by fouling fishing lures and equipment. Boat propellers and oars may also get tangled by aquatic vegetation.

When nutrients exceed the assimilative capacity of a water body, the ensuing eutrophic cycle can negatively impact in-stream dissolved oxygen levels. Through respiration, and the decomposition of dead plant matter, excessive algae and plant growth can reduce instream dissolved oxygen concentrations to levels that could negatively impact aquatic life. During the day, primary producers (*e.g.*, algae, plants) provide oxygen to the water as a by-product of photosynthesis. At night, however, when photosynthesis ceases but respiration continues, dissolved oxygen concentrations decline. Furthermore, as primary producers die, they are decomposed by bacteria that consume oxygen, and large populations of decomposers can consume large amounts of dissolved oxygen. Many aquatic insects, fish, and other organisms become stressed and may even die when dissolved oxygen levels drop below a particular threshold level.

Nutrient overenrichment of estuaries and nearshore coastal waters from human-based causes is now recognized as a national problem on the basis of CWA Section 305(b) reports from coastal States (EPA, 2001). Most of the nation's estuarine and coastal waters are moderately to severely polluted by excessive nutrients, especially nitrogen and phosphorus (NOAA, 2007; NOAA, 1999, EPA, 2006; EPA, 2004, EPA; and EPA, 2001).

c. Water Quality Standards Applicable to the Taunton River Estuary and Mount Hope Bay

Under the Massachusetts Surface Water Quality Standards, 314 CMR 4.00 (MA SWQS), surface waters are divided into water "use" classifications, including Class SA and SB for marine and coastal waters. The Taunton River Estuary and the eastern portion of Mount Hope Bay are classified as SB waters, with designations for Shellfishing (R) and CSO. Class SB waters are designated as a "habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. In certain waters, habitat for fish, other aquatic life and wildlife may include, but is not limited to, seagrass. Where designated in the tables to 314 CMR 4.00 for shellfishing, these waters shall be suitable for shellfish harvesting with depuration (Restricted and Conditionally Restricted Shellfish Areas)." 314 CMR 4.05(4)(b). Waters in this classification "shall have consistently good aesthetic value." *Id.*

Class SB waters are subject to class-specific narrative and/or numeric water quality criteria. 314 CMR 4.05(4)(b)1 to 8. Dissolved oxygen concentrations in Class SB waters "[s]hall not be less than 5.0 mg/l. Seasonal and daily variations that are necessary to protect existing and designated uses shall be maintained. Where natural background conditions are lower, DO shall not be less than natural background."

The western portion of Mount Hope Bay is designated as a Class SA – Shellfishing water. These waters are designated as an excellent habitat for fish, other aquatic life and wildlife and for primary and secondary contact recreation. In approved areas, they shall be suitable for shellfish harvesting without depuration (Open Shellfish Areas). These waters shall have excellent aesthetic value. With respect to DO, the criteria for class SA waters is "not less than 6.0 mg/L unless background conditions are lower; natural seasonal and daily variations above this level shall be maintained; levels shall not be lowered below 75% of saturation due to a discharge."

Both Class SA and Class SB waters are also subject to additional minimum standards applicable to all surface waters, as set forth at 314 CMR 4.05(5). With respect to nutrients, the MA SWQS provide:

> Unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated

> uses and shall not exceed the site specific criteria developed in a TMDL or as otherwise established by the Department pursuant to 314 CMR 4.00. Any existing point source discharge containing nutrients in concentrations that would cause or contribute to cultural eutrophication, including the excessive growth of aquatic plants or algae, in any surface water shall be provided with the most appropriate treatment as determined by the Department, including, where necessary, highest and best practical treatment (HBPT) for POTWs and Best Available Technology (BAT) for non POTWs, to remove such nutrients to ensure protection of existing and designated uses.

314 CMR 4.05(5)(a). In addition, the MA SWQS require:

> Aesthetics – All surface waters shall be free from pollutants in concentrations or combinations that settle to form objectionable deposits; float as debris, scum, or other matter to form nuisances; produce objectionable odor, color, taste, or turbidity; or produce undesirable or nuisance species of aquatic life. 314 CMR 4.05(5)(a)

Massachusetts has not adopted numeric criteria for total nitrogen or other nutrients. MassDEP has, however, used a number of indicators in interpreting its narrative nutrient standard. The DEP/SMAST Massachusetts Estuaries Project report, *Site-Specific Nitrogen Thresholds for Southeastern Massachusetts Embayments: Critical Indicators - Interim Report* (Howes et al., 2003) (Critical Indicators Report), was developed to provide "a translator between the current narrative standard and nitrogen thresholds (as they relate to the ecological health of each embayment) which can be further refined based on the specific physical, chemical and biological characteristics of each embayment. This report is intended to provide a detailed discussion of the issue and types of indicators that can be used, as well as propose an acceptable range of nitrogen thresholds that will be used to interpret the current narrative standard." http://www.oceanscience.net/estuaries/pdf/nitroest.pdf. This interpretive guidance has been used in a number of TMDLs for estuarine waters in southeastern Massachusetts.

The Critical Indicators Report finds that the indicators of primary concern to be:

- plant presence and diversity (eelgrass, macroalgae, etc.)
- animal species presence and diversity (finfish, shellfish, infauna)
- nutrient concentrations (nitrogen species)
- chlorophyll-a concentration
- dissolved oxygen levels in the embayment water column

(Howes et al., 2003 at 11). With respect to total nitrogen, it concluded:

> It is not possible at this time to put quantitative nitrogen levels on each Water Quality Class. In fact, initial results of the Massachusetts Estuaries Project (Chatham Embayment Report 2003) indicate that the total nitrogen level associated with a particular ecological response can vary by over 1.4 fold (e.g. Stage Harbor versus Bassing Harbor in Chatham MA). Although between embayments nitrogen criteria may be different, it does appear that within a single embayment a consistent quantitative nitrogen criterion can be developed.

However, the Critical Indicators Report provides guidance for indicators, including total nitrogen, for various water quality classes. The nitrogen indicator ranges are based on long-term (>3 yr) average mid-ebb tide concentrations of total nitrogen (mg/L) in the water column. For "Excellent to Good" nitrogen related water quality conditions, equivalent to SA classification, the Report guidance is as follows: "Eelgrass beds are present, macroalgae is generally non-existent but in some cases may be present, benthic animal diversity and shellfish productivity are high, oxygen levels are generally not less than 6.0 mg/l with occasional depletions being rare (if at all), chlorophyll-a levels are in the 3 to 5 μg/L range. . . . For the case study, total nitrogen levels of 0.30-0.39 mg N/L were used to designate "excellent to good" quality areas." Id at 21-22.

For SB waters, the Critical Indicators Report provides the following guidance for indicators of unimpaired conditions, to be refined based on data from the specific embayments: "benthic animal diversity and shellfish productivity are high, oxygen levels are generally not less than 5.0 mg/l with depletions to <4 mg/L being infrequent, chlorophyll-a levels are in the 3 to 5 μg/L range and nitrogen levels are in the 0.39 - 0.50 range. . . . eelgrass is not present . . . and macroalgae is not present or present in limited amounts even though a good healthy aquatic community still exists." Id. at 22.

"Moderate Impairment" is indicated by "Shellfisheries may shift to more resistant species. Oxygen levels generally do not fall below 4 mg/L, although phytoplankton blooms raise chlorophyll a levels to around 10 μg/L. Eelgrass is not sustainable and macro-algae accumulations occur in some regions of the embayment. In the Case Study, embayment regions supporting total nitrogen levels >0.5 mg N/L were clearly impaired." Significant Impairment is indicated by total nitrogen concentrations of 0.6/0.7 mg/l and above. In "severely degraded" conditions, "algal blooms are typical with chlorophyll-a levels generally >20 μg/L, oxygen depletions to hypoxic levels are common, there are periodic fish kills, and macro-algal accumulations occur with both ecological and aesthetic impacts."

In addition to the Massachusetts water quality standards, RI water quality standards applicable to the Rhode Island portion of Mount Hope Bay must also be satisfied. As in Massachusetts, the Rhode Island portions of Mount Hope Bay are designated SB waters in the eastern portion and SA waters in the western portion of the Bay. Rhode Island, like Massachusetts, has specific numeric criteria for dissolved oxygen in SA and SB waters[1], and narrative criteria for nutrients[2]

---

[1] Rule 8.D.3. Table 3. For waters with a seasonal pynocline, no less than 4.8 mg/l above the seasonal pynocline; below the seasonal pynocline DO concentrations above 4.8 mg/l shall be considered protective of Aquatic Life Uses. When instantaneous DO values fall below 4.8 mg/l, the waters shall not be (1) Less than 2.9 mg/l for more than 24 consecutive hours during the recruitment season; nor (2) Less than 1.4 mg/l for more than 1 hour more than twice during the recruitment season; nor (3) Shall they exceed the allowable cumulative DO exposure (Table 3.A).

For waters without a seasonal pycnocline, DO concentrations above 4.8 mg/l shall be considered protective of Aquatic Life Uses. When instantaneous DO values fall below 4.8 mg/l, the waters shall not be: (1) Less than 3.0 mg/l for more than 24 consecutive hours during the recruitment season; nor (2) Less than 1.4 mg/l for more than 1 hour more than twice during the recruitment season; nor (3) Shall they exceed the allowable cumulative DO exposure presented (Table 3.A. and Table 3.B).

and aesthetics.[3] The Rhode Island portions of Mount Hope Bay, like the Massachusetts portions are listed for impairments due to total nitrogen, dissolved oxygen (as well as fishes bioassessments and temperature impairments linked to the Brayton Point power plant). As discussed below, permit limits designed to meet water quality standards in the Taunton River Estuary and the Massachusetts portions of Mount Hope Bay are expected to achieve water quality standards in Rhode Island.

d. Receiving Water Quality Violations

The Taunton River Estuary and Mount Hope Bay have reached their assimilative capacity for nitrogen and are suffering from the adverse water quality impacts of nutrient overenrichment, including cultural eutrophication. They are, consequently, failing to attain the water quality standards described above. The impacts of excessive nutrients are evident throughout the Taunton River Estuary and Mount Hope Bay.

Section 303(d) of the CWA requires states to identify those waterbodies that are not expected to meet surface water quality standards after implementation of technology-based controls. The State of Massachusetts has identified Mount Hope Bay and the lower reach[es] of the Taunton River Estuary for impairments due to organic enrichment/low DO, with Total Nitrogen specifically identified as a cause of impairments in Mount Hope Bay.

A three-year water quality monitoring study was conducted by the School for Marine Science and Technology at UMass-Dartmouth (SMAST) and involved monthly sampling at 22 sites across Mount Hope Bay and the Taunton River Estuary from 2004 to 2006 (see Figure 4). This study showed that average chlorophyll-a over the three year period was above 10 ug/l at all monitoring stations across the Taunton River Estuary and Mount Hope Bay. The 20th percentile DO concentrations for the three year period were below the 5.0 mg/l water quality standard at four of the six sites in the Taunton River Estuary (MHB 1, 2 and 18-21). Table 4, reproduced from SMAST, *Summary of Water Quality Monitoring Program for the Mount Hope Bay Embayment System (2004 – 2006)* at 24 (August 16, 2007).

---

[2] Rule 8.D.1(d). Nutrients - Nutrients shall not exceed the limitations specified in rule 8.D.(2) (freshwaters) and 8.D.(3) (seawaters) and/or more stringent site-specific limits necessary to prevent or minimize accelerated or cultural eutrophication.

Rule 8.D.3. None in such concentration that would impair any usages specifically assigned to said Class, or cause undesirable or nuisance aquatic species associated with cultural eutrophication. Shall not exceed site-specific limits if deemed necessary by the Director to prevent or minimize accelerated or cultural eutrophication. Total phosphorus, nitrates and ammonia may be assigned site-specific permit limits based on reasonable Best Available Technologies. Where waters have low tidal flushing rates, applicable treatment to prevent or minimize accelerated or cultural eutrophication may be required for regulated nonpoint source activities.

[3] Rule 8.D.1(b)(iv). Aesthetics - all waters shall be free from pollutants in concentrations or combinations that: iv. Result in the dominance of species of fish and wildlife to such a degree as to create a nuisance or interfere with the existing or designated uses.

Table 4. Mount Hope Bay Monitoring Program results as reported in SMAST, 2007.

Summary of average levels of primary nutrient related water quality parameters measured in the summers of 2004, 2005 and 2006 in Mount Hope Bay by SMAST Coastal Systems staff.

Station	Total Depth (m)	20% Low* D.O. (mg/L)	Sal (ppt)	PO4 (mg/L)	NH4 (mg/L)	NOX (mg/L)	DIN (mg/L)	DON (mg/L)	PON (mg/L)	TN (mg/L)	DIN/DIP Molar Ratio	Total Chl a (ug/L)
MHB1	10.0	5.02	23.3	0.054	0.052	0.095	0.147	0.299	0.155	0.601	6	11.75
MHB2	8.9	4.94	26.1	0.052	0.047	0.043	0.090	0.312	0.170	0.572	4	13.50
MHB3	5.2	5.49	26.0	0.051	0.037	0.035	0.072	0.282	0.163	0.517	3	14.32
MHB4	3.5	5.61	25.7	0.052	0.026	0.017	0.043	0.308	0.173	0.525	3	14.71
MHB5	5.6	5.20	26.2	0.050	0.029	0.020	0.050	0.294	0.169	0.512	2	14.53
MHB6	3.9	5.09	24.1	0.061	0.049	0.030	0.079	0.359	0.168	0.606	3	12.87
MHB7	4.5	5.94	25.5	0.049	0.023	0.016	0.039	0.308	0.189	0.536	2	17.46
MHB8	5.1	4.93	25.8	0.046	0.022	0.019	0.041	0.280	0.165	0.486	2	15.84
MHB9	ND	ND	19.7	0.062	0.049	0.040	0.089	0.453	0.263	0.805	3	14.02
MHB10	3.2	5.86	25.7	0.048	0.017	0.012	0.027	0.314	0.167	0.508	1	14.11
MHB11	4.9	5.02	26.2	0.043	0.017	0.012	0.029	0.268	0.175	0.472	1	16.23
MHB12	5.0	5.36	26.4	0.049	0.020	0.021	0.040	0.284	0.168	0.493	2	16.12
MHB13	5.9	6.00	26.8	0.045	0.020	0.013	0.033	0.282	0.158	0.473	2	15.40
MHB14	6.5	5.34	27.0	0.044	0.024	0.009	0.033	0.289	0.197	0.519	2	16.78
MHB15	12.9	6.46	27.9	0.035	0.021	0.009	0.029	0.273	0.143	0.445	2	12.68
MHB16	11.2	6.33	27.7	0.043	0.028	0.012	0.039	0.265	0.157	0.461	2	13.02
MHB17	ND	ND	24.6	0.064	0.057	0.026	0.083	0.404	0.181	0.669	3	11.81
MHB18	6.7	4.96	22.3	0.062	0.061	0.136	0.197	0.300	0.156	0.652	7	11.44
MHB19	4.0	4.93	18.7	0.058	0.074	0.201	0.275	0.342	0.178	0.799	10	12.27
MHB20	1.8	5.09	17.5	0.054	0.063	0.144	0.207	0.372	0.192	0.771	8	13.59
MHB21	2.6	4.60	14.2	0.061	0.066	0.350	0.415	0.420	0.219	1.058	15	13.34
MHBMOOR	6.3	5.85	26.8	0.045	0.025	0.013	0.038	0.284	0.181	0.503	2	15.57

* Average of the lowest 20% of recorded values

Figure 4. Mount Hope Bay Monitoring Program estuarine stations.

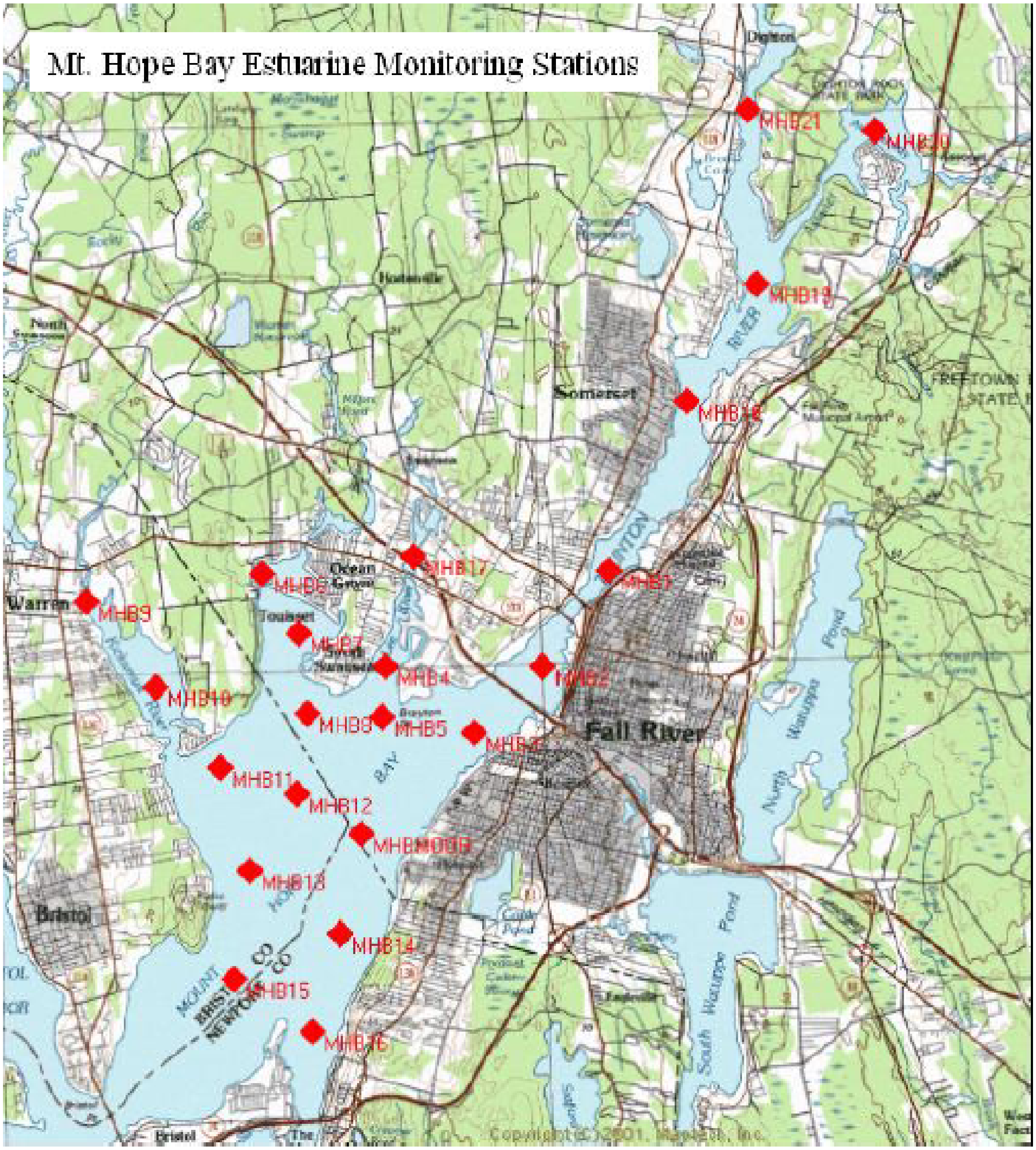


Table 5 below shows the results of the SMAST monitoring for each of the three years of the monitoring program, with the Taunton River stations highlighted. Minimum measured DO concentrations in each year were below 5.0 mg/l at all the Taunton River stations in 2004 and 2006, and a majority of those stations in 2005. In Mount Hope Bay proper, minimum DO concentrations below 5.0 mg/l were encountered at all but one of the Mount Hope Bay stations at least once during the three year period, and at five of the ten stations in both 2004 and 2005. This is compelling evidence of pervasive low DO conditions throughout the Taunton River

Estuary and Mount Hope Bay, given that the sampling was intermittent (and therefore unlikely to capture isolated low DO events) and was not timed to reflect the lowest DO conditions in the waterbody (just before dawn, when oxygen depletion due to respiration is greatest).

Elevated chlorophyll-a concentrations are similarly pervasive based on the SMAST monitoring data. Mean chlorophyll-a concentrations are above the Critical Indicators Report guidelines for unimpaired waters (3-5 ug/l) at every station monitored, in all three of the monitoring seasons. See Table 5. Maximum chlorophyll-a concentrations are routinely above 20 ug/l, a commonly used threshold for determining algal blooms. Again, given the likelihood of intermittent sampling missing the worst conditions in terms of algal blooms, this is compelling evidence of pervasive eutrophic conditions throughout the Taunton River Estuary and Mount Hope Bay.

Total nitrogen concentrations are elevated throughout the system, with a three year average TN concentration above 0.5 mg/l at sixteen of the 22 sites and above 0.45 mg/l at 21 of 22 sites. SMAST, 2007. Total Nitrogen concentrations are generally highest in the tidal rivers, including the Taunton River (e.g. Station 19, TN range 0.66 to 0.99 mg/l). Molar N/P ratios are consistent with nitrogen limitation (≤ 10 at all stations other than MHB21, the uppermost Taunton River station).

EXHIBIT C
AR B2

Table 5. SMAST Monitoring Data Summarized by Year. Taunton River stations highlighted.

			2004				2005				2006			
Station	**Location**	**State**	**DO min (mg/l)**	**Chl-a max (ug/l)**	**Chl-a mean (ug/l)**	**TN mean (mg/l)**	**DO min (mg/l)**	**Chl-a max (ug/l)**	**Chl-a mean (ug/l)**	**TN mean (mg/l)**	**DO min (mg/l)**	**Chl-a max (ug/l)**	**Chl-a mean (ug/l)**	**TN mean (mg/l)**
1	Taunton River	MA	4.8	24.2	7.8	0.53	5.1	49.2	10.9	0.56	4.1	26.6	10.3	0.74
2	Taunton River	MA	4.7	33.2	9.6	0.53	5.0	16.6	8.2	0.51	3.0	48.6	14.2	0.68
3	MHB proper (61-06)	MA	5.1	65.1	11.9	0.51	5.2	20.0	10.2	0.45	4.8	41.5	16.8	0.60
4	Lee River	MA	4.7	19.5	10.5	0.51	5.1	16.0	10.8	0.48	6.1	28.6	16.3	0.59
5	MHB proper (61-07)	MA	4.7	22.4	10.5	0.48	4.6	22.6	11.7	0.49	5.1	29.7	14.3	0.57
6	Cole River	MA	4.9	26.4	11.1	0.52	4.7	16.0	11.0	0.56	5.3	18.6	8.5	0.74
7	MHB proper (61-07)	MA	3.4	37.2	14.2	0.47	5.3	22.3	13.3	0.54	7.1	24.9	16.2	0.60
8	MHB proper (61-07)	MA	3.8	38.8	12.7	0.46	2.6	27.5	11.8	0.45	5.6	32.7	14.1	0.55
9	Kickamut River	RI	No data	19.1	11.9	0.70	No Data	17.7	9.7	0.73	No data	33.1	13.1	1.03
10	Kickamut River	RI	6.0	12.5	8.5	0.48	5.4	29.9	13.6	0.49	5.4	28.9	14.6	0.57
11	MHB-proper	RI	3.2	26.3	10.4	0.44	4.5	33.2	14.3	0.45	5.5	35.6	17.1	0.53
12	MHB-proper	RI	4.0	29.2	10.8	0.45	4.0	29.6	14.4	0.50	5.4	36.4	14.1	0.52
13	MHB-proper	RI	6.5	25.8	11.2	0.42	4.1	27.9	13.4	0.46	6.2	26.5	13.7	0.53
14	MHB-proper	RI	6.0	36.8	14.2	0.58	6.1	32.4	12.1	0.41	2.1	80.6	19.4	0.57
15	MHB-proper	RI	6.9	23.1	9.8	0.45	6.3	23.6	8.8	0.42	4.3	42.4	14.5	0.46
16	MHB-proper	RI	6.2	25.5	10.5	0.45	6.0	33.3	10.3	0.44	5.3	30.4	14.1	0.50
17	Lee River	MA	No data	9.2	4.7	0.65	No Data	17.3	7.9	0.61	No data	27.2	13.8	0.76
18	Taunton River	MA	4.7	16.1	7.5	0.61	4.4	38.0	9.0	0.60	4.3	12.9	7.2	0.80
19	Taunton River	MA	4.4	27.0	10.8	0.72	4.7	33.2	10.5	0.73	4.6	15.0	5.5	0.99
20	Assonet River	MA	5.1	15.7	9.1	0.72	5.6	27.1	12.2	0.63	4.8	16.9	7.6	0.94
21	Taunton River	MA	3.8	23.1	10.5	0.98	4.1	19.8	10.5	1.04	4.8	14.3	5.9	1.24
MOOR	MHB proper (61-06)	MA	6.3	21.4	11.4	0.51	5.4	19.9	11.5	0.45	2.7	35.4	16.5	0.55

Based on these data, the SMAST report concluded that a Massachusetts Estuaries Project ("MEP") analysis of nitrogen loading was warranted for the Mount Hope Bay/Taunton River complex, stating:

> Given the high population within the watershed and resultant N loading to this down gradient estuary and the observed high chlorophyll levels and oxygen depletions, it is not surprising that nitrogen levels are moderately to highly enriched over offshore waters. The Taunton River estuarine reach, as the focus of upper watershed N loading, showed very high total nitrogen levels (TN) in its upper reach (1.058 mg N L-1) and maintained high levels throughout most of its reach (>0.6 mg N L-1). The main basin of Mt. Hope Bay supported lower TN levels primarily as a result of mixing with incoming waters (generally 0.5-0.6 mg N L-1). This is consistent with the observed oxygen depletions and infauna animal communities. The highest (Moderate) water quality was found at the stations in the main basin and lower reaches of Mt Hope Bay out to the channels to lower Narragansett Bay and the Sakonet River (Figure 6).
>
> . . .
>
> In general, the Taunton River Estuary, with its large watershed N load and high TN levels, is showing poor water quality due to its high chlorophyll and oxygen depletions. The main basin of Mt. Hope Bay, with its greater flushing and access to higher quality waters of the lower Bay, is showing less impairment with moderate water quality. Finally, the lower basin of Mt. Hope Bay, nearest the tidal "inlet", is generally showing moderate water quality. . . . [T]hese data indicate that the MEP analysis of this system should focus on restoration of the main basin of Mt. Hope Bay and the Taunton River estuarine reach, and that it is likely that restoration of the Taunton River Estuary will have a significant positive effect on the habitat quality of the main basin of Mt. Hope Bay.

To date, the MEP analysis, along with the TMDL that would result from the analysis, has not been completed.[4]

Additional evidence of conditions in Mount Hope Bay is provided from the Narragansett Bay Water Quality Network, fixed monitoring station in the Bay, equipped with two datasondes that measured temperature, salinity, dissolved oxygen and depth at approximately 1 meter from the bottom and 0.5 meters below the surface, and chlorophyll fluorescence at the near surface sonde. (http://www.narrbay.org/d_projects/buoy/buoydata.htm). The datasondes have been deployed in the Rhode Island portion of Mount Hope Bay near SMAST site MHB13, from May or June through October, since 2005. Analysis of the DO data from the deep sonde at this site in 2005 and 2006 showed multiple events (three in 2005; seven in 2006) of DO depletion below the 4.8 mg/l RI water quality threshold, with individual events lasting between two and twelve days. Codiga et al, "Narragansett Bay Hypoxic Even Characteristics Based on Fixed-Site Monitoring

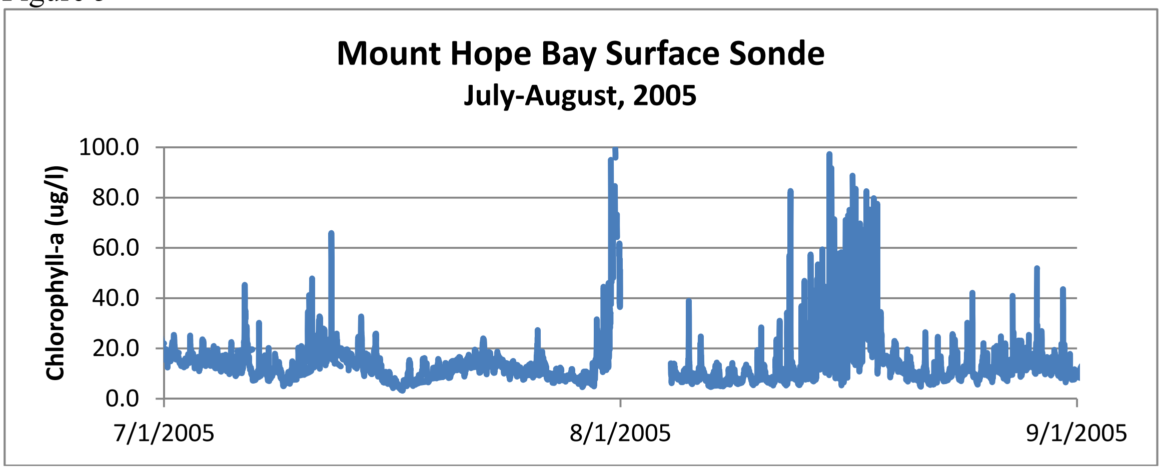
---

[4] EPA is required to issue the permit with limits and conditions necessary to ensure compliance with State water quality standards at the time of permit reissuance. Neither the CWA nor EPA regulations require that a TMDL be completed before a water quality-based limit may be included in a permit. Rather, water quality-based effluent limitations in NPDES permits must be "consistent with the assumptions and requirements of any *available* [emphasis added] wasteload allocation." 40 C.F.R. § 122.44(d)(1)(vii)(B). Thus, an approved TMDL is not a precondition to the issuance of an NPDES permit for discharges to an impaired waterway.

Network Time Series: Intermittency, Geographic Distribution, Spatial Synchronicity, and Interannual Variability," *Estuaries and Coasts* 32:621-641 (2009). Two of the 2006 events were characterized as "hypoxic", with DO concentrations less than 2.9 mg/l persisting for over two days. Id.

The sonde data also confirms the occurrence of algal blooms and generally elevated chlorophyll-a concentrations in Mount Hope Bay. The 2005 sonde data, Figure 5, shows multiple events with chlorophyll-a concentrations well above 20 ug/l, and above the maximum concentrations captured with the intermittent SMAST sampling.

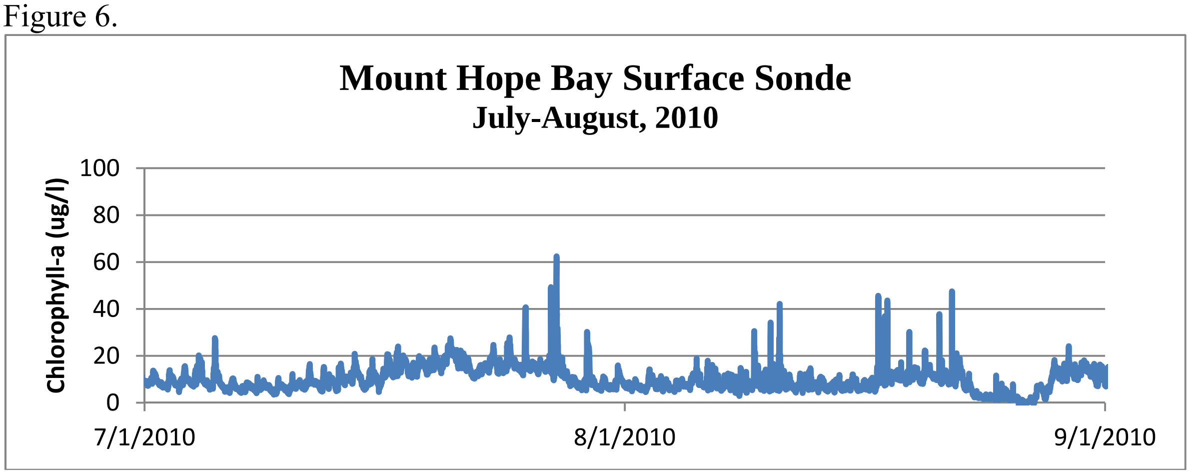
Figure 5



Charts by EPA. Source data: Narragansett Bay Fixed-Site Monitoring Network (NBFSMN), 2005. 2005 Datasets. Rhode Island Department of Environmental Management, Office of Water Resources. Data available at www.dem.ri.gov/bart

The sonde monitoring also confirms that these water quality violations continue to the present. The most recent published data (for 2010) show elevated chlorophyll-a concentrations and persistent DO concentrations below 5 mg/l. Figure 6.

Figure 6.



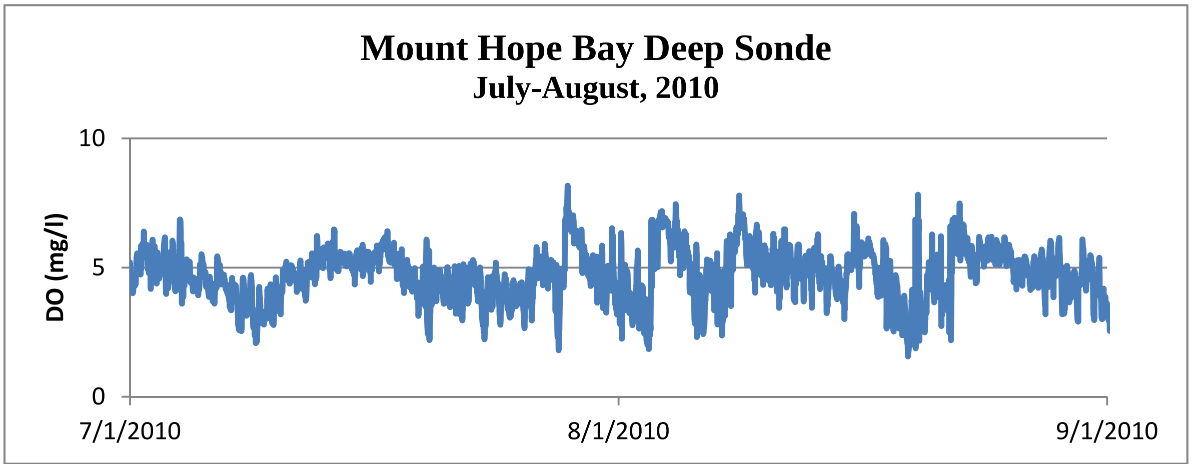


Chart by EPA. Source data: Narragansett Bay Fixed-Site Monitoring Network (NBFSMN), 2010. 2010 Datasets. Rhode Island Department of Environmental Management, Office of Water Resources. Data available at www.dem.ri.gov/bart

Based on these data, EPA has concluded that cultural eutrophication due to nitrogen overenrichment in the Taunton River Estuary and Mount Hope Bay has reached the level of a violation of both Massachusetts and Rhode Island water quality standards for nutrients and aesthetics, and has also resulted in violations of the numeric DO standards in these waters.

e. Reasonable Potential Analysis

Pursuant to 40 CFR § 122.44(d)(1), NPDES permits must contain any requirements in addition to technology-based limits necessary to achieve water quality standards established under Section 303 of the CWA, including state narrative criteria for water quality. In addition, limitations "must control any pollutant or pollutant parameter (conventional, non-conventional, or toxic) that the Director has determined are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any water quality standard, including State narrative criteria for water quality" (40 CFR § 122.44(d)(1)(i)). An excursion occurs if the actual or projected instream data exceeds any numeric or narrative water quality criterion.

To determine the extent of the facility's contribution to the violation of the MA SWQS, EPA performed an analysis of nitrogen loading to the Taunton River Estuary using data from the SMAST monitoring program, which included monitoring on the Taunton River and major tributaries to the Taunton River Estuary, in additional to the estuarine stations. The analysis focuses on the Taunton River Estuary because that area shows the greatest eutrophication impacts and greatest nitrogen concentrations. Using the 2004-2005 to representative a "typical year" based on precipitation data,[5] EPA used the USGS LOADEST program to calculate a

[5] Rainfall during the summers of 2004 and 2005 totalled 17.82 and 11.03 inches respectively (http://weather-warehouse.com/WeatherHistory/PastWeatherData_TauntonMuniArpt_EastTaunton_MA_September.html), compared to a long term average of 15.24 inches (http://www.weather.com/weather/wxclimatology/monthly/graph/02780). The third monitoring year, 2006, was excluded because extremely high rainfall in May and June (over 9 inches per month, or more than twice the long term average) has potential to disturb the "steady-state" assumption that underlies EPA's load analysis.

seasonal average (June to September) nitrogen load for the Taunton River and each tributary using measured nitrogen concentrations and flow for several discrete events. A description of the LOADEST analysis is provided in Attachment A.

EPA also calculated the point source loads to the Taunton River Estuary derived from wastewater treatment plants based on DMR data from each facility from June through September 2004. These include direct discharges to the Taunton River Estuary (Taunton and Somerset WWTPs), and discharges to the tributaries from other POTWs, which are a component of the tributary loads calculated above. For POTWs discharging to tributaries to the Taunton River, an attenuation factor was applied to account for instream uptake of nitrogen. A description of the attenuation calculation is provided in Attachment B. Attenuation was determined to range from four to eighteen percent for the major (> 1 mgd) facilities located on tributaries (eleven percent for Brockton, the largest discharger), with higher attenuation for some of the smaller facilities on smaller tributaries. Table 6 shows the point sources, the receiving stream, their nitrogen discharges and the delivered load to the estuary.

Table 6.

WWTF	Design Flow (MGD)	Receiving stream	Average 2004-05 Summer TN discharged (lb/d)	Average 2004-05 Summer TN delivered to Estuary (lb/d)
Direct discharges to Estuary				
Taunton	8.4	Taunton River Estuary	610	610
Somerset	4.2	Taunton River Estuary	349.5	349.5
			Total direct point source load:	959
Upstream discharges				
MCI Bridgewater	0.55	Taunton River	37	33
Brockton	18	Salisbury Plain River	1303	1160
Bridgewater	1.44	Town River	137.5	132
Dighton-Rehoboth Schools	0.01	Segregansett River	1	1
Mansfield	3.14	Three Mile River	375.5	312
Middleboro	2.16	Nemasket River	207.5	191
Wheaton College	0.12	Three Mile River	6	3
Oak Point	0.18	Bartlett Brook	9	8
East Bridgewater High School	0.01	Matfield River	1.5	1
			Total upstream point source load:	1841

Finally, EPA calculated total loads to the estuary and allocated those loads between point sources and nonpoint sources. For upstream loads, nonpoint sources were calculated by subtracting the delivered point source loads from the LOADEST total load. Nonpoint source loads from the watershed area downstream of the SMAST monitoring sites, not accounted for in the LOADEST analysis, were calculated using an areal loading factor derived from the LOADEST loading figures. Direct atmospheric deposition to the Taunton River Estuary was not included in the model as it is a relatively small contribution given the relatively small area of the estuary.[6] The average summer load to the estuary in 2004 to 2005 is 4,228 lbs/day.

Figure 7 and Table 7 show the total watershed nitrogen loads to the Taunton River Estuary. Wastewater treatment plant loads make up 66% of the total nitrogen load, with the Taunton WWTP alone constituting 14% of the total load. Nonpoint sources make up the remaining 34%.

Figure 7

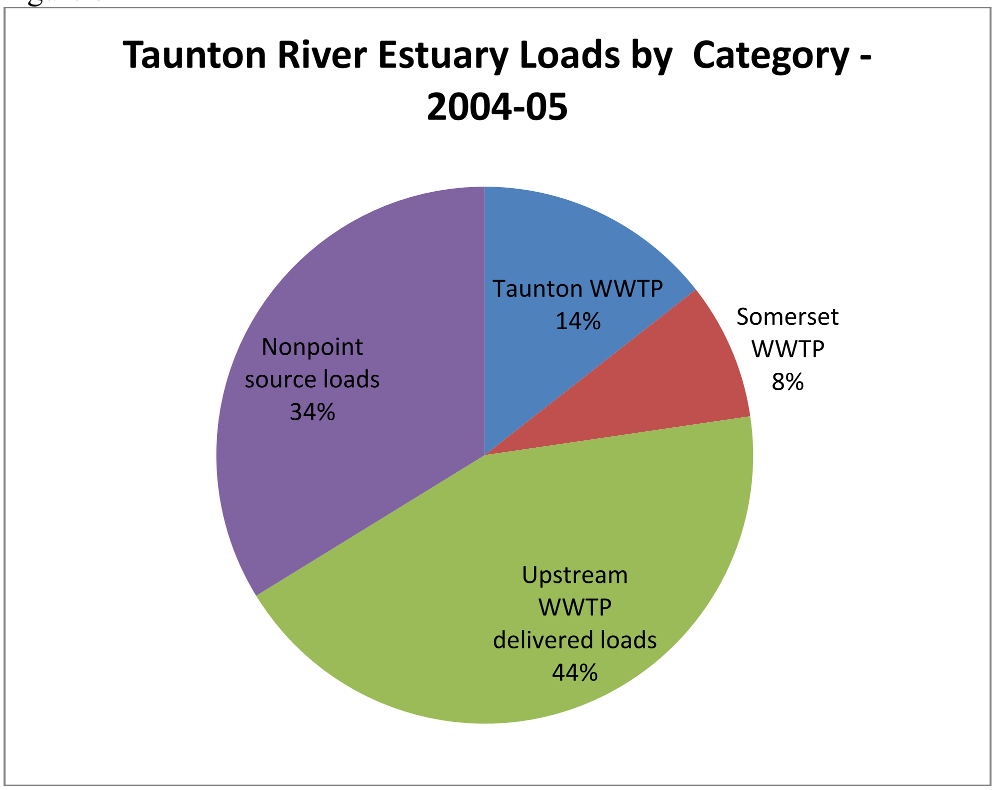


Table 7.

Total loads	Avg 2004-05 Summer Load (lb/d)
Taunton WWTP	610
Somerset WWTP	350
Upstream WWTP delivered loads	1841
Nonpoint source loads	1428
Total	4228

[6] Atmospheric deposition to the watershed is included in the nonpoint source loading figures.

On this basis, EPA concludes that the Taunton WWTP's nitrogen discharges "cause, have a reasonable potential to cause, or contribute" to nitrogen-related water quality violations in the Taunton River Estuary. Therefore, an effluent limit must be included in the permit.

f. Effluent limitation calculation

EPA's calculation of an effluent limitation for nitrogen consists of two parts. First, EPA determines a threshold nitrogen concentration in the water body that is consistent with unimpaired conditions. Second, EPA determines the allowable load from watershed sources generally, and this facility specifically, that will result in receiving water concentrations at or below the allowable threshold.

i. Threshold nitrogen concentration

To determine an appropriate threshold concentration, EPA applied the procedure developed by the Massachusetts Estuaries Project of identifying a target nitrogen concentration threshold based on a location within the estuary where water quality standards are not violated, in order to identify a nitrogen concentration consistent with unimpaired conditions. This approach is consistent with EPA guidance regarding the use of reference conditions for the purposes of developing nutrient water quality criteria. The Taunton River Estuary is classified as an SB water and is not a location where eelgrass has historically been found.[7] Therefore the primary water quality parameter considered in determining a sentinel location is DO. EPA notes that total nitrogen concentrations previously found to be protective of DO in other southeastern Massachusetts estuaries have ranged between 0.35 and 0.55 mg/l.[8]

Data from the SMAST monitoring program indicates widespread DO violations at a range of TN concentrations. Table 5 of the SMAST report (Table 4 above) provides the three year period 20% low DO concentration, which was below the 5 mg/l water quality standard at four stations, with long term average TN concentrations ranging from 0.486 to 1.058 mg/l. However, EPA does not consider a three year, 20% low DO to be a sufficiently sensitive indicator of water quality violations because the water quality criteria are based on a minimum DO concentration of 5 mg/l.

Closer examination of the SMAST monitoring data indicates multiple stations with minmum DO violations during the year with corresponding TN mean concentrations below 0.48 mg/l Indeed, minimum DO concentrations of less than 5.0 mg/l were encountered at all but one site (MHB16) during the three year monitoring program. See Table 5.

---

[7] Known historic eelgrass locations within Mount Hope Bay are located on the western portion of the Bay, including the mouths of the Kickamuit, Cole and Lee Rivers, and in the Sakkonet River. See Restoration Sites and Historical Eelgrass Distribution in Narragansett Bay, Rhode Island (2001), http://www.edc.uri.edu/restoration/images/maps/historiceelgrass.pdf . Water quality based TN thresholds would be lower in those areas to protect eelgrass habitat. The DO-based thresholds used for development of permit limits will also protect eelgrass in those locations due to much greater dilution of the Taunton River discharges in those areas of the Bay.

[8] See, e.g. MassDEP, *FINAL West Falmouth Harbor Embayment System Total Maximum Daily Loads For Total Nitrogen* (2007) (Harbor Head threshold 0.35 – SA water); MassDEP, *Oyster Pond Embayment System Total Maximum Daily Loads For Total Nitrogen* (2008) (threshold 0.55).

In addition, DO concentrations from the fixed site monitoring station indicate extensive periods with DO below 5.0 mg/l in 2005 and 2006 (the datasonde was not operating in 2004). EPA considers fixed site monitoring to be superior to intermittent sampling data with respect to DO concentrations because the continuous monitoring includes critical conditions and time periods (e.g. early morning DO minimums) that are generally missed in intermittent sampling. The SMAST monitoring station that is closest to the fixed site station is MHB13. The average TN concentration at MHB13 between 2004 and 2006 was 0.473 mg/l, indicating that the threshold concentration must be lower than that value.

On the basis of these data, EPA determined that station MHB16 was appropriate as a sentinel site where dissolved oxygen standards were met, and that a total nitrogen concentration of **0.45** mg/l (the average of 2004-05 concentrations) represents the threshold protective of the dissolved oxygen water quality standard of 5.0 mg/l. Higher TN concentrations are associated with multiple DO violations, based on the available monitoring data. EPA notes that this value is within the range of target nitrogen thresholds previously determined in southeastern Massachusetts embayments, and is also consistent with TN concentration thresholds to protect dissolved oxygen standards identified in other estuaries. See NHDES, 2009.

ii. Allowable TN load

EPA next determined an allowable total nitrogen load from the watershed that would result in TN concentrations at or below the 0.45 mg/l TN threshold. To do so, EPA applied a steady state ocean water dilution model based on salinity, from Fischer et al. (1979). A similar approach was used by the New Hampshire Department of Environmental Services (NHDES) to develop loading scenarios for the Great Bay Estuary (NHDES, 2009). The basic premise is that steady state concentrations of nitrogen in an estuary will be equal to the nitrogen load divided by the total water flushing rate from freshwater and ocean water. Estuaries are complicated systems with variability due to tides, weather, and stream flows. However, by making the steady state assumption, it is not necessary to model all of these factors. The steady state assumption can be valid for calculations based on long term average conditions, which approximate steady state conditions.

Salinity data is used to determine the proportion of fresh and ocean water in the estuary. Freshwater input is calculated from streamflow measurements at USGS gages in the watershed. Then, ocean water inputs are estimated using salinity measurements and the freshwater inputs. The total flushing rate is then used with the target nitrogen threshold to determine the total allowable load to the estuary. For this calculation, salinity at Station MHB19 during 2004-05[9] was used to represent the sentinel location for meeting the target threshold, because it is the uppermost station that appears clearly nitrogen limited based on the Mount Hope Bay Monitoring Program data.

Freshwater Flow: Average freshwater flow input to the estuary in the summers of 2004 and 2005 is shown in Table 8. Freshwater flows at the mouths of the river is determined based on the USGS streamgage data using a drainage area ratio calculation as follows:

[9] As discussed above, 2004-05 represent a typical year.

Flow at mouth = Flow at USGS gage * Drainage area at mouth/Drainage area at gage

Table 8

	1 Taunton River (Bridge-water) *USGS Gage*	2 Taunton River (area to mouth of estuary minus tributaries) *Drainage Area calculation*	3 Three Mile River (North Dighton) *USGS Gage*	4 Three Mile River (mouth) *Drainage Area calculation*	5 Segre-ganset River (Dighton) *USGS Gage*	6 Segre ganset River (mouth) *Drainage Area calculation*	7 Assonet River (dam) *based on Segregansett*	8 Quequechan River (mouth) *based on Segregansett*	Total Fresh-water Flow (Sum of Columns 2+ 4+6+ 7+8
Drainage Area	261 sq. miles	410 sq. Miles	84 sq. miles	85 sq. miles	10.6 sq. miles	14.9 sq. miles	21.9 sq. miles	30.5 sq. miles	
2004	195 cfs	306 cfs	54 cfs	55 cfs	4.4 cfs	6.1 cfs	9.0 cfs	12.6 cfs	**389 cfs**
2005	217 cfs	341 cfs	55 cfs	56 cfs	4.6 cfs	6.4 cfs	9.4 cfs	13.1 cfs	**427 cfs**

Salinity: A mass balance equation is applied as follows:

Average salinity at ocean boundary (Rhode Island Sound) = 30 ppt (Kincaid and Pockalny, 2003)
Average salinity at MHB19 in Taunton River Estuary for 2004-05 = 22.35 ppt

Average freshwater flow 2004-05 (Table 8) = 408 cfs

(30 ppt * X cfs + 0 ppt * 408 cfs)/(408 cfs + X) = 22.35 ppt

X = 1,192 cfs ocean water

Nitrogen Target: The nitrogen target load in lbs per day is calculated by combining all water inputs and multiplying by the threshold concentration and the appropriate conversion factors.

(408 cfs + 1,192 cfs)*(0.646)*(8.34)*(0.45 mg/l) = 3,879 lbs/day

The nitrogen concentration at the seaward boundary is 0.28 mg/l (from Oviattet al., Annual Primary Production in Narragansett Bay with no Bay-Wide Winter-Spring*** (2001)). The ocean load can then be calculated:

Ocean load = 1,192 cfs * (0.646)*(8.34)*(0.28 mg/l) = 1,798 lbs/day

Based on the overall flow of the estuary (average of summers 2004 and 2005), the allowable TN load to the Taunton River Estuary, including both ocean and watershed loads, is 3,879 lbs/day.[10]

[10] To provide a check on this calculation, EPA calculated the predicted TN concentration in the estuary using calculated loads from 2004-05 using the same mass balance equation. Using the calculated watershed load of 4,228 lbs/day and an ocean load of 1,798 lbs/day as calculated above, the predicted concentration in the estuary is 0.70

The load from the ocean is 1,798 lbs/day, leaving an allowable load of **2,081** lbs/day from watershed sources. As noted above, actual loads in 2004-05 averaged 4,228 lbs/day. This means a reduction in watershed loads of 2,147 lbs/day, or approximately 51%, is required in order to meet water quality standards in the Taunton River Estuary.[11]

Clearly, the required load reduction is greater than the total load currently discharged from the Taunton WWTP and cannot be achieved only through permit limits on this facility. Furthermore, the reduction should be fairly allocated among all discharges to the estuary. EPA notes that all the wastewater treatment plants contributing to the Taunton River are due for permit reissuance, and it is EPA's intent to include nitrogen limits in those permits as appropriate, consistent with this analysis. In doing so, EPA considers not only the facility's current discharges, but their potential discharges under their approved design flows. As this analysis considers summer flows only, an estimated summer flow is calculated at 90% of design flow, consistent with the analysis done by RIDEM for Narragansett Bay facilities. (RIDEM, 2004) See Table 9. This accounts for the fact that a facility discharging at an annual average flow equal to its design flow will average less than design flow during the drier summer months.

For purposes of allocating the required load reduction, EPA first notes that nonpoint sources are unlikely to be reduced by 51% (the overall reduction required in the estuary), and that therefore a higher proportion of the reduction will be allocated to wastewater point sources in the estuary. This is consistent with approaches in approved TMDLs in Massachusetts and elsewhere. EPA considers a 20% nonpoint source (NPS) reduction to be a reasonably aggressive target for nonpoint source reduction in this watershed based on the prevalence of regulated MS4 stormwater discharges, trends in agricultural uses and population, and potential reductions in atmospheric deposition through air quality programs. EPA notes that should nonpoint source reductions fail to be achieved, permit limits for WWTPs in the watershed shall be revisited to ensure that water quality standards are met.

Using the baseline NPS load of 1,428 lbs/day from 2004-05, as shown in Table 7, a 20% reduction would result in a NPS load of 1,142 lbs/day. This leaves an available load for wastewater discharges of 939 lbs/day. Of the eleven facilities discharging to the watershed, five are minor discharges (< 1 MGD) with a combined load of less than 50 lbs/day. These facilities are considered de minimis contributors for the purposes of this analysis and are not analyzed further here.

To determine an equitable load allocation, EPA first determined the permit limit that would be required to meet the allowable load if a uniform limit were applied to all facilities. While permit limits are generally set to be more stringent on larger dischargers/direct discharges to impaired waters, calculating a uniform limit allows EPA to determine the range of options for permit limits. As shown in Table 9 below, a uniform permit limit on all discharges > 1 MGD in the Taunton would have to be between 3.4 and 3.5 mg/l for the allowable loading threshold to be met. For the largest discharges such at Taunton, therefore, a 3.4 mg/l limit represents the upper bound of possible permit limits to meet the water quality requirement. For a lower bound on

mg/l. The monitoring data indicates that the average TN concentration was 0.73 mg/l, within 5% of the predicted value.

[11] Ocean loads are not considered controllable.

potential permit limits, EPA notes that the currently accepted limit of technology (LOT) for nitrogen removal is a seasonal average of 3.0 mg/l.

Table 9.

WWTF	Design Flow (MGD)	Percent delivered to estuary	Limit assumption: 3.3	Limit assumption: 3.4	Limit assumption: 3.5
Taunton	8.4	100%	208	214	221
Somerset	4.2	100%	104	107	110
Brockton	18	89%	397	409	421
Bridgewater	1.44	96%	34	35	36
Mansfield	3.14	83%	65	67	69
Middleboro	2.16	92%	49	51	52
Smaller facilities (at current loads)			46	46	46
Total			903	929	955

Given the determination that the maximum possible limit is less than 4 mg/l, and that upgrades to meet the most stringent permit limits are more cost-effective at facilities with the highest flows and highest proportion of the load delivered to the estuary, EPA concludes that a LOT permit limit of 3.0 mg/l (seasonal average) is required for the Taunton WWTP. The Taunton WWTP is the second largest discharger to the Taunton River watershed, is responsible for approximately 14% of watershed loads, and discharges directly to the upper portion of the Taunton River estuary, with no potential for uptake or attenuation of its nitrogen discharges.

EPA notes that this will mean the potential for somewhat higher, although still stringent, nitrogen limits at some of the smaller dischargers in the Taunton River watershed. Table 10 shows an example permitting scenario that would meet the allowable loading threshold. In this particular example permit limits for the Brockton AWRF (the largest discharger) and Somerset WWTP (the third largest discharge and a direct discharger to the estuary) are also set at 3.0 mg/l; and the remaining three facilities (Bridgewater, Mansfield and Middleboro) are set at 5.5 mg/l. Final determinations as to the permit limits on these facilities will be made in each individual permit issuance.

Table 10.

WWTF	Design Flow (MGD)	Percent delivered to estuary	Potential permit limit	Load discharged (lbs/d) at 90% design flow	Load delivered to Estuary
Taunton	8.4	100%	3	189	189
Somerset	4.2	100%	3	95	95
Brockton	18	89%	3	405	361
Bridgewater	1.44	96%	5.5	59	57
Mansfield	3.14	83%	5.5	130	108
Middleboro	2.16	92%	5.5	89	82
Smaller facilities (at current loads)					46
Total					938

For these reasons, EPA has included a seasonal average total nitrogen limit of 3.0 mg/l (May to October) in the new draft permit.[12] The seasonal limit shall be applied on a rolling basis (e.g. the average reported for June shall include May and June of the reporting year as well as July through October of the preceding year). Also, in accordance with 40 CFR 122.45(f), EPA is imposing a seasonal average mass limit of 210 lbs/day, also applicable during the months of May through October. This mass limit is based on the seasonal average concentration limit and the design flow of the facility, and represents the highest load that the facility can discharge consistent with achieving water quality standards. The sampling frequency is three times per week. The permit contains a compliance schedule for meeting the nitrogen limits (see Permit Section 1.G); EPA encourages the permittee and others to provide comments on the specific milestone and deadlines included in that schedule.

Consistent with the seasonal analysis, EPA has not included nitrogen limits for the timeframe of November through March because these months are not the most critical period for phytoplankton growth. As noted earlier, EPA is imposing a condition requiring the permittee to optimize nitrogen removal during the wintertime. The summer limits and the winter optimization requirements will serve to keep the annual discharge load low. In combination, the numeric limitations and the optimization requirements are designed to ensure that the discharge does not cause or contribute to violations of applicable water quality standards, including narrative water quality criterion for nutrients, in accordance with Section 301(b)(1)(C) of the CWA.

EPA also notes that while the permit limit was set based on standards in the Taunton River Estuary, the limit is also protective of water quality standards in Mount Hope Bay under Massachusetts and Rhode Island water quality standards. Mount Hope Bay receives much greater dilution by ocean water, so that the nitrogen concentrations resulting from Taunton River loadings will be lower in the Bay than the 0.45 mg/l being met in the Taunton River Estuary. While other loads to Mount Hope Bay (particularly the Fall River WWTP) will need to be addressed as well, the reduction in nitrogen loadings from the Taunton River will ensure that those discharges do not cause or contribute to nitrogen-related impairments in Mount Hope Bay.

6. Ammonia-Nitrogen

The draft permit also carries over the ammonia-nitrogen limits of the current permit of 1 mg/l average monthly and average weekly, and 2 mg/l maximum daily, in the June to September period. EPA notes that the new 3 mg/l total nitrogen limits, once in effect, should be sufficient to ensure that ammonia-nitrogen concentrations are below these limits. The facility had one violation of the monthly average permit limit and two violations of the weekly average and daily maximum limits in the period June 2010 to June 2012. See Table 1.

---

[12] The May to October seasonal period is consistent with other Narragansett Bay-related nitrogen limits. See Upper Blackstone Water Pollution Abatement District, MA01002369. The Mount Hope Bay Monitoring Program did not include May and October sampling, so those months were not explicitly included in the loading analysis. However, the Narragansett Bay Fixed Site Monitoring Program extends through October and includes limited data at the end of May and supports the need for permit limits in those months. For example, in 2006 chlorophyll-a concentrations in the last week of May averaged 13 ug/l with a maximum of 25 ug/l, with an average DO at the surface sonde of less than 5.0 mg/l. In 2005, chlorophyll-a concentrations from October 1 through 5 averaged 15 ug/l, with a maximum of 45 ug/l; DO concentrations measured at the near-bottom datasonde were less than 5.0 mg/l for approximately 5% of that time.

7. Phosphorus

EPA also received comments contending that an effluent limitation on phosphorus was necessary to ensure that water quality standards are met in the immediate vicinity of the discharge. Phosphorus is generally the 'limiting nutrient' in freshwater systems and therefore the focus of control with respect to eutrophication,. While the segment of the Taunton River that receives the discharge is classified as marine water, salinities are quite low in the vicinity of the discharge, conditions under which phosphorus may cause or contribute to water quality violations. EPA therefore reviewed the available information regarding phosphorus in the immediate receiving water to determine whether an effluent limit is required.

Phosphorus data collected during the Mount Hope Bay Monitoring Program just upstream at Weir Village (Plain Street, Taunton) indicate total phosphorus concentrations averaged 0.10 mg/l (range 0.06-0.19) in 2004 and 0.70 mg/l (range 0.65-0.13) in 2005. Total nitrogen concentrations were also monitored, and the average total nitrogen/total phosphorus (TN/TP) ratio was 19 (range 11 to 30), consistent with expected phosphorus limitation in this area. However, upstream facilities have implemented permit limits on their phosphorus discharges since 2005. The Taunton River Watershed Association (TRWA) monitors sites upstream (Plain Street, Taunton) and downstream (Center Street/Berkley Bridge). TRWA phosphorus data for April to October 2010 averaged 0.12 mg/l at both the upstream and downstream sites. In 2011, the average concentration was 0.08 mg/l at both sites.[13] The 2011 concentration is below the EPA-recommended Gold Book concentration of 0.1 mg/l, which has been used by EPA as the basis for permit limits in numerous permit proceedings as an interpretation of the Massachusetts narrative water quality standard for nutrients. See, e.g., *In re Upper Blackstone Water Pollution Abatement District*, 14 E.A.D. __ (2010). While the Taunton WWTP does not monitor phosphorus discharges under its current permit, these data do not indicate discernable increases in total phosphorus concentrations attributable to the Taunton WWTP.

Receiving water quality data is limited with respect to other indicators of eutrophic conditions in the immediate vicinity of the discharge. Dissolved oxygen data was not collected in the Mount Hope Bay Monitoring Program, but monthly monitoring by the TRWA did not document any violations of the DO standard. No chlorophyll-a data was collected in either program. MassDEP monitoring in 2006 did not include this portion of the Taunton River; the most downstream station was at the South Street East/Old Colony Bridge (Taunton/Raynham), several river miles upstream. The most recent MassDEP Water Quality Assessment from 2001 found that this segment of the Taunton River "Supports" the Aquatic Life use, although the only data cited were toxicity test results for the Taunton WWTP (including ambient toxicity testing from receiving water at Weir Village).

Based on the available information, particularly the recent TRWA total phosphorus data showing instream concentrations approximately equal to the Gold Book value (averaging 0.1 mg/l in 2010-11) both upstream and downstream of the discharge, there is insufficient basis to conclude that phosphorus discharges from the Taunton WWTP cause, have reasonable potential to cause, or contribute to violations of water quality standards in the Taunton River. EPA therefore has included a monitoring requirement for phosphorus in the Draft Permit, but no effluent limit.

---

[13] Non-detects included at detection limit of 0.05 mg/l.

EPA encourages the permittee to provide flexibility in its facility planning so that phosphorus removal may be incorporated at a later date if necessary.

8. Metals

The current permit for this facility contains an effluent limit for total recoverable copper based on the freshwater criteria for class B waters. The correct criteria for SB waters is set forth below in terms of dissolved metals (form used for water quality standard) and total recoverable metals (used for permit limits). See 314 CMR 4.05(5)(e).

Dissolved Criteria CMC ug/l	Dissolved Criteria CCC ug/l	Translator	Total Criteria CMC ug/l	Total Criteria CCC ug/l
4.8	3.1	0.83	**5.8**	**3.7**

Permit limits are calculated based on the meeting the criteria in the receiving water under 7Q10 conditions after accounting for the background concentration in the receiving water.

Mass balance:

$$\frac{\underline{(\text{Upstream 7Q10 flow})*(\text{Background}) + (\text{Taunton WWTP design flow})*(\text{permit limit})}}{(\text{Upstream 7Q10 flow} + \text{Taunton WWTP flow})} = \text{Criteria}$$

Where: Upstream flow = 31.6 cfs
Taunton flow = 13 cfs
Background copper = 2 ug/l(tr) (median of upstream concentration from WET reports)
Criteria = CCC (3.7 ug/l tr) for average monthly permit limit
CMC (5.8 ug/l tr) for daily maximum permit limit

The resulting permit limits are:

Average monthly = 8 ug/l
Maximum Daily = 15 ug/l

Average Monthly Mass Loading Limits = (constant)(chronic criteria mg/l)(design Q mgd)

(8.34)(0.008 mg/l)(8.4 mgd) = 0.56 lbs/Day

The average monthly limit for total recoverable copper based on the chronic water quality criteria will be 8 ug/l and the maximum daily limit, based on the acute criteria, will be 15 ug/l. These limits are made more stringent than those in the existing permit based upon the use of salt water criteria and revised dilution.

EPA also reviewed analytical data submitted in connection with the Taunton WET Reports to determine whether the facility discharges other toxic metals. Data from samples of the effluent and receiving water for the period February 2008 through August 2011 are set forth in Table 11 (attachment), along with the relevant water quality criteria for each parameter. The facility discharges none of these metals at concentrations above the water quality criteria, so no limits are required.

Whole Effluent Toxicity (WET) - Under Section 301(b)(1)(C) of the CWA, discharges are subject to effluent limitations based on water quality standards. The MA SWQS include the following narrative statement and requires that EPA criteria established pursuant to Section 304(a)(1) of the CWA be used as guidance for interpretation of the following narrative criteria: "All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife."

National studies conducted by the EPA have demonstrated that domestic sources contribute toxic constituents. These constituents include metals, chlorinated solvents, aromatic hydrocarbons and others. The Region's current policy is to include toxicity testing requirements in all permits, while Section 101(a) (3) of the CWA specifically prohibits the discharge of toxic pollutants in toxic amounts.

Based on the potential for toxicity resulting from domestic sewage, in accordance with EPA national and regional policy, and in accordance with MassDEP policy, the draft permit includes acute toxicity limitations and monitoring requirements. (See *Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants*, 50 Fed. Reg. 30,784 (July 24, 1985); EPA, *Technical Support Document for Water Quality-Based Toxics Control* (September, 1991); and MassDEP, *Implementation Policy for the Control of Toxic Pollutants in Surface Waters* (February 23, 1990)).

Pursuant to EPA, Region I and MassDEP policy, discharges having a dilution factor less than 100:1 (3.4:1 for this discharge) require acute and chronic toxicity testing and an acute LC_{50} limit of ≥100%. The draft permit requires the permittee to conduct four chronic and acute WET tests per year. The tests use the species, Ceriodaphnia dubia, in accordance with existing permit conditions, and are to be conducted in accordance with the EPA Region I Toxicity protocol found in the draft permit Attachment A for the chronic test and Attachment B for the acute test. While the receiving water has been determined to be Class SB (seawater), the location where the permittee draws its upstream dilution water is freshwater. MassDEP has therefore requested that the freshwater toxicity protocol continue to be used for this discharge. The prior permit'ss use of the single "chronic (and modified acute)" test has been revised to two separate tests, consistent with the requirement to use approved test methods.

The chronic no observable effects concentration (C-NOEC) limit is calculated to be greater than or equal to the effluent concentration in the receiving water. The inverse of the receiving water concentration (chronic dilution factor) multiplied by one hundred is used to calculate the chronic C-NOEC as a percent limit. $(1/3.4)(100) \geq 29\%$

VII. INDUSTRIAL PRETREATMENT PROGRAM

The permittee is required to administer a pretreatment program based on the authority granted under 40 CFR 122.44(j), 40 CFR Part 403 and Section 307 of the Act. The permittee's pretreatment program received EPA approval on July 31, 1982 and, as a result, appropriate pretreatment program requirements were incorporated into the previous permit, which were consistent with that approval and federal pretreatment regulations in effect when the permit was issued.

The Federal Pretreatment Regulations in 40 CFR Part 403 were amended in October 1988, in July 1990, and again in October 2005. Those amendments established new requirements for implementation of pretreatment programs. Upon reissuance of this NPDES permit, the permittee is obligated to modify its pretreatment program to be consistent with current Federal Regulations. Those activities that the permittee must address include, but are not limited to, the following: (1) develop and enforce EPA approved specific effluent limits (technicallybased local limits); (2) revise the local sewer-use ordinance or regulation, as appropriate, to be consistent with Federal Regulations; (3) develop an enforcement response plan; (4) implement a slug control evaluation program; (5) track significant noncompliance for industrial users; and (6) establish a definition of and track significant industrial users.

These requirements are necessary to ensure continued compliance with the POTW's NPDES permit and its sludge use or disposal practices.

In addition to the requirements described above, the draft permit requires the permittee to submit to EPA in writing, within 180 days of the permit's effective date, a description of proposed changes to permittee's pretreatment program deemed necessary to assure conformity with current federal pretreatment regulations. These requirements are included in the draft permit to ensure that the pretreatment program is consistent and up-to-date with all pretreatment requirements in effect. Lastly, the permittee must continue to submit, annually by October 1, a pretreatment report detailing the activities of the program for the twelve month period ending 60 days prior to the due date.

VIII. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

EPA regulations set forth a standard condition for "Proper Operation and Maintenance" that is included in all NPDES permits. *See* 40 CFR § 122.41(e). This condition is specified in Part II.B.1 (General Conditions) of the draft permit and it requires the proper operation and maintenance of all wastewater treatment systems and related facilities installed or used to achieve permit conditions.

EPA regulations also specify a standard condition to be included in all NPDES permits that specifically imposes on permittees a "duty to mitigate." *See* 40 CFR § 122.41(d). This condition is specified in Part II.B.3 of the draft permit and it requires permittees to take all reasonable steps – which in some cases may include operations and maintenance work - to minimize or prevent any discharge in violation of the permit which has the reasonable likelihood of adversely affecting human health or the environment.

Proper operation of collection systems is critical to prevent blockages and equipment failures that would cause overflows of the collection system (sanitary sewer overflows, or SSOs), and to limit the amount of non-wastewater flow entering the collection system (inflow and infiltration or I/I[14]). I/I in a collection system can pose a significant environmental problem because it may

---

14 "Infiltration" is groundwater that enters the collection system through physical defects such as cracked pipes, or

displace wastewater flow and thereby cause, or contribute to causing, SSOs. Moreover, I/I could reduce the capacity and efficiency of the treatment plant and cause bypasses of secondary treatment. Therefore, reducing I/I will help to minimize any SSOs and maximize the flow receiving proper treatment at the treatment plant. MassDEP has stated that the inclusion in NPDES permits of I/I control conditions is a standard State Certification requirement under Section 401 of the CWA and 40 CFR § 124.55(b).

Therefore, specific permit conditions have been included in Part I.B. and I.C. of the draft permit. These requirements include mapping of the wastewater collection system, preparing and implementing a collection system operation and maintenance plan, reporting unauthorized discharges including SSOs, maintaining an adequate maintenance staff, performing preventative maintenance, controlling infiltration and inflow to the extent necessary to prevent SSOs and I/I related-effluent violations at the wastewater treatment plant, and maintaining alternate power where necessary. These requirements are intended to minimize the occurrence of permit violations that have a reasonable likelihood of adversely affecting human health or the environment.

Several of the requirements in the new draft permit were not included in the current permit or the previous draft permit, including collection system mapping, and preparation of a collection system operation and maintenance plan. EPA has determined that these additional requirements are necessary to ensure the proper operation and maintenance of the collection system and has included schedules for completing these requirements in the draft permit.

Because Raynham and Dighton each own and operate collection systems that discharge to the Taunton treatment works, these municipalities have been included as co-permittees for the specific permit requirements discussed in the paragraph above. The historical background and legal framework underlying this co-permittee approach is set forth in Attachment C to this Fact Sheet, EPA Region 1 NPDES Permitting Approach for Publicly Owned Treatment Works that Include Municipal Satellite Sewage Collection Systems. The town of Norton is not a co-permittee due to the low number of homes tied in to the Taunton collection system.

IX. COMBINED SEWER OVERFLOWS

A. Combined Sewer System

The City of Taunton's sewer system is partially combined, with at least 300 manhole covers in the system had holes drilled in them so that they act as catch basins during storm events, and an additional 33 manholes had combined drainage and sanitary pipelines in the same structure There is one active combined sewer overflow (CSO) located on West Water Street, Outfall 004. Pursuant to the 2008 AO, the City is required to continue working on improving its collection system and to evaluate its ability to eliminate the CSO outfall through the collection system improvements. If the collection system improvements by themselves will not eliminate the CSO outfall, the AO requires that the City submit a plan and schedule for additional options; the target

deteriorated joints. "Inflow" is extraneous flow entering the collection system through point sources such as roof leaders, yard and area drains, sump pumps, manhole covers, tide gates, and cross connections from storm water systems.

elimination date set in the AO is October 2013. CSO discharges are subject to the conditions set forth in Part I.F. of the Draft Permit

B. Regulatory Framework

CSOs are point sources subject to NPDES permit requirements for both water-quality based and technology-based requirements but are not subject to the secondary treatment regulations applicable to publicly owned treatment works in accordance with 40 CFR §133.103(a).

As noted above, Section 301(b)(1)(C) of the Clean Water Act of 1977 mandated compliance with water quality standards by July 1, 1977. Technology-based permit limits must be established for best conventional pollutant control technology (BCT) and best available technology economically achievable (BAT) based on best professional judgment (BPJ) in accordance with Section 301(b) and Section 402(a) of the Water Quality Act Amendments of 1987 (WQA).

The framework for compliance with Clean Water Act requirements for CSOs is set forth in EPA's National CSO Control Policy, 59 Fed. Reg. 18688 (1994). It sets the following objectives:

1) To ensure that if the CSO discharges occur, they are only as a result of wet weather;
2) To bring all wet weather CSO discharge points into compliance with the technology based requirements of the CWA and applicable federal and state water quality standards; and
3) To minimize water quality, aquatic biota, and human health impacts from wet weather flows.

The CSO Control Policy also established as a matter of national policy the minimum BCT/BAT controls that represent the BPJ of the agency on a consistent, national basis. These are the "nine minimum controls" defined in the CSO Control Policy and set forth in the Draft Permit Part 1.e.1.a (1) through (9): (1) proper operation and maintenance of the sewer system and the CSOs, (2) maximum use of the collection system for storage, (3) review pretreatment programs to assure that CSO impacts are minimized, (4) maximization of flow to the POTW for treatment, (5) prohibition of dry weather overflows, (6) control of solid and floatable materials in CSOs, (7) pollution prevention programs, (8) public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts, and (9) monitoring to effectively characterize CSO impacts and the efficacy of CSO controls. Massachusetts has established similar requirements for CSO permits. MassDEP, *Guidance for Abatement of Pollution from CSO Discharges* (1997).

C. Permit Requirements

In accordance with the National CSO Control Policy, the draft permit contains the following conditions for CSO discharges:

(i) Dry weather discharges from CSO outfalls are prohibited. Dry weather discharges must be immediately reported to EPA and MassDEP.

(ii) During wet weather, the discharges must not cause any exceedance of water quality standards. Wet weather discharges must be monitored and reported as specified in the permit.

(iii) The permittee shall meet the technology-based nine minimum controls, set forth above, complying with the implementation levels as set forth in Part I.F.2 of the draft permit.

(iv) The permittee shall submit updated documentation on its implementation of the Nine Minimum Controls within 6 months of the effective date of the permit, and shall provide an annual report on monitoring results from CSO discharges and the status of CSO abatement projects by April 30 of each year.

X. SLUDGE INFORMATION AND REQUIREMENTS

The Taunton WWTP produces approximately 1655.29 dry metric tons of sludge each year. Section 405(d) of the CWA requires that sludge conditions be included in all POTW permits. Primary and secondary thickened sludge from the Taunton WWTF is currently trucked off-site to the Taunton Municipal Sanitary Landfill. If the ultimate sludge disposal method changes, the permittee must notify EPA and MassDEP and the requirements pertaining to sludge monitoring and other conditions would change accordingly (See enclosed Sludge Guidance Document).

XI. UNAUTHORIZED DISCHARGES

This permit authorizes discharges only from the outfalls listed in Part I.A.1 and I.D of this permit, in accordance with the terms and conditions of this permit. Discharges of wastewater from any other point sources are not authorized by the permit and shall be reported in accordance with Section D.1.e. (1) of the General Requirements of the permit (Twenty-four hour reporting).

XII. ENDANGERED SPECIES ACT

Section 7(a) of the Endangered Species Act of 1973, as amended (ESA) grants authority to and imposes requirements upon Federal agencies regarding endangered or threatened species of fish, wildlife, or plants ("listed species") and habitat of such species that has been designated as critical (a "critical habitat"). The ESA requires every Federal agency, in consultation with and with the assistance of the Secretary of Interior, to insure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat.

EPA has reviewed the federal endangered or threatened species of fish, wildlife, or plants to determine if any listed species might potentially be impacted by the re-issuance of this NPDES permit. The only listed species that have the potential to be present in the vicinity of the Taunton WWTP is the Atlantic sturgeon (*Acipenser oxyrinchus*).

Based on the analysis of potential impacts to Atlantic sturgeon presented in Attachment D to this Fact Sheet, EPA has determined that impacts to Atlantic sturgeon from the discharge at Taunton

WWTP, if any, will be insignificant or discountable. Attachment D provides the complete discussion of EPA's Endangered Species Act assessment as it relates to the renewal of the Taunton WWTP's NPDES permit.

XIII. ESSENTIAL FISH HABITAT

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq. (1998)), EPA is required to consult with the National Marine Fisheries Services (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes, may adversely impact any essential fish habitat as: waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. § 1802 (10)). Adversely impact means any impact which reduces the quality and/or quantity of EFH (50 C.F.R. § 600.910 (a)). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions. Essential fish habitat is only designated for species for which federal fisheries management plans exist (16 U.S.C. § 1855(b) (1) (A)). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999. The Taunton River is not covered by the EFH designation for riverine systems and is not included within the scope of the EFH designation for Mount Hope Bay. Therefore EPA has determined that a formal EFH consultation with NMFS is not required.

XIV. MONITORING AND REPORTING

The effluent monitoring requirements have been established to yield data representative of the discharge under authority of Section 308 (a) of the CWA in accordance with 40 CFR §§122.41 (j), 122.44 (l), and 122.48.

The Draft Permit includes new provisions related to Discharge Monitoring Report (DMR) submittals to EPA and the State. The Draft Permit requires that, no later than one year after the effective date of the permit, the permittee submit all monitoring data and other reports required by the permit to EPA using NetDMR, unless the permittee is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for submitting DMRs and reports ("opt-out request").

In the interim (until one year from the effective date of the permit), the permittee may either submit monitoring data and other reports to EPA in hard copy form, or report electronically using NetDMR.

NetDMR is a national web-based tool for regulated CWA permittees to submit discharge monitoring reports (DMRs) electronically via a secure Internet application to U.S. EPA through the Environmental Information Exchange Network. NetDMR allows participants to discontinue mailing in hard copy forms under 40 CFR § 122.41 and § 403.12. NetDMR is accessed from the following url: http://www.epa.gov/netdmr. Further information about NetDMR, including contacts for EPA Region 1, is provided on this website.

EPA currently conducts free training on the use of NetDMR, and anticipates that the availability of this training will continue to assist permittees with the transition to use of NetDMR. To participate in upcoming trainings, visit http://www.epa.gov/netdmr for contact information for

Massachusetts.

The Draft Permit requires the permittee to report monitoring results obtained during each calendar month using NetDMR, no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be required to submit hard copies of DMRs to MassDEP. However, permittees must continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP.

The Draft Permit also includes an "opt-out" request process. Permittees who believe they can not use NetDMR due to technical or administrative infeasibilities, or other logical reasons, must demonstrate the reasonable basis that precludes the use of NetDMR. These permittees must submit the justification, in writing, to EPA at least sixty (60) days prior to the date the facility would otherwise be required to begin using NetDMR. Opt-outs become effective upon the date of written approval by EPA and are valid for twelve (12) months from the date of EPA approval. The opt-outs expire at the end of this twelve (12) month period. Upon expiration, the permittee must submit DMRs and reports to EPA using NetDMR, unless the permittee submits a renewed opt-out request sixty (60) days prior to expiration of its opt-out, and such a request is approved by EPA.

Until electronic reporting using NetDMR begins, or for those permittees that receive written approval from EPA to continue to submit hard copies of DMRs, the Draft Permit requires that submittal of DMRs and other reports required by the permit continue in hard copy format. Hard copies of DMRs must be postmarked no later than the 15th day of the month following the completed reporting period.

XV. STATE PERMIT CONDITIONS

The NPDES Permit is issued jointly by the U. S. Environmental Protection Agency and the Massachusetts Department of Environmental Protection under federal and state law, respectively. As such, all the terms and conditions of the permit are, therefore, incorporated into and constitute a discharge permit issued by the MassDEP Commissioner.

XVI. GENERAL CONDITIONS

The general conditions of the permit are based primarily on the NPDES regulations 40 CFR §§122 through 125 and consist primarily of management requirements common to all permits.

XVII. STATE CERTIFICATION REQUIREMENTS

EPA may not issue a permit unless MassDEP certifies that the effluent limitations included in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State water quality standards, or waives certification. EPA has requested permit certification by the State pursuant to 40 CFR §124.53 and expects the draft permit will be certified.

XVIII. COMMENT PERIOD, HEARING REQUESTS, AND PROCEDURES FOR FINAL DECISIONS

All persons, including applicants, who believe any condition of the permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period to Susan Murphy, U.S. Environmental Protection Agency, 5 Post Office Square, Suite 100 (OEP06-1), Boston, MA 02109. Any person prior to such date may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues to be raised in the hearing. A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston office.

Following the close of the comment period, and after the public hearing, if held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and to each person who has submitted written comments or requested notice.

XIX. EPA CONTACT

Requests for additional information or questions concerning the draft permit may be addressed Monday through Friday, between the hours of 9:00 a.m. and 5:00 p.m., to :

Susan Murphy
U.S. Environmental Protection Agency
5 Post Office Square, Suite 100 (OEP06-1)
Boston, MA 02109
Telephone: (617) 918-1534 Fax: (617) 918-0534
Email: murphy.susan@epa.gov

Claire Golden
Massachusetts Department of Environmental Protection
205B Lowell Street
Wilmington, MA 01887
Telephone: (978) 694-3244 Fax (978) 694-3498
Email: claire.golden@state.ma.us

____
Date

Stephen Perkins, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

EXHIBIT C
AR B2

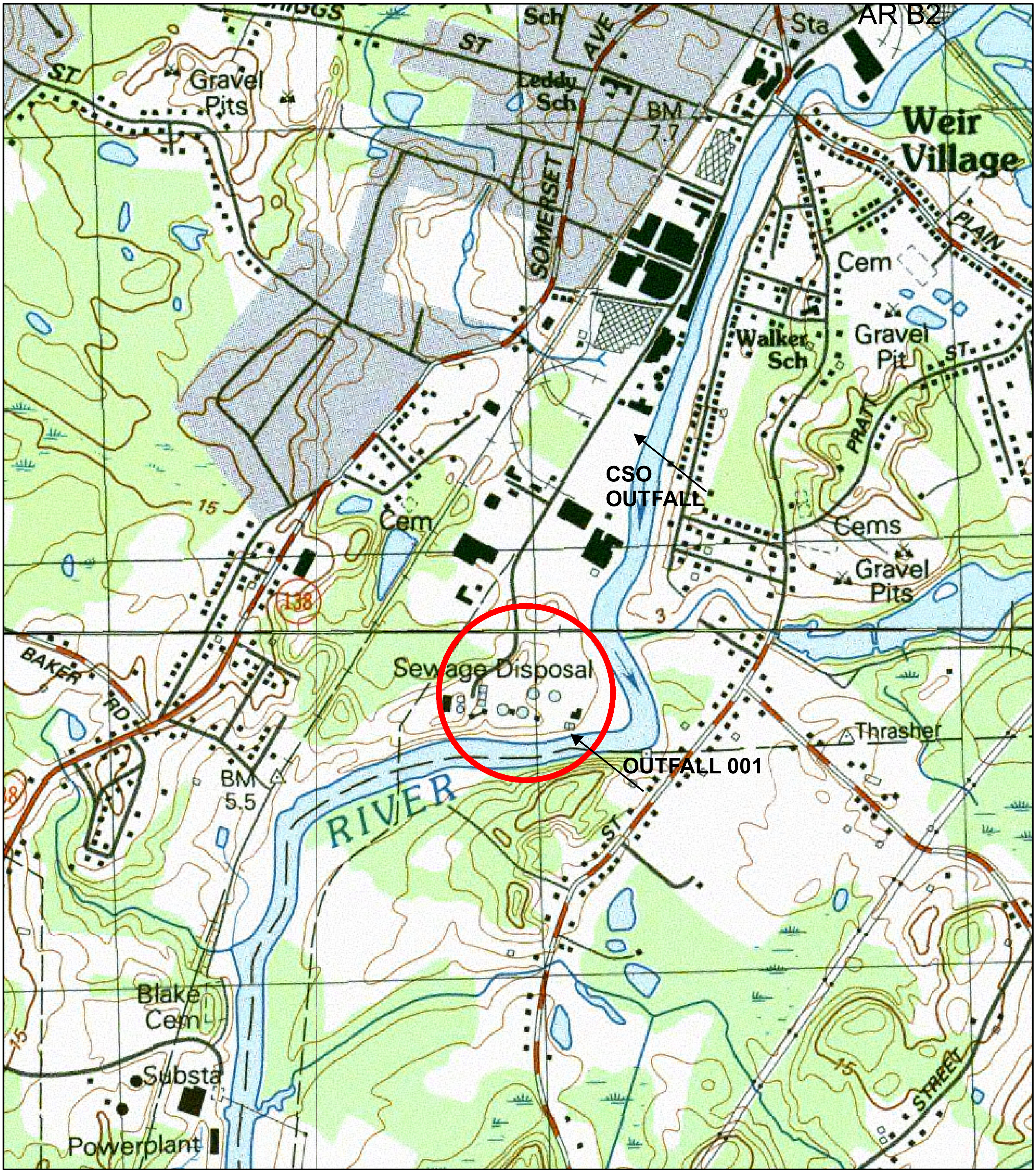


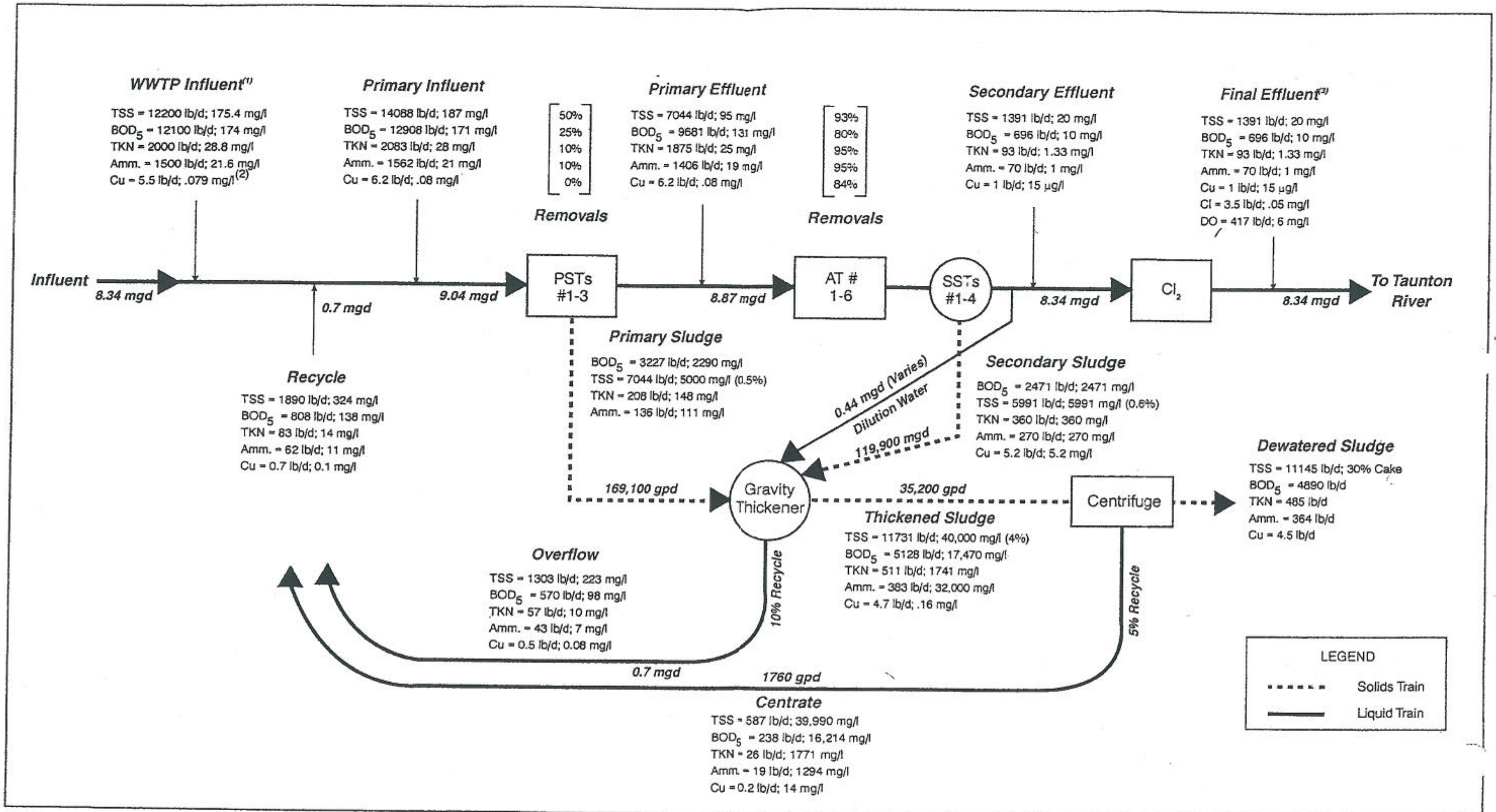
Figure 1. Location Map
Taunton WWTP
NPDES No. MA0100897

N W E S

1,000 500 0 1,000 Feet

Taunton WWTF

EXHIBIT C
AR B2



NOTES:

1. The influent loads are based on values given in Appendix K of the RFP; "Sewerage Flow and Load Allowances Taunton WWTP Planning Criteria".
2. Copper loading value is estimated based on average concentration determined from quarterly sampling data reported by OMI, included in the RFP.
3. Recycle flows and loads based on continuous operation under average design conditions. Dilution water loads are negligible and are not included in the calculation.
4. Secondary system removals calculated based on meeting NPDES permit units. It is expected that these removal rates are conservative.

TAUNTON WWTP UPGRADE
AND MODIFICATIONS
MASS BALANCE

EXHIBIT C
AR B2

Monitoring Period End Date	BOD5					CBOD5					Total Residual Chlorine		Fecal Coliform	
	Average Monthly	Average Weekly	Average Monthly	Average Weekly	Maximum Daily	Average Monthly	Average Weekly	Average Monthly	Average Weekly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
	lb/day	lb/day	mg/L	mg/L	mg/L	lb/day	lb/day	mg/L	mg/L	mg/L	mg/L		cfu/100mL	
06/30/2010	Test Not Required					76	159	2	3	9	0.028	0.047	4	150
07/31/2010	Test Not Required					133	264	3	6	18	0.028	0.053	4	380
08/31/2010	Test Not Required					96	214	2	5	6	0.024	0.07	6	280
09/30/2010	Test Not Required					50	199	1	4	6	0.019	0.05	1	6
10/31/2010	Test Not Required					20	79	0	2	5	0.02	0.06	2	6
11/30/2010	386	572	7	10	19	Test Not Required					0.018	0.05	8	86
12/31/2010	446	785	8	15	20	Test Not Required					0.02	0.047	3	190
01/31/2011	404	844	7	15	25	Test Not Required					0.021	0.057	2	14
02/28/2011	721	433	10	8	37	Test Not Required					0.025	0.06	1	4
03/31/2011	298	1734	4	20	17	Test Not Required					0.024	0.077	3	10
04/30/2011	Test Not Required					193	302	3	5	12	0.022	0.063	3	12
05/31/2011	Test Not Required					243	365	4	6	11	0.02	0.057	3	35
06/30/2011	Test Not Required					102	278	2	5	9	0.02	0.05	2	8
07/31/2011	Test Not Required					87	289	2	6	8	0.012	0.04	21	97
08/31/2011	Test Not Required					0	0	0	0	0	0.015	0.067	23	130
09/30/2011	Test Not Required					103	156	2	2	6	0.01	0.05	41	260
10/31/2011	Test Not Required					91	162	1	3	6	0.009	0.053	12	55
11/30/2011	776	1857	12	29	44	Test Not Required					0.014	0.043	5	18
12/31/2011	469	785	6	9	20	Test Not Required					0.008	0.047	14	27
01/31/2012	267	371	5	7	13	Test Not Required					0.008	0.05	23	430
02/29/2012	111	202	2	4	7	Test Not Required					0.011	0.047	4	63
03/31/2012	80	132	2	2	7	Test Not Required					0.008	0.043	3	58
04/30/2012	Test Not Required					200	402	4	6	11	0.012	0.047	1	4
05/31/2012	Test Not Required					142	168	3	3	11	0.015	0.047	8	48
06/30/2012	Test Not Required					113	351	2	7	10	0.013	0.047	8	21
Existing Permit Limit	2102	3153	30	45	Report	1051	1051	15	15	Report	0.046	0.08	200	400
Minimum	80	132	2	2	7	0	0	0	0	0	0.008	0.04	1	4
Maximum	776	1857	12	29	44	243	402	4	7	18	0.028	0.077	41	430
Average	396	772	6	12	21	110	226	2	4	9	0.017	0.053	8.2	95.68
Standard Deviation	227	592	3	8	12	66	110	1	2	4	0.006	0.009	9.574	121.574
Number of Measurements	10	10	10	10	10	15	15	15	15	15	25	25	25	25
Number of Exceedences	0	0	0	0	N/A	0	0	0	0	N/A	0	0	0	1

Note: NR = Test Not Required

EXHIBIT C
AR B2

Monitoring Period End Date	Total Copper			Flow		Ammonia Nitrogen (October 1-May 31)			Ammonia Nitrogen (June 1-September 30)				
	Average Monthly	Average Monthly	Maximum Daily	12 Month Average	Maximum Daily	Average Monthly	Average Monthly	Maximum Daily	Average Monthly	Average Weekly	Average Monthly	Average Weekly	Maximum Daily
	lb/day	mg/L	mg/L	MGD		lb/day	mg/L	mg/L	lb/day	lb/day	mg/L	mg/L	mg/L
06/30/2010	0.3	0.005	0.005	7.7	6.576	Test Not Required			88	122	1.7	2	3
07/31/2010	0.3	0.006	0.006	7.6	7.518	Test Not Required			45	90	0.9	2	3
08/31/2010	0.27	0.0058	0.007	7.6	6.968	Test Not Required			19	22	0.4	0.4	0.8
09/30/2010	0.17	0.004	0.004	7.6	6.748	Test Not Required			63	66	1	1	1
10/31/2010	0.3	0.006	0.006	7.6	6.867	119	2	3	Test Not Required				
11/30/2010	0.54	0.0102	0.012	7.6	6.874	109	2	3.7	Test Not Required				
12/31/2010	0.62	0.012	0.012	7.4	6.896	109	2	2	Test Not Required				
01/31/2011	0.4	0.008	0.008	7.4	6.918	53	1	1	Test Not Required				
02/28/2011	0.6	0.012	0.014	7.3	13.44	177	3	5	Test Not Required				
03/31/2011	0.3	0.004	0.004	7	10.686	0	0	0	Test Not Required				
04/30/2011	0.3	0.005	0.005	6.6	9.858	413	6.7	8.8	Test Not Required				
05/31/2011	0.3	0.006	0.008	6.6	7.697	229	4	7	Test Not Required				
06/30/2011	0.4	0.007	0.007	6.6	6.844	Test Not Required			34	42	0.7	1	1
07/31/2011	0.2	0.0045	0.0045	6.6	7.797	Test Not Required			28	56	0.6	1	1.9
08/31/2011	0.51	0.009	0.011	6.5	7.76	Test Not Required			41	57	0.8	1	1.7
09/30/2011	0.3	0.0068	0.0068	6.6	12.914	Test Not Required			42	50	0.8	1	1.8
10/31/2011	0.3	0.006	0.006	6.8	12.23	51	0.9	0.9	Test Not Required				
11/30/2011	0.65	0.009	0.012	7	11.413	283	4.3	6.6	Test Not Required				
12/31/2011	0.8	0.009	0.009	7.2	13.69	91	1.1	1.1	Test Not Required				
01/31/2012	0.4	0.007	0.007	7.2	8.108	63	1.1	1.1	Test Not Required				
02/29/2012	0.5	0.01	0.012	7.1	7.041	50	1	1.4	Test Not Required				
03/31/2012	0.5	0.01	0.012	6.9	7.101	48	0.9	1.2	Test Not Required				
04/30/2012	0.4	0.009	0.009	6.8	7.841	29	0.6	1.2	Test Not Required				
05/31/2012	0.34	0.0063	0.0063	6.8	8.546	71	1	5	Test Not Required				
06/30/2012	0.34	0.007	0.007	6.7	6.714	Test Not Required			30	41	0.6	1	1.1
Existing Permit Limit	1.1	0.016	0.022	8.4	Report	Report	Report	Report	Report	Report	1	1	2
Minimum	0.17	0.004	0.004	6.5	6.576	0	0	0	19	22	0.4	0.4	0.8
Maximum	0.8	0.012	0.014	7.7	13.69	413	6.7	8.8	88	122	1.7	2	3
Average	0.402	0.007	0.008	7.072	8.602	118	2	3	45	63	1	1	2
Standard Deviation	0.153	0.002	0.003	0.405	2.348	108	2	3	22	31	0	1	1
Number of Measurements	25	25	25	25	25	16	16	16	8	8	8	8	8
Number of Exceedences	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	1	2	2

Note: NR = Test N

EXHIBIT C
AR B2

Monitoring Period End Date	Total Kjeldahl Nitrogen			Total Nitrate			Total Nitrite			Disolved Oxygen	pH		Settleable Solids	
	Average Monthly	Average Monthly	Maximum Daily	Average Monthly	Average Monthly	Maximum Daily	Average Monthly	Average Monthly	Maximum Daily	Minimum	Daily Minimum	Daily Maximum	Average Weekly	Maximum Daily
	lb/day	mg/L	mg/L	lb/day	mg/L	mg/L	lb/day	mg/L	mg/L	mg/L	SU		mg/L	
06/30/2010	152	2.8	2.8	218	4	4	0	0	0	7.61	6.8	7.5	0.6	4
07/31/2010	103	2.1	2.1	190.9	3.9	3.9	0	0	0	7.63	6.9	7.4	0	0
08/31/2010	58	1.3	1.3	228	5.1	5.1	0.9	0.02	0.02	7.52	7	7.4	0	0
09/30/2010	101	2.1	3.1	281	5.8	6.7	36	0.7	0.8	7.43	6.7	7.3	0	0
10/31/2010	131	2.6	2.6	383	7.6	7.6	21	0.4	0.4	7.87	6.7	7.3	0	0
11/30/2010	257	5.5	5.5	252	5.4	5.4	369	7.9	7.9	NR	6.4	7	0	0
12/31/2010	139	2.7	2.7	515	10	10	21	0.41	0.41	NR	6.5	7	0	0
01/31/2011	144	2.7	2.7	336	6.3	6.3	0	0	0	NR	6.5	7	0	1
02/28/2011	146	2.8	2.8	506	9.7	9.7	0	0	0	NR	6.6	7.7	0	0
03/31/2011	834	11	11	137	1.8	1.8	55	0.72	0.72	NR	6.7	7.3	0	0
04/30/2011	311	5.4	5.4	150	2.6	2.6	47	0.8	0.8	8.52	6.8	7.4	0.3	2
05/31/2011	405	6.9	6.9	106	1.8	1.8	23	0.4	0.4	8.16	6.8	7.3	0	0
06/30/2011	149	2.8	2.8	512	9.6	9.6	0	0	0	7.29	6.9	7.4	0	0
07/31/2011	80	1.5	1.5	310	5.8	5.8	0	0	0	7.2	7.1	7.4	0	0
08/31/2011	49	1.2	1.2	408	9.9	9.9	0	0	0	6.57	6.91	7.43	0	0
09/30/2011	72	1.6	1.6	435	9.7	9.7	0	0	0	7.99	6.98	7.33	0	0
10/31/2011	96	1.7	1.7	441	7.8	7.8	0	0	0	8.16	6.56	7.24	0	0
11/30/2011	127	1.5	1.5	931	11	11	0	0	0	NR	6.6	7.3	0	0
12/31/2011	208	2.5	2.5	631	7.6	7.6	14	0.17	0.17	NR	6.5	7	0	0
01/31/2012	159	2.8	2.8	501	8.8	8.8	21	0.37	0.37	NR	6.5	7	0	0
02/29/2012	124	2.3	2.3	593	11	11	0	0	0	NR	6.5	7	0	0
03/31/2012	102	2	2	559	11	11	0	0	0	NR	6.5	6.9	0	0
04/30/2012	101	2.2	2.2	642	14	14	0	0	0	9.21	6.53	7.26	0	0
05/31/2012	141	2.6	2.6	544	10	10	0	0	0	8.34	6.7	7.3	1.3	6.5
06/30/2012	113	2.5	2.9	503	11	13	0	0	0	7.29	6.74	7.26	1.4	6
Existing Permit Limit	Report	Report	Report	Report	Report	Report	Report	Report	Report	Not less than 6 mg/L	6.5	8.3	Report	Report
Minimum	49	1.2	1.2	106	1.8	1.8	0	0	0	6.57	6.4	6.9	0	0
Maximum	834	11	11	931	14	14	369	7.9	7.9	9.21	7.1	7.7	1.4	6.5
Average	172.08	3.004	3.06	412.516	7.648	7.764	24.316	0.476	0.48	7.786	6.697	7.257	0.144	0.78
Standard Deviation	158.979	2.145	2.134	194.412	3.269	3.36	73.586	1.569	1.569	0.642	0.192	0.197	0.386	1.871
Number of Measurements	25	25	25	25	25	25	25	25	25	15	25	25	25	25
Number of Exceedences	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1	0	N/A	N/A

Note: NR = Test N

EXHIBIT C
AR B2

Monitoring Period End Date	TSS (April 1 - October 31)					TSS (November 1 - March 31)					Ceriodaphnia Dubia	
	Average Monthly	Maximum Daily	Average Monthly	Average Weekly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Average Weekly	Maximum Daily	Acute	Chronic
	lb/day	lb/day	mg/L	mg/L	mg/L	lb/day	lb/day	mg/L	mg/L	mg/L	%	
06/30/2010	375	676	7	13	21	Test Not Required					NR	NR
07/31/2010	245	546	5	11	11	Test Not Required					NR	NR
08/31/2010	163	191	3	4	5	Test Not Required					100	100
09/30/2010	152	257	3	5	5	Test Not Required					NR	NR
10/31/2010	207	239	4	5	6	Test Not Required					NR	NR
11/30/2010	Test Not Required					417	538	8	10	14	100	100
12/31/2010	Test Not Required					628	701	12	12	18	NR	NR
01/31/2011	Test Not Required					620	1435	11	25	30	NR	NR
02/28/2011	Test Not Required					540	511	8	9	16	100	100
03/31/2011	Test Not Required					418	1090	6	13	10	NR	NR
04/30/2011	871	1570	14	23	28	Test Not Required					NR	NR
05/31/2011	684	1048	12	18	33	Test Not Required					100	100
06/30/2011	448	551	9	10	17	Test Not Required					NR	NR
07/31/2011	212	649	5	13	10	Test Not Required					NR	NR
08/31/2011	225	334	5	6	10	Test Not Required					100	100
09/30/2011	216	316	4	5	6	Test Not Required					NR	NR
10/31/2011	268	268	4	4	7	Test Not Required					NR	NR
11/30/2011	Test Not Required					661	994	10	15	21	100	100
12/31/2011	Test Not Required					477	731	7	9	10	NR	NR
01/31/2012	Test Not Required					341	545	6	10	13	NR	NR
02/29/2012	Test Not Required					292	368	6	7	9	100	100
03/31/2012	Test Not Required					224	354	4	6	8	NR	NR
04/30/2012	533	1069	11	18	23	Test Not Required					NR	NR
05/31/2012	652	913	12	18	40	Test Not Required					100	100
06/30/2012	748	1497	16	31	58	Test Not Required					NR	NR
Existing Permit Limit	1401	1401	20	20	Report	2102	3153	30	45	Report	>100	>24
Minimum	152	191	3	4	5	224	354	4	6	8	100	100
Maximum	871	1570	16	31	58	661	1435	12	25	30	100	100
Average	400	675	8	12	19	462	727	8	12	15	100	100
Standard Deviation	240	453	4	8	15	150	348	3	5	7	0	0
Number of Measurements	15	15	15	15	15	10	10	10	10	10	8	8
Number of Exceedences	0	2	0	2	N/A	0	0	0	0	N/A	0	0

Note: NR = Test N

EXHIBIT C
AR B2

Taunton WWTP
NPDES Permit No. MA 0100897

Table 11
Metals Effluent Data and Criteria Calculations

	Effluent Analytical Data (ug/l total recoverable metal)						Receiving Water Analytical Data (ug/l total recoverable)					
	Hardness	Al	Cd	Ni	Pb[1]	Zn	Hardness	Al	Cd[1]	Ni	Pb	Zn
February-08	72	ND-20	ND-0.5	ND-3	ND-0.5		34	110	ND-0.5	ND-2	1	
May-08	120	28	ND-0.5	3	ND-0.5	40	34	110	ND-0.5	ND-2	1.5	24
August-08	100	70	ND-0.5	3	1	40	59	60	ND-0.5	ND-2	1	12
November-08	67	30	ND-0.5	2	0.5	35	33	ND-20	ND-0.5	ND-2	2	20
February-09	67	40	ND-0.5	3	1	50	34	140	ND-0.5	ND-2	2*	24*
May-09	87	30	ND-0.5	3	ND-0.5	27	31	180	ND-0.5	ND-2	1	14
August-09	87	ND-20	ND-0.5	3	ND-0.5	22	41	100	ND-0.5	ND-2	1.4	18
November-09	65	30	ND-0.5	4	0.6	14	35	140	ND-0.5	ND-2	1	11
February-10	61	ND-20	ND-0.5	4	0.6	28	33	ND-20	ND-0.5	ND-2	0.9	21
May-10	110	28	ND-0.5	3	0.9	58	27	170	ND-0.5	ND-2	2	21
August-10	160	ND-20	ND-0.5	3	ND-0.5	28	46	130	ND-0.5	ND-2	2	7
November-10	65	45	ND-0.5	3	0.5	25	39	200	3	24	2	13
February-11	66	29	ND-0.5	3	ND-0.5	27	37	130	0.6	ND-2	1	15
May-11	93	38	ND-0.5	3	0.6	9	36	160	ND-0.5	ND-2	1	6
August-11	96	27	ND-0.5	3	ND-0.5	20	39	130	ND-0.5	ND-2	2	14
Median	87	30	ND	3.0	ND	28	35	130	ND	24.0	1.2	14.0
95th percentile		53	ND	3.9	1.0	61						
99th percentile		67	ND	4.3	1.3	85						
Marine water												
Chronic Criterion		NA	8.80	8	8.1	81						
Acute Criterion		NA	40.00	74	210	90						

1 95th and 99th percentile calculated using adjustment for non-detects as set forth in Technical Support Document for Water Quality Based Toxics Control (1991)

To estimate the TN load to the Taunton River Estuary, the USGS LOADEST computer modeling program was used. This program develops a number of regression equations correlating constituent concentration and streamflow based on an input calibration file listing corresponding data points of these two variables. For each regression equation, three different models are used to estimate the average summer load based on the summer flow record. The first, Adjusted Maximum Likelihood Estimation (AMLE), and the second, Maximum Likelihood Estimation (MLE) are applicable when the calibration model errors, or "residuals," are normally distributed. Normality is determined by the Turnbull-Weiss test. These two estimations will be the same unless there are any censored data points, in which case the AMLE estimate is more accurate. The third model, Least Absolute Deviation (LAD), is used for non-normally distributed data.

The average summer TN load to the Taunton River at Weir Village, as well as to the four tributaries downstream from this point, were modeled by LOADEST using nitrogen concentration data from the Mount Hope Bay Monitoring Program and 2004 and 2005 daily streamflow data either measured by USGS gages, or adjusted proportionally based on drainage area. For days on which more than one concentration was measured, the average concentration was used in the LOADEST calibration file. Days on which the streamflow was 0 cfs were excluded from the dataset.

For all load estimations the best regression equation was automatically selected by the program based on the Akaike Information Criteria (AIC) value. In calculating the summer loads, the regression equation was selected based on the full year of monitoring data (i.e., the equation used to calculate the summer 2004 loads was selected based on a calibration dataset of the entire year 2004 monitoring data).

As described earlier, LOADEST gives load estimations based on three different models. If the calibration residuals were distributed normally, the Maximum Likelihood Estimation (MLE) was chosen. Otherwise, the Least Absolute Deviation (LAD) estimation was chosen. The calibration residuals were considered normal if the p-value of the Turnbull Weiss test was greater than 0.05.

Taunton River at Weir Village	
Year	Load Est. (lb/d)
2004	2659
2005	2289

Three Mile River	
Year	Load Est. (lb/d)
2004	547
2005	403

Segreganset River	
Year	Load Est. (lb/d)
2004	35
2005	34

Assonet River	
Year	Load Est. (lb/d)
2004	49
2005	51

Quequechan River	
Year	Load Est. (lb/d)
2004	85
2005	112

Sum of Loads (lb/d)	
2004	3375
2005	2889

Nitrogen Attenuation

As a result of chemical and biological processes, not all of the nitrogen discharged from each point source reaches the estuary. To determine the delivered nitrogen load, attenuation from each point source was calculated. The governing equation is:

$$L_f = L_i * e^{-kt} \text{ ; where}$$

L_f = the delivered load;
L_i = discharged load;
k = attenuation coefficient; and
t = travel time in days.

Attenuation calculations have been estimated in a number of studies for smaller order streams but generally do not reflect the effluent-dominated stream conditions encountered downstream of the Brockton AWRF (DF (dilution factor) = 1.02) and, to a lesser extent, the Bridgewater (DF 2.2), Mansfield (DF 2.2) and Middleboro (DF 1.9) WWTPs. For example, attenuation coefficients for small streams are given by the NE SPARROW models. Moore et al., *Estimation of Total Nitrogen and Phosphorus in New England Streams Using Statistically Referenced Regression Models*, USGS SIR-2004-5012. The NE SPARROW model indicates that no attenuation would be expected in the Taunton River mainstem, but that the tributaries (with flows ≤ 100cfs) are given an attenuation coefficient of 0.77 day^{-1}.

For the Brockton AWRF, attenuation calculations based on regional regression equations were determined to be insufficient. Using the above analysis with SPARROW regression coefficients, the calculated attenuation of the Brockton AWRF discharge under summer flow conditions is predicted to be approximately 30%. EPA determined that this figure was unreliable for the following reasons:

(1) Use of a 30% attenuation factor for Brockton's load to allocate the total loads at Weir Village from the LOADEST analysis resulted in an implausibly large nonpoint source load per square mile compared to the other tributaries. This would indicate that the point source component of the load is being understated; the likeliest explanation for that is that attenuation of Brockton's load is overstated.[1]

[1] To explain further, monitoring of the Taunton River at Weir Village indicates an average summer load for 2004-05 of 2,474 lbs/day. If the Brockton discharge of 1,303 lbs/day is assumed to be reduced by 30% through attenuation, then 912 lbs/day of the load at Weir Village is due to Brockton. Other WWTPs contribute 330 lbs/day, leaving 1,232 lbs/day attributable to nonpoint sources. Given the drainage area above Weir Village of 358 square miles, this gives an estimated summer nonpoint source loading of 3.4 lbs/day/sq.mi. This is significantly greater than the areal nonpoint source loading found at any other monitoring site in the Mount Hope Bay Monitoring Program, including the Quequechan River (which drains the City of Fall River) as well as the Ten Mile, Assonet and Segreganset Rivers.

(2) Nitrogen data collected by CDM for the Brockton AWRF receiving water study, although not collected for the purposes of attenuation calculations, do not appear to be consistent with significant in-stream attenuation.[2]

(3) The extremely effluent-dominated conditions downstream of the Brockton AWRF discharge are likely outside of the range of conditions used in developing the SPARROW regional regression equations.[3,4]

Because of the large impact of Brockton's discharge on the loading analysis, EPA determined that an improved attenuation estimate was necessary for this analysis, and therefore conducted a monitoring study including sampling and streamflow measurements in the summer of 2012, in order to determine an attenuation rate for Brockton's discharge.

The Matfield River Monitoring Study utilized a Lagrangian sampling program modelled on USGS, *Lagrangian Sampling of Wastewater Treatment Plant Effluent in Boulder Creek, Colorado, and Fourmile Creek, Iowa*, Open File Report 2011-1054 (2011), based on following the same "packet" of water downstream from the AWRF and sampling downstream based on calculated time of travel from the AWRF. Samples were taken at one upstream and four downstream locations on the Salisbury Plain and Matfield Rivers, as well as the two major tributaries (Beaver Brook and Meadow Brook) and the AWRF discharge, and streamflow was measured at three downstream locations. Sampling locations are shown on Figure B-1.

The furthest downstream station (MATF08) was located at the former USGS streamgage site on the Matfield River at Elmwood (USGS 01106500). Time of travel to this site was based on 15-minute streamflow data provided by USGS for summer months prior to discontinuance of data collection at the streamgage in October 2009. These show a clear pattern of influence from the Brocton AWRF's diurnal discharge variation. Figure B-2 shows two 24-hour streamflow records from September 2009 at relatively low (chart A)

---

[2] For example, total nitrogen concentrations at the site of the discontinued USGS gage on the Matfield (CDM's station BR1-08) were within 5% of the concentrations found over 4 miles upstream on the Salisbury Plain River (CDM Station BR1-03), indicating on a qualitative level that little attuenuation is occurring once the additional dilution resulting from the confluence of Beaver Brook, Meadow Brook and other minor tributaries and baseflow is accounted for.

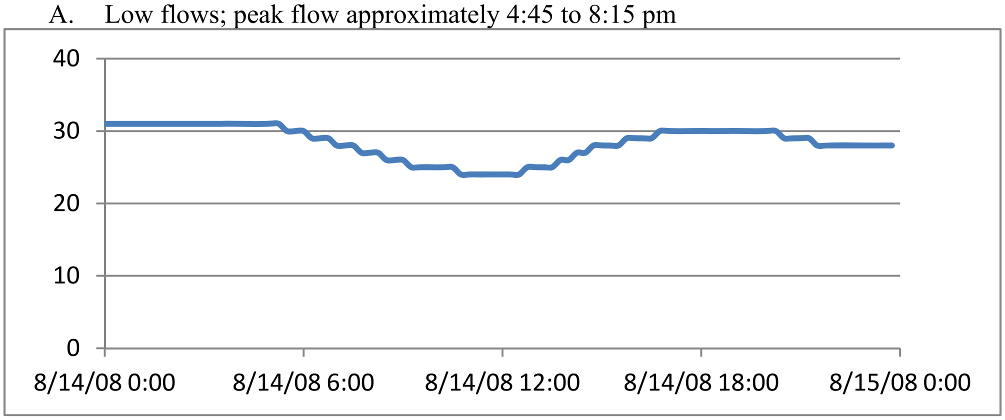
[3] Furthermore, the SPARROW regression equations themselves indicate that more wastewater load is passing thought the system than would be indicated by the discharge loads and attenuation coefficient. For the predictor variable 'municipal wastewater facilities' the regression coefficient is 1.11, so that the regression model predicts 11% more in-stream load from WWTPs than is actually discharged. That is, direct application of the SPARROW model would require that Brockton's load be inflated by 11% before applying the attenuation factor in order to calculate Brockton's contribution to the delivered flow.

[4] Available literature also indicates the potential for significant reduction in attenuation rates under high nitrogen concentrations. See Alexander et al, Dynamic modeling of nitrogen losses in river networks unravels the coupled effects of hydrological and biogeochemical processes, *Biogeochemistry* 93:91–116 (2009).

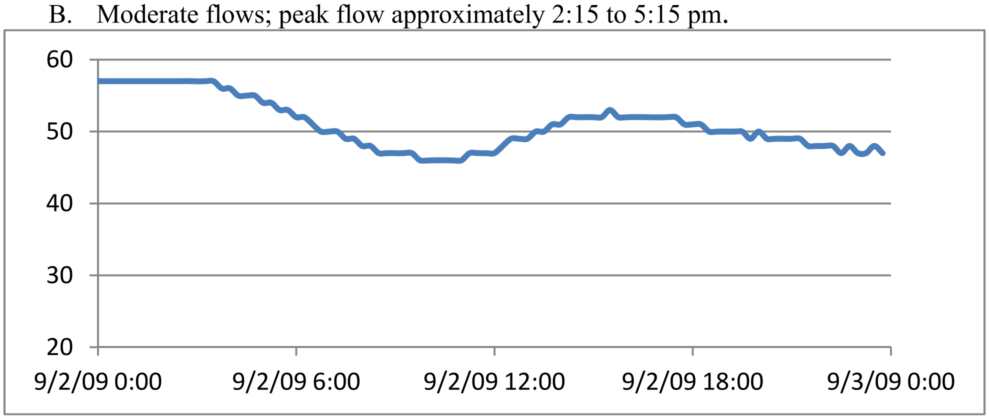
and moderate (chart B) flows. These show a distinct diurnal flow pattern, consistent with wastewater discharges, and a delayed and more spread out pattern under lower flow conditions, consistent with lower stream velocities under those conditions. The time of travel for individual days was determined by comparison of the daily streamflow pattern with the Brocton AWRF discharge data from the facility's SCADA system (measurements approximately every 3 minutes; an example is shown at Figure B-3). Time of travel to the intermediate sites was assumed to be proportional to time of travel to MATF08, based on the distance in river miles to each site.

Figure B-2. USGS 01106500, Matfield River at Elmwood, 15-minute flow data

A. Low flows; peak flow approximately 4:45 to 8:15 pm

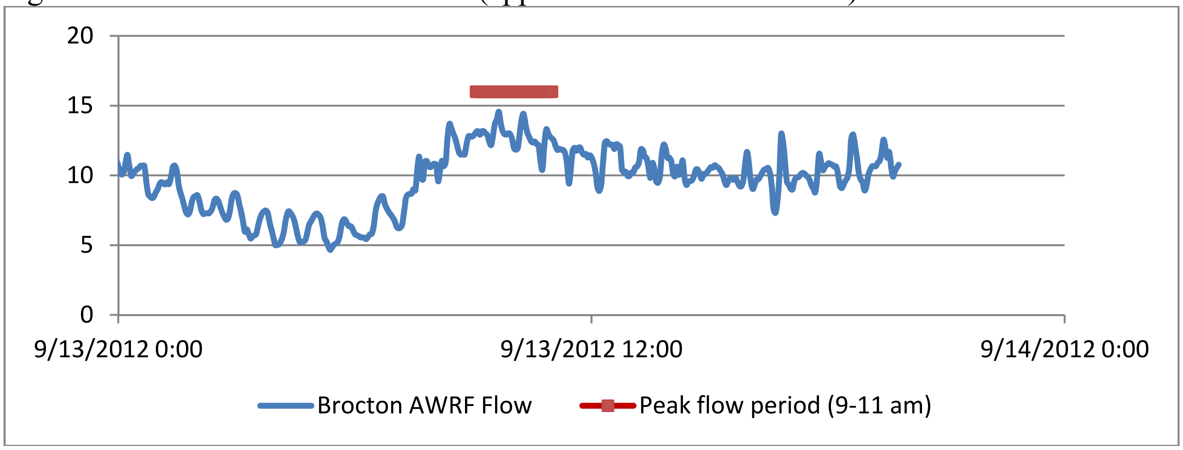


B. Moderate flows; peak flow approximately 2:15 to 5:15 pm.



As can be seen from the Brockton AWRF SCADA data, there is considerable short term variability in the AWRF discharge rate. As explained by the facility, this is due to the interaction of the various pump operations related to facility discharge and is inherent in the operation of the facility. While this variability will tend to dissipate as the plume moves downstream (see smoother pattern in 15-min data from the USGS gage downstream), there is potential for initial load calculations, and thus the attenuation factor, to vary on the order of 5-8% in the short term (on the order of 3 minutes). A time of travel analysis is not expected to be sufficiently precise to capture the exact packet of discharge within the sub-3 minute variability of the discharge. Therefore the analysis focused of following the peak period of Brockton's flows, approximately 9 to 11 a.m. While this provides a lower level of precision than would be ideal, it is sufficient that attenuation on the order of 30% (as predicted using regional regression models) would be apparent.

Figure B-3. Brockton AWRF Flows (approx. 3-min SCADA data)



Monitoring data from sampling stations on the Salisbury Plain and Matfield River are shown in Table B-1. On two of the sampling dates, instream total nitrogen concentrations increase slightly as sampling moves downstream, inconsistent with significant attenuation of nitrogen under those flow conditions (these are the two lowest flow dates). These increases could indicate instream release of nitrogen under low flow conditions. In contrast, in the August sampling a significant reduction in total nitrogen concentration occurred between sites 5 and 8. In general, the reach between sites 5 and 8 saw the most variability, with both load increases and one day of significant load decrease recorded between the two sites. This is likely due to the extensive wetland system the river passes through between these two stations, which appear to provide potential for sizeable release as well as uptake of nitrogen discharges. EPA notes that results showing widely variation attenuation rates under different stream conditions are consistent with the available literature (see, e.g. Smith et al., Nitrogen attenuation in the Connecticut River, northeastern USA; a comparison of mass balance and N2 production modeling approaches, *Biogeochemistry* 87, 311-323 (2008) (differing attenuation in April (zero in both reaches) from August (zero in southern reach, 18% in northern reach)); Vanderburg et al., Field Evaluation of Mixing Length and Attenuation of Nutrients and Fecal Coliform in a Wastewater Effluent Plume, Environmental Monitoring and Assessment (2005) 107: 45–57 (2005) ("Nitrate attenuation is markedly different between the two sampling events.").

Table B-1

Station	Distance Downstream from AWRF (ft)	6/18/2012		7/9/2012		8/13/2012		9/13/2012	
		Flow (cfs)	TN (mg/l)	Flow (cfs)	TN (mg/l)	Flow (cfs)	TN (mg/l)	Flow (cfs)	TN (mg/l)
SALP01	-200	--	1.67	--	2.13	--	1.67	--	1.53
AWRF	0	25.2	4.22	18.3	4.32	22.1	4.82	19.9	4.00
SALP03	6644	37.4	3.26	26.0	3.21	42.2	3.32	25.2	3.43
MATF05	17288	42.1	2.79	26.8	3.22	55.3	2.82	25.8	3.51
MATF08[1]	28742	46.0	3.09	27.7	3.40	63.0	1.64	26.7	3.82

[1] Flow at MATF08 determined from USGS staff gage and most recent shifted rating curve for June, August and September sampling dates. Direct streamflow measurements on 7/9/12 and early morning on 9/13/12 used to confirm shifted rating curve, which is considered highly provisional by USGS since discontinuance of site as active USGS streamgage.

Load reduction percentages were calculated for each sampling station on the Salisbury Plain/Matfield Rivers for each monitoring data and are shown in Table B-2. In general load reductions are on the order of a few percent and, given the uncertainty in the analysis, are consistent with either zero attenuation or a low level of attenuation in the system on all sampling dates but August 13 (when significant attenuation is shown). These calculations indicate that, averaged over the summer, there is attenuation of nitrogen taking place downstream of the AWRF discharge. Average attenuation over the summer for the three reaches were combined to determine a cumulative attenuation percentage from the AWRF to Station MATF08 of 7%. This corresponds to an attenuation coefficient k of 0.28 day^{-1}.

An alternative approach to estimating attenuation from these data was also applied as a qualitative check on this analysis, using chloride concentrations to assess relative changes in TN concentrations using the approach of Vanderburg et al. (2005). This approach uses chloride concentration to determine dilution of the nitrogen discharge, then compares TN predicted based purely on dilution to the measured concentration to determine whether attenuation of nitrogen has occurred. Results using the approach are generally consistent with the above analysis, with no attenuation shown on sampling dates other than August 13.[5]

[5] The chlorides analysis was not used to assess attenuation upstream of site 3 due to the nearly identical chloride concentration of the discharge and upstream flow, which prevents dilution analysis based on chloride concentration.

Table B-2

	6/18/2012			7/9/2012			8/13/2012			9/13/2012		
	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load
Input Loads												
Brockton AWRF	25.2	4.2	572	18.3	4.3	425	22.1	4.8	572	19.9	4.0	428
Upstream of SALP03[1]	12.2	1.7	110	7.8	2.1	89	20.1	1.7	181	5.3	1.5	44
			682			**514**			**753**			**472**
Output Load												
Total load at SALP03	37.4	3.26	**656**	26.0	3.21	**450**	42.2	3.32	**754**	25.2	3.43	**465**
Attenuation percent			**4%**			**12%**			**0%**			**1%**

[1] Flow upstream calculated from flow at SALP03 minus Brockton AWRF flow; concentration upstream from Salisbury Plain River at SALP01, representing 82% of watershed at SALP03.

	6/18/2012			7/9/2012			8/13/2012			9/13/2012		
	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load
Input Loads												
Load at SALP03	37.4	3.3	656.1	26.0	3.2	449.6	42.2	3.3	754.1	25.2	3.4	465.1
Load added between SALP03 and MATF05	4.7	1.0	25	0.7	1.4	5	13.1	1.5	106	0.7	1.0	3
			681			**455**			**860**			**468**
Output Load												
Total load at SALP05	42.1	2.785	**632**	26.8	3.22	**464**	55.3	2.82	**839**	25.8	3.51	**488**
Attenuation percent			**7%**			**-2%**			**2%**			**-4%**

[2] Flow input between SALP03 and SALP05 calculated from flow at SALP05 minus flow at SALP03; concentration of input flow based on concentration of Beaver Brook at BEAB04, representing 91% of additional watershed betwee SALP03 and SALP05.

	6/18/2012			7/9/2012			8/13/2012			9/13/2012		
	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load
Input Loads												
Load at SALP03	42.1	2.8	632.0	26.8	3.2	464.0	55.3	2.8	839.1	25.8	3.5	488.4
Load added between MATF05 and MATF08	3.9	1.6	34	1.0	1.7	9	7.7	2.8	117	0.9	1.5	7
			666			**473**			**956**			**495**
Output Load												
Total load at SALP08[3]	46	3.085	**765**	27.7	3.40	**508**	63	1.64	**555**	26.7	3.82	**549**
Attenuation percent			**-15%**			**-7%**			**42%**			**-11%**

[3] Flow input between SALP08 and SALP05 calculated from flow at SALP08 minus flow at SALP05; concentration of input flow based on concentration of Meadow Brook at MEBR06, representing 77% of additional watershed betwee SALP05 and SALP08

Reach	Average attenuation in reach	Cumulative attenuation	Cumulative delivery factor	k (1/day)
Upstream of SAPB03	4%	4%	96%	
Between SALP03 and MATF05	1%	5%	95%	
Between MATF05 and MATF08	2%	7%	93%	0.28

The calculated value of k (0.28 day^{-1}) was used to determine the delivery factor for the Brockton AWRF and for the Bridgewater, Mansfield and Middleborough WWTPs that also discharge to effluent-dominated streams. For the small facilities discharging to tributaries the New England SPARROW attenuation coefficient was applied. Travel time from each point source to the Taunton River, was calculated using river distance and a calculated average summer velocity,[6] Table B-3 shows the river distance, average velocity, travel time and percent load delivered for each facility.

Table B-3

Facility	River distance on tributary (ft)	Average velocity (fps)	Travel Time (days)	Percent of load delivered
Oak Point	9,613	0.67	0.17	88
MCI Bridgewater	7,665	0.67	0.13	90
Brockton	44,135	1.23	0.42	89
Bridgewater	13,015	1.04	0.14	96
Dighton-Rehoboth Schools	53,385	0.79	0.78	55
Mansfield	62,503	1.1	0.66	83
Middleboro	27,608	1.05	0.30	92
Wheaton College	81,449	1.1	0.86	52
East Bridgewater H.S.	22,976	0.99	0.27	81

EPA notes that the results of this field work confirm the complex nature of nitrogen cycling in the Salisbury Plain and Matfield River, and that continued work developing a water quality model of the Salisbury Plain and Matfield Rivers as contemplated by MassDEP and USGS would assist in informing this analysis and any future TMDL

---

[6] Annual average velocities by reach were obtained from the National Hydrography Dataset (NHDPlus), and were used to calculate the average summer velocity based on the following relationship from Jobson, H.E., 1996, *Prediction of traveltime and longitudinal dispersion in rivers and streams*: U.S. Geological Survey Water-Resources Investigations Report 96-4013 (equation 12).

$$V_p = 0.094 + 0.0143 \times (D'_a)^{0.919} \times (Q'_a)^{-0.469} \times S^{0.159} \times \frac{Q}{D_a}.$$

Where $Q'_a = Q/Qa$
Q = summer average flow
Qa = annual average flow
Da = Drainage area

$$D'_a = \frac{D_a^{1.25} \times \sqrt{g}}{Q_a}$$

The NHDPlus average annual velocities were calculated using the Jobson equation where Q=Qa. The Jobson equation can be used to derive a relationship between summer average and annual average velocity:

$$V_{summer} = 0.094 + (V_{annual} - 0.094) * (Q/Qa)^{0.531}$$

This equation was used to calculate average summer flows for each reach in NHDPlus.

analysis, particularly with respect to attenuation under differing loads as upgrades are implemented. However, at this time no modeling effort is ongoing, and the attenuation analysis performed by EPA is the best available information upon which to develop this permit limit. EPA also notes that the permit limit for the Taunton facility of 3.0 mg/l would remain the same under a wide range of assumptions regarding attenuation of the Brockton discharge. For example, the Fact Sheet notes that, using the 7% attenuation figure, if a uniform permit limit were applied to all facilities in the watershed it would have to be less than 3.5 mg/l. For comparison, if it were assumed that there is zero attenuation of Brockton's discharge, the resulting uniform permit limit would be only slightly higher (approximately 3.7). On the other hand, if the attenuation factor was doubled (approximately 21% attenuation), a permit limit between 3.1 and 3.2 mg/l would need to be applied. (Required permit limits are more stringent if greater attenuation is assumed. This is because the attenuation factor is used in calculating how much of the measured load is from nonpoint sources; a higher attenuation rate means more load is attributed to the (more difficult to control) nonpoint sources, so that greater reduction from point sources is needed to meet the same total load target). As discussed in the Fact Sheet, since the highest possible permit limit is less than 4, and the Taunton WWTP is the second largest discharge and is a direct discharger to the estuary, a permit limit of 3.0 mg/l would still be applied.

EXHIBIT C
AR B2

EPA REGION 1 NPDES PERMITTING APPROACH FOR PUBLICLY OWNED TREATMENT WORKS THAT INCLUDE MUNICIPAL SATELLITE SEWAGE COLLECTION SYSTEMS

This interpretative statement provides an explanation to the public of EPA Region 1‘s interpretation of the Clean Water Act (―CWA” or ―Act”) and implementing regulations, and advises the public of relevant policy considerations, regarding the applicability of the National Pollutant Discharge Elimination System (―NPDES”) program to publicly owned treatment works (―POTWs”) that are composed of municipal satellite sewage collection systems owned by one entity and treatment plants owned by another (―regionally integrated POTWs”). When issuing NPDES permits to these types of sanitary sewer systems, it is EPA Region 1‘s practice to directly regulate, as necessary, the owners/operators of the municipal satellite collection systems through a co-permitting structure. This interpretative statement is intended to explain, generally, the basis for this practice. In determining whether to include municipal satellite collection systems as co-permittees in any particular circumstances, Region 1‘s decision will be made by applying the law and regulations to the specific facts of the case before the Region.

EPA has set out a national policy goal for the nation‘s sanitary sewer systems to adhere to strict design and operational standards:

> ―Proper [operation and maintenance] of the nation‘s sewers is integral to ensuring that wastewater is collected, transported, and treated at POTWs; and to reducing the volume and frequency of …[sanitary sewer overflow] discharges. Municipal owners and operators of sewer systems and wastewater treatment facilities need to manage their assets effectively and implement new controls, where necessary, as this infrastructure continues to age. Innovative responses from all levels of government and consumers are needed to close the gap.”[1]

Because ownership/operation of a regionally integrated POTW is sometimes divided among multiple parties, the owner/operator of the treatment plant many times lacks the means to implement comprehensive, system-wide operation and maintenance (―O & M”) procedures. Failure to properly implement O & M measures in a POTW can cause, among other things, excessive extraneous flow (*i.e.*, inflow and infiltration) to enter, strain and occasionally overload treatment system capacity. This failure not only impedes EPA‘s national policy goal concerning preservation of the nation‘s wastewater infrastructure assets, but also frustrates achievement of the water quality- and technology-based requirements of CWA § 301 to the extent it results in sanitary sewer overflows and degraded treatment plant performance, with adverse impacts on human health and the environment.

In light of these policy objectives and legal requirements, it is Region 1‘s permitting practice to subject all portions of the POTW to NPDES requirements in order to ensure that the treatment system as a whole is properly operated and maintained and that human health and water quality impacts resulting from excessive extraneous flow are minimized. The approach of addressing

---

[1] *See Report to Congress: Impacts and Control of CSOs and SSOs* (EPA 833-R-04-001) (2004), at p. 10-2. *See also* ―1989 National CSO Control Strategy,” 54 Fed. Reg. 37371 (September 8, 1989).

O&M concerns in a regionally integrated treatment works by adding municipal satellite collection systems as co-permittees is consistent with the definition of ―publicly owned treatment works," which by definition includes sewage collection systems. Under this approach, the POTW in its entirety will be subject to NPDES regulation as a point source discharger under the Act. Region 1's general practice will be to impose permitting requirements applicable to the POTW treatment plant along with a more limited set of conditions applicable to the connected municipal satellite collection systems.

The factual and legal basis for the Region's position is set forth in greater detail in *Attachment A*.

EXHIBIT C
AR B2

Attachment A

ANALYSIS SUPPORTING EPA REGION 1 NPDES PERMITTING APPROACH FOR PUBLICLY OWNED TREATMENT WORKS THAT INCLUDE MUNICIPAL SATELLITE SEWAGE COLLECTION SYSTEMS

Exhibit A	List of POTW permits that include municipal satellite collection systems as co-permittees
Exhibit B	Analysis of extraneous flow trends and SSO reporting for representative systems
Exhibit C	Form of Regional Administrator‘s waiver of permit application requirements for municipal satellite collection systems

Introduction

On May 28, 2010, the U.S. EPA Environmental Appeals Board (―Board”) issued a decision remanding to the Region certain NPDES permit provisions that included and regulated satellite collection systems as co-permittees. *See In re Upper Blackstone Water Pollution Abatement District*, NPDES Appeal Nos. 08-11 to 08-18 & 09-06, 14 E.A.D. __ (*Order Denying Review in Part and Remanding in Part*, EAB, May 28, 2010).[2] While the Board ―did not pass judgment” on the Region‘s position that its NPDES jurisdiction encompassed the entire POTW and not only the treatment plant, it held that ―where the Region has abandoned its historical practice of limiting the permit only to the legal entity owning and operating the wastewater treatment plant, the Region had not sufficiently articulated in the record of this proceeding the statutory, regulatory, and factual bases for expanding the scope of NPDES authority beyond the treatment plant owner/operator to separately owned/operated collection systems that do not discharge directly to waters of the United States, but instead that discharge to the treatment plant.” *Id., slip op.* at 2, 18. In the event the Region decided to include and regulate municipal satellite collection systems as co-permittees in a future permit, the Board posed several questions for the Region to address in the analysis supporting its decision:

> (1) In the case of a regionally integrated POTW composed of municipal satellite collection systems owned by different entities and a treatment plant owned by another, is the scope of NPDES authority limited to owners/operators of the POTW treatment plant, or does the authority extend to owners/operators of the municipal satellite collection systems that convey wastewater to the POTW treatment plant?
>
> (2) If the latter, how far up the collection system does NPDES jurisdiction reach, *i.e.*, where does the ―collection system” end and the ―user” begin?

[2] The decision is available on the Board‘s website via the following link: http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/30b93f139d3788908525706c005185b4/34e841c87f346d94852577360068976f!OpenDocument.

EXHIBIT C
AR B2

(3) Do municipal satellite collection systems ―discharge [ ] a pollutant” within the meaning of the statute and regulations?

(4) Are municipal satellite collection systems ―indirect dischargers” and thus excluded from NPDES permitting requirements?

(5) Is the Region‘s rationale for regulating municipal satellite collection systems as co-permittees consistent with the references to ―municipality” in the regulatory definition of POTW, and the definition‘s statement that ―[t]he term also means the municipality…which has jurisdiction over the Indirect Discharges to and the discharges from such a treatment works”?

(6) Is the Region‘s rationale consistent with the permit application and signatory requirements under NPDES regulations?

See *Blackstone, slip op.* at 18, 20, n. 17.

This regional interpretative statement is, in part, a response to the Board‘s decision. It details the legal and policy bases for regulating publicly owned treatment works (―POTWs”) that include municipal satellite collection systems through a co-permittee structure. Region 1‘s analysis is divided into five sections. First, the Region provides context for the co-permitting approach by briefly describing the health and environmental impacts associated with poorly maintained sanitary sewer systems. Second, the Region outlines its evolving permitting practice regarding regionally integrated POTWs, particularly its attempts to ensure that such entity‘s municipal satellite collection systems are properly maintained and operated. Third, the Region explains the legal authority to include municipal satellite collection systems as co-permittees when permitting regionally integrated POTWs. In this section, the Region answers the questions posed by the Board in the order presented above. Fourth, the Region sets forth the basis for the specific conditions to which the municipal satellite collection systems will be subject as co-permittees. Finally, the Region discusses other considerations informing its decision to employ a co-permittee structure when permitting regionally integrated POTWs.

I. Background

A sanitary sewer system (SSS) is a wastewater collection system owned by a state or municipality that conveys domestic, industrial and commercial wastewater (and limited amounts of infiltrated groundwater and some storm water runoff) to a POTW.[3] *See* 40 C.F.R. § 35.2005(b)(37) (defining ―sanitary sewer”). The purpose of these systems is to transport wastewater uninterrupted from its source to a treatment facility. Developed areas that are served by sanitary sewers often also have a separate storm sewer system (*e.g.*, storm drains) that collects and conveys runoff, street wash waters and drainage and discharges them directly to a receiving

[3] *See generally* Report to Congress: Impacts and Control of CSOs and SSOs (EPA 833-R-04-001) (2004), from which EPA Region 1 has drawn this background material.

water (*i.e.*, without treatment at a POTW). While sanitary sewers are not designed to collect large amounts of runoff from precipitation events or provide widespread drainage, they typically are built with some allowance for higher flows that occur during periods of high groundwater and storm events. They are thus able to handle minor and controllable amounts of extraneous flow (*i.e.*, inflow and infiltration, or I/I) that enter the system. Inflow generally refers to water other than wastewater—typically precipitation like rain or snowmelt—that enters a sewer system through a direct connection to the sewer. Infiltration generally refers to other water that enters a sewer system from the ground, for example through defects in the sewer.

Municipal sanitary sewer collection systems can consist of a widespread network of pipes and associated components (*e.g.*, pump stations). These systems provide wastewater collection service to the community in which they are located. In some situations, the municipality that owns the collector sewers may not provide treatment of wastewater, but only conveys its wastewater to a collection system that is owned and operated by a different municipal entity (such as a regional sewer district). This is known as a satellite community. A ―satellite" community is a sewage collection system owner/operator that does not have ownership of the treatment facility and the wastewater outfall but rather the responsibility to collect and convey the community‘s wastewater to a POTW treatment plant for treatment. *See* 75 Fed. Reg. 30395, 30400 (June 1, 2010).

Municipal sanitary sewer collection systems play a critical role in protecting human health and the environment. Proper operation and maintenance of sanitary sewer collection systems is integral to ensuring that wastewater is collected, transported, and treated at POTW treatment plants. Through effective operation and maintenance, collection system operators can maintain the capacity of the collection system; reduce the occurrence of temporary problem situations such as blockages; protect the structural integrity and capacity of the system; anticipate potential problems and take preventive measures; and indirectly improve treatment plant performance by minimizing I/I-related hydraulic overloading.

Despite their critical role in the nation‘s infrastructure, many collection systems exhibit poor performance and are subjected to flows that exceed system capacity. Untreated or partially treated overflows from a sanitary sewer system are termed ―sanitary sewer overflows" (SSOs). SSOs include releases from sanitary sewers that reach waters of the United States as well as those that back up into buildings and flow out of manholes into city streets.

There are many underlying reasons for the poor performance of collection systems. Much of the nation‘s sanitary sewer infrastructure is old, and aging infrastructure has deteriorated with time. Communities also sometimes fail to provide capacity to accommodate increased sewage delivery and treatment demand from increasing populations. Furthermore, institutional arrangements relating to the operation of sewers can pose barriers to coordinated action, because many municipal sanitary sewer collection systems are not entirely owned or operated by a single municipal entity.

The performance and efficiency of municipal sanitary sewer collection systems influence the performance of sewage treatment plants. When the structural integrity of a municipal sanitary sewer collection system deteriorates, large quantities of infiltration (including rainfall-induced infiltration) and inflow can enter the collection system, causing it to overflow. These extraneous flows are among the most serious and widespread operational challenges confronting treatment works.[4]

Infiltration can be long-term seepage of water into a sewer system from the water table. In some systems, however, the flow characteristics of infiltration can resemble those of inflow, *i.e.*, there is a rapid increase in flow during and immediately after a rainfall event, due, for example, to rapidly rising groundwater. This phenomenon is sometimes referred to as rainfall-induced infiltration.

Sanitary sewer systems can also overflow during periods of normal dry weather flows. Many sewer system failures are attributable to natural aging processes or poor operation and maintenance. Examples include years of wear and tear on system equipment such as pumps, lift stations, check valves, and other moveable parts that can lead to mechanical or electrical failure; freeze/thaw cycles, groundwater flow, and subsurface seismic activity that can result in pipe movement, warping, brittleness, misalignment, and breakage; and deterioration of pipes and joints due to root intrusion or other blockages.

Inflow and infiltration impacts are often regional in nature. Satellite collection systems in the communities farthest from the POTW treatment plant can cause sanitary sewer overflows (―SSOs") in communities between them and the treatment plant by using up capacity in the interceptors. This can cause SSOs in the interceptors themselves or in the municipal sanitary sewers that lead to them. The implication of this is that corrective solutions often must also be regional in scope to be effective.

The health and environmental risks attributed to SSOs vary depending on a number of factors including location and season (potential for public exposure), frequency, volume, the amount and type of pollutants present in the discharge, and the uses, conditions, and characteristics of the receiving waters. The most immediate health risks associated with SSOs to waters and other areas with a potential for human contact are associated with exposure to bacteria, viruses, and other pathogens.

Human health impacts occur when people become ill due to contact with water or ingestion of water or shellfish that have been contaminated by SSO discharges. In addition, sanitary sewer systems can back up into buildings, including private residences. These discharges provide a direct pathway for human contact with untreated wastewater. Exposure to land-based SSOs typically occurs through the skin via direct contact. The resulting diseases are often similar to those associated with exposure through drinking water and swimming (*e.g.*, gastroenteritis), but may also include illness caused by inhaling microbial pathogens. In addition to pathogens, raw sewage may contain metals, synthetic chemicals, nutrients, pesticides, and oils, which also can be detrimental to the health of humans and wildlife.

---

[4] In a 1989 Water Pollution Control Federation survey, 1,003 POTWs identified facility performance problems. Infiltration and inflow was the most frequently cited problem, with 85 percent of the facilities reporting I/I as a problem. I/I was cited as a major problem by 41 percent of the facilities (32 percent as a periodic problem).

II. Region 1 Past Practice of Permitting POTWs that Include Municipal Satellite Collection Systems

Region 1's practice in permitting regionally integrated POTWs has developed in tandem with its increasing focus on addressing I/I in sewer collection systems, in response to the concerns outlined above. Up to the early 1990s, POTW permits issued by Region 1 generally did not include specific requirements for collection systems. When I/I and the related issue of SSOs became a focus of concern both nationally and within the region in the mid-1990s, Region 1 began adding general requirements to POTW permits that required the permittees to ―eliminate excessive infiltration and inflow" and provide an annual ―summary report" of activities to reduce I/I. As the Region gathered more information and gained more experience in assessing these reports and activities, it began to include more detailed requirements and reporting provisions in these permits.

MassDEP also engaged in a parallel effort to address I/I, culminating in 2001 with the issuance of MassDEP Policy No. BRP01-1, ―Interim Infiltration and Inflow Policy." Among other provisions, this policy established a set of standard NPDES permit conditions for POTWs that included development of an I/I control plan (including funding sources, identification and prioritization of problem areas, and public education programs) and detailed annual reporting requirements (including mapping, reporting of expenditures and I/I flow calculations). Since September 2001, these requirements have been the basis for the standard operation and maintenance conditions related to I/I.

Regional treatment plants presented special issues as I/I requirements became more specific, as it is generally the member communities, rather than the regional sewer district, that own the collection systems that are the primary source of I/I. Before the focus on I/I, POTW permits did not contain specific requirements related to the collection system component of POTWs. Therefore, when issuing NPDES permits to authorize discharges from regionally integrated treatment POTWs, Region 1 had generally only included the legal entity owning and/or operating the regionally centralized wastewater treatment plant as the permittee. As the permit conditions were focused on the treatment plant and its effluent discharge, a permit issued only to the owner or operator of the treatment plant was sufficient to ensure that permit conditions could be fully implemented and that EPA had authority to enforce the permit requirements.

In implementing the I/I conditions, Region 1 initially sought to maintain the same structure, placing the responsibility on the regional sewer district to require I/I activities by the contributing systems and to collect the necessary information from those systems for submittal to EPA. MassDEP's 2001 Interim I/I Policy reflected this approach, containing a condition for regional systems:

> ((FOR REGIONAL FACILITIES ONLY)) The permittee shall require, through appropriate agreements, that all member communities develop and implement infiltration and inflow control plans sufficient to ensure that high flows do not cause or contribute to a violation of the permittee's effluent limitations, or cause overflows from the permittee's collection system.

As existing NPDES permittees, the POTW treatment plants were an obvious locus of regulation. The Region assumed the plants would be in a position to leverage preexisting legal and/or contractual relationships with the satellite collection systems they serve to perform a coordinating function, and that utilizing this existing structure would be more efficient than establishing a new system of direct reporting to EPA by the collection system owners. The Region also believed that the owner/operator of the POTW treatment plant would have an incentive to reduce flow from contributing satellite systems because doing so would improve treatment plant performance and reduce operation costs. While relying on this cooperative approach, however, Region 1 also asserted that it had the authority to require that POTW collection systems be included as NPDES permittees and that it would do so if it proved necessary. Indeed, in 2001 Region 1 acceded to Massachusetts Water Resources Authority‘s (―MWRA") request to include as co-permittees the contributing systems to the MWRA Clinton wastewater treatment plant (―WWTP") based on evidence provided by MWRA that its relationship with those communities would not permit it to run an effective I/I reduction program for these collection systems. Region 1 also put municipal satellite collection systems on notice that they would be directly regulated through legally enforceable permit requirements if I/I reductions were not pursued or achieved.

In time, the Region realized that its failure to assert direct jurisdiction over municipal satellite dischargers was becoming untenable in the face of mounting evidence that cooperative (or in some cases non-existent) efforts on the part of the POTW treatment plant and associated satellites were failing to comprehensively address the problem of extraneous flow entering the POTW. The ability and/or willingness of regional sewer districts to attain meaningful I/I efforts in their member communities varied widely. The indirect structure of the requirements also tended to make it difficult for EPA to enforce the implementation of meaningful I/I reduction programs.

It became evident to Region 1 that a POTW‘s ability to comply with CWA requirements depended on successful operation and maintenance of not only the treatment plant but also the collection system. For example, the absence of effective I/I reduction and operation/maintenance programs was impeding the Region‘s ability to prevent or mitigate the human health and water quality impacts associated with SSOs. Additionally, these excess flows stressed POTW treatment plants from a hydraulic capacity and performance standpoint, adversely impacting effluent quality. *See Exhibit B* (Analysis of extraneous flow trends and SSO reporting for representative systems). Addressing these issues in regional systems was essential, as these include most of the largest systems in terms of flow, population served and area covered.

The Region‘s practice of imposing NPDES permit conditions on the municipal collection systems in addition to the treatment plant owner/operator represents a necessary and logical progression in its continuing effort to effectively address the serious problem of I/I in sewer collection systems.[5] In light of its past permitting experience and the need to effectively address

---

5 Although the Region has in the past issued NPDES permits only to the legal entities owning and operating the wastewater treatment plant (*i.e.*, only a portion of the ―treatment works"), the Region‘s reframing of permits to include municipal satellite collection systems does not represent a break or reversal from its historical legal position. Region 1 has never taken the legal position that the satellite collection systems are beyond the reach of the CWA and the NPDES permitting program. Rather, the Region as a matter of discretion had merely never determined it

the problem of extraneous flow on a system-wide basis, Region 1 decided that it was necessary to refashion permits issued to regionally integrated POTWs to include all owners/operators of the treatment works (*i.e.*, the regional centralized POTW treatment plant and the municipal satellite collection systems).[6] Specifically, Region 1 determined that the satellite systems should be subject as co-permittees to a limited set of O&M-related conditions on permits issued for discharges from regionally integrated treatment works. These conditions pertain only to the portions of the POTW collection system that the satellites own. This ensures maintenance and pollution control programs are implemented with respect to all portions of the POTW. Accordingly, since 2005, Region 1 has generally included municipal satellite collection systems as co-permittees for limited purposes while it required the owner/operator of the treatment plant, as the primary permittee, to comply with the full array of NPDES requirements, including secondary treatment and water-quality based effluent limitations. The Region has identified 25 permits issued by the Region to POTWs in New Hampshire and Massachusetts that include municipal satellite collection systems as co-permittees. *See Exhibit A.* The 25 permits include a total of 55 satellite collection systems as co-permittees.

III. Legal Authority

The Region's prior and now superseded practice of limiting the permit only to the legal entity owning and/or operating the wastewater treatment plant had never been announced as a regional policy or interpretation. Similarly, the Region's practice of imposing NPDES permit conditions on the municipal collection systems in addition to the treatment plant owner/operator has also never been expressly announced as a uniform, region-wide policy or interpretation. Upon consideration of the Board's decision, described above, Region 1 has decided to supply a clearer, more detailed explanation regarding its use of a co-permittee structure when issuing NPDES permits to regionally integrated POTWs. In this section, the Region addresses the questions posed by the Board in the *Upper Blackstone* decision referenced above.

(1) In the case of a regionally integrated POTW composed of municipal satellite collection systems owned by different entities and a treatment plant owned by another, is the scope of

---

necessary to exercise its statutory authority to directly reach these facilities in order to carry out its NPDES permitting obligations under the Act.

Although the Region adopted a co-permittee structure to deal I/I problems in the municipal satellite collection systems, that decision does nothing to foreclose a permitting authority from opting for alternative permitting approaches that are consistent with applicable law. Each permitting authority has the discretion to determine which permitting approach best achieves the requirements of the Act based on the facts and circumstances before it. Upon determining that direct regulation of a satellite collection system via an NPDES permit is warranted, a permitting authority has the discretion to make the owner or operator of the collection system a co-permittee, or to cover it through an individual or general permit. Nothing in EPA regulations precludes the issuance of a separate permit to an entity that is part of the larger system being regulated. As in the pretreatment program, there are many ways to ensure that upstream collection systems are adequately contributing to the successful implementation of a POTW's permit requirements.

[6] EPA has ―considerable flexibility in framing the permit to achieve a desired reduction in pollutant discharges." *Natural Resources Defense Council, Inc. v. Costle*, 568 F.2d 1369, 1380 (D.C.Cir.1977). (―[T]his ambitious statute is not hospitable to the concept that the appropriate response to a difficult pollution problem is not to try at all.").

NPDES authority limited to owners/operators of the POTW treatment plant, or does the authority extend to owners/operators of the municipal satellite collection systems that convey wastewater to the POTW treatment plant?

The scope of NPDES authority extends beyond the owners/operators of the POTW treatment plant to include the owners/operators of the municipal satellite collection systems conveying wastewater to the treatment plant for the reasons discussed below.

The CWA prohibits the –discharge of any pollutant by any person" from any point source to waters of the United States, except, *inter alia,* in compliance with an NPDES permit issued by EPA or an authorized state pursuant to Section 402 of the CWA. CWA § 301, 402(a)(1); 40 C.F.R. § 122.1(b).

–Publicly owned treatment works" are facilities that, when they discharge, are subject to the NPDES program. Statutorily, POTWs as a class must meet performance-based effluent limitations based on available wastewater treatment technology. *See* CWA § 402(a)(1) (–[t]he Administrator may…issue a permit for the discharge of any pollutant….upon condition that such discharge will meet (A) all applicable requirements under [section 301]…"); § 301(b)(1)(B) (–In order to carry out the objective of this chapter there shall be achieved…for publicly owned treatment works in existence on July 1, 1977...effluent limitations based upon secondary treatment[.]"); *see also* 40 C.F.R. pt 133. In addition to secondary treatment requirements, POTWs are also subject to water quality-based effluent limits if necessary to achieve applicable state water quality standards. *See* CWA § 301(b)(1)(C). *See also* 40 C.F.R. § 122.44(a)(1) (–…each NPDES permit shall include…[t]echnology-based effluent limitations based on: effluent limitations and standards published under section 301 of the Act") and (d)(1) (same for water quality standards and state requirements). NPDES regulations similarly identify the –POTW" as the entity subject to regulation. *See* 40 C.F.R. § 122.21(a) (requiring –new and existing POTWs" to submit information required in 122.21(j)," which in turn requires –all POTWs," among others, to provide permit application information).

The CWA and its implementing regulations broadly define –POTW" to include not only wastewater treatment plants but also the sewer systems and associated equipment that collect wastewater and convey it to the treatment plants. When a municipal satellite collection system conveys wastewater to the POTW treatment plant, the scope of NPDES authority extends to both the owner/operators of the treatment facility and the municipal satellite collection system, because the POTW is discharging pollutants.

Under section 212 of the Act,

> –(2)(A) The term ‗treatment works' means any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature to implement section 1281 of this title, or necessary to recycle or reuse water at the most economical cost over the estimated life of the works, including intercepting sewers, outfall sewers, *sewage collection systems* [emphasis added], pumping, power, and other equipment, and their appurtenances; extensions, improvements, remodeling, additions, and alterations thereof; elements essential to provide a reliable recycled supply such as

> standby treatment units and clear well facilities; and any works, including site acquisition of the land that will be an integral part of the treatment process (including land used for the storage of treated wastewater in land treatment systems prior to land application) or is used for ultimate disposal of residues resulting from such treatment.
>
> (B) In addition to the definition contained in subparagraph (A) of this paragraph, ‗treatment works' means any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste, including storm water runoff, or industrial waste, including waste in combined storm water and *sanitary sewer systems* [emphasis added]. Any application for construction grants which includes wholly or in part such methods or systems shall, in accordance with guidelines published by the Administrator pursuant to subparagraph (C) of this paragraph, contain adequate data and analysis demonstrating such proposal to be, over the life of such works, the most cost efficient alternative to comply with sections 1311 or 1312 of this title, or the requirements of section 1281 of this title."

EPA has defined POTW as follows:

> ―The term *Publicly Owned Treatment Works* or *POTW* [emphasis in original]…includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they convey wastewater to a POTW Treatment Plant. The term also means the municipality as defined in section 502(4) of the Act, which has jurisdiction over the Indirect Discharges to and the discharges from such a treatment works."

See 40 C.F.R. §§ 403.3(q) and 122.2.

Thus, under the CWA and its implementing regulations, wastewater treatment plants and the sewer systems and associated equipment that collect wastewater and convey it to the treatment plants fall within the broad definition of ―POTW."

The statutory and regulatory definitions plainly encompass both the POTW treatment plant and municipal satellite collection systems conveying wastewater to the POTW treatment plant even if the treatment plant and the satellite collection system have different owners. Municipal satellite collection systems indisputably fall within the definition of a POTW. First, they are ―sewage collection systems" under section 212(A) and ―sanitary sewer systems" under section 212(B). Second, they convey wastewater to a POTW treatment plant for treatment under 40 C.F.R. § 403.3(q)). The preamble to the rule establishing the regulatory definition of POTW supports the reading that the treatment plant comprises only one portion of the POTW. *See* 44 Fed. Reg. 62260, 62261 (Oct. 29, 1979).[7] Consistent with Region 1's interpretation, courts have similarly

---

[7] ―A new provision…defining the term ‗POTW Treatment Plant' has been added to avoid an ambiguity that now exists whenever a reference is made to a POTW (publicly owned treatment works). …[T]he existing regulation defines a POTW to include both the treatment plant and the sewer pipes and other conveyances leading to it. As a result, it is unclear whether a particular reference is to the pipes, the treatment plant, or both. The term ―POTW

taken a broad reading of the terms treatment works and POTW.[8] Finally, EPA has long recognized that a POTW can be composed of different parts, and that sometimes direct control is required under a permit for all parts of the POTW system, not just the POTW treatment plant segment. *See Multijurisdictional Pretreatment Programs Guidance Manual,* Office off Water (4203) EPA 833-B-94-005 (June 1994) at 19. (―If the contributing jurisdiction owns or operates the collection system within its boundaries, then it is a co-owner or operator of the POTW. As such, it can be included on the POTW‘s NPDES permit and be required to develop a pretreatment program. Contributing jurisdictions should be made co-permittees where circumstances or experience indicate that it is necessary to ensure adequate pretreatment program implementation."). The Region‘s interpretation articulated here is consistent with the precepts of the pretreatment program, which pertains to the same regulated entity, i.e., the POTW.[9]

Thus, under the statutory and regulatory definitions, a satellite collection system owned by one municipality that transports municipal sewage to another portion of the POTW owned by another municipality can be classified as part of a single integrated POTW system discharging to waters of the U.S.

(2) If the latter, how far up the collection system does NPDES jurisdiction reach, i.e., where does the "collection system" end and the "user" begin?

NPDES jurisdiction extends beyond the treatment plant to the outer boundary of the municipally-owned sewage collection systems, that is, to the outer bound of those sewers whose purpose is to transport wastewater for others to a POTW treatment plant for treatment, as explained below.

As discussed in response to Question 1 above, the term ―treatment works" is defined to include ―sewage collection systems." CWA § 212. In order to identify the extent of the sewage collection system for purposes of co-permittee regulation—*i.e.*, to identify the boundary between the portions of the collection system that are subject to NPDES requirements and those that are not—Region 1 is relying on EPA‘s regulatory interpretation of the term ―sewage collection system." In relevant part, EPA regulations define ―sewage collection system" at 40 C.F.R. § 35.905 as:

---

treatment plant" will be used to designate that portion of the municipal system which is actually designed to provide treatment to the wastes received by the municipal system."

[8] *See, e.g., United States v. Borowski, 977 F.2d 27, 30 n.5* (1st Cir. 1992) (―We read this language [POTW definition] to refer to such sewers, pipes and other conveyances that are publicly owned. Here, for example, the City of Burlington's sewer is included in the definition because it conveys waste water to the Massachusetts Water Resource Authority's treatment works."); *Shanty Town Assoc. v. Envtl. Prot. Agency, 843 F.2d 782, 785* (4th Cir. 1988) (―As defined in the statute, a ‗treatment work‘ need not be a building or facility, but can be any device, system, or other method for treating, recycling, reclaiming, preventing, or reducing liquid municipal sewage and industrial waste, including storm water runoff.") (citation omitted); *Comm. for Consideration Jones Fall Sewage System v. Train,* 375 F. Supp. 1148, 1150-51 (D. Md. 1974) (holding that NPDES wastewater discharge permit coverage for a wastewater treatment plant also encompasses the associated sanitary sewer system and pump stations under § 1292 definition of ―treatment work").

[9] The fact that EPA has endorsed a co-permittee approach in addressing pretreatment issues in situations where the downstream treatment plant was unable to adequately regulate industrial users to the collection system in another jurisdiction reinforces the approach taken here.

> ―… each, and all, of the common lateral sewers, within a publicly owned treatment system, which are primarily installed to receive waste waters directly from facilities which convey waste water from individual structures or from private property and which include service connection ―Y" fittings designed for connection with those facilities. The facilities which convey waste water from individual structures, from private property to the public lateral sewer, or its equivalent, are specifically excluded from the definition…."

Put otherwise, a municipal satellite collection system is subject to NPDES jurisdiction under the Region's approach insofar as it transports wastewater for others to a POTW treatment plant for treatment. This test (i.e., common sewer installed to receive and carry waste water from others) allows Region 1 to draw a principled, predictable and readily ascertainable boundary between the POTW's collection system and the users. This test would exclude, for example, single user branch drainpipes that collect and transport wastewater from plumbing fixtures in a commercial building or public school to the common lateral sewer, just as service connections from private residential structures to lateral sewers are excluded. This type of infrastructure would not be considered part of the collection system, because it is not designed to receive and carry wastewaters from other users. Rather, it is designed to transport its users' wastewater to such a common collection system at a point further down the sanitary sewer system.

EPA's reliance on the definition of ―sewage collection system" from the construction grants regulations for interpretative guidance is reasonable because these regulations at 40 C.F.R. Part 35, subpart E pertain to grants specifically for POTWs, the entity that is the subject of this NPDES policy. Additionally, the term ―sewage collection systems" expressly appears in the definition of treatment works under section 212 of the Act as noted above.

(3) Do municipal satellite collection systems "discharge [] a pollutant" within the meaning of the statute and regulations?

Yes, the collection system ―discharges a pollutant" because it adds pollutants to waters of the U.S. from a point source. This position is consistent with the definition of ―discharge of a pollutant" at 40 C.F.R. § 122. [10] The fact that a collection system may be located in the upper reaches of the POTW and not necessarily near the ultimate discharge point at the treatment plant, or that its contribution may be commingled with other wastewater flows prior to the discharge point, is not material to the question of whether it ―discharges" a pollutant and consequently may be subject to conditions of an NPDES permit issued for discharges from the POTW.[11]
40 C.F.R. § 122.2 defines ―discharge of a pollutant" as follows:

[10] This position differs from that taken by the Region in the *Upper Blackstone* litigation. There, the Region stated that the treatment plant was the discharging entity for regulatory purposes. The Region has clarified this view upon further consideration of the statute, EPA's own regulations and case law and determined that a municipal satellite collection system in a POTW is a discharging entity for regulatory purposes.

[11] As explained more fully below, non-domestic contributors of pollutants to the collection system and treatment plant do not require NPDES permits because they are regulated through the pretreatment program under Section 307 of the CWA and are specifically excluded from needing an NPDES permit. 40 C.F.R. § 122.3(c).

―Discharge of a pollutant means:

(a) Any addition of any ‗pollutant‟ or combination of pollutants to ‗waters of the United States‟ from any ‗point source,‘ or
(b) Any addition of any pollutant or combination of pollutants to the waters of the ‗contiguous zone‘ or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation.

This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works. This term does not include an addition of pollutants by any ‗indirect discharger.‘"

POTW treatment plants as well as the municipal satellite collection systems that comprise portions of the larger POTW and that transport flow to the POTW treatment plant clearly add pollutants or combinations of pollutants to waters of the U.S. and to waters of the ―contiguous zone" and are thus captured under sections (a) and (b) of this definition.[12]

(4) Are municipal satellite collection systems "indirect dischargers" and thus excluded from NPDES permitting requirements?

No, municipal satellite collection systems that convey wastewater from domestic sources to another portion of the POTW for treatment are not ―indirect dischargers" to the POTW.

Section 307(b) of the Act requires EPA to establish regulatory pretreatment requirements to prevent the ―introduction of pollutants into treatment works" that interfere, pass through or are otherwise incompatible with such works. Section 307 is implemented through the General Pretreatment Regulations for Existing and New Sources of Pollution (40 C.F.R. Part 403) and categorical pretreatment standards (40 C.F.R. Parts 405-471). Section 403.3(i) defines ―indirect discharger" as ―any non-domestic" source that introduces pollutants into a POTW and is regulated under pretreatment standards pursuant to CWA § 307(b)-(d). The source of an indirect discharge is termed an ―industrial user." *Id*. at § 403.3(j). Under regulations governing the

[12] Some municipal satellite collection systems have argued that the addition of pollutants to waters of the United States from pipes, sewers or other conveyances that go to a *treatment plant* are not a ―discharge of a pollutant" under 40 C.F.R. § 122.2. This is erroneous. Only one category of such discharges is excluded: indirect discharges. For the reasons explained below in section 4, the satellite system discharges at issue here are not indirect discharges. It is correct that the discharge of wastewater that does not go to the treatment works is included as a discharge under the definition. However, interpreting the *inclusion* of such discharges under the definition as categorically *excluding* the conveyance of other discharges that do go to the treatment works is not a reasonable reading of the regulation. This argument is also flawed in that it incorrectly equates ―treatment works," the term used in the definition above, with ―treatment plant." To interpret ―treatment works" as it appears in the regulatory definition of ―discharge of a pollutant" as consisting of only the POTW treatment plant would be inconsistent with the definition of ―treatment works" at 40 C.F.R. § 403.3(q), which expressly includes the collection system. *See also* § 403.3(r) (defining ―POTW Treatment Plant" as ―*that portion* [emphasis added] of the POTW which is designed to provide treatment (including recycling and reclamation) of municipal sewage and industrial waste.")

NPDES permitting program, the term ―indirect discharger" is defined as ―a non-domestic discharger introducing ‗pollutants' to a ‗publicly owned treatment works.'" 40 C.F.R. § 122.2. Indirect dischargers are excluded from NPDES permit requirements at 40 C.F.R. § 122.3(c), which provides, ―The following discharges do not require an NPDES permit: . . . The introduction of sewage, industrial wastes or other pollutants into publicly owned treatment works by indirect dischargers."

Municipal satellite collection satellite systems are not indirect dischargers as that term is defined under part 122 or 403 regulations. Unlike indirect dischargers, municipal satellite collection systems are not a non-domestic discharger ―introducing pollutants" to POTWs as defined in 40 C.F.R. § 122.2. Instead, they themselves fall within the definition of POTW, whose components consist of the municipal satellite collection system owned and operated by one POTW and a treatment system owned and operated by another POTW. Additionally, they are not a non-domestic *source* regulated under section 307(b) that introduces pollutants into a POTW within the meaning of § 403.3(i). Rather, they are part of the POTW and collect and convey municipal sewage from industrial, commercial and domestic users of the POTW.

The Region's determination that municipal satellite collection systems are not indirect dischargers is, additionally, consistent with the regulatory history of the term indirect discharger. The 1979 revision of the part 122 regulations defined ―indirect discharger" as ―a non-municipal, non-domestic discharger introducing pollutants to a publicly owned treatment works, which introduction does not constitute a ‗discharge of pollutants'…" *See* National Pollutant Discharge Elimination System, 44 Fed. Reg. 32854, 32901 (June 7, 1979). The term ―non-municipal" was removed in the Consolidated Permit Regulations, 45 Fed. Reg. 33290, 33421 (May 19, 1980) (defining ―indirect discharger" as ―a nondomestic discharger…"). Although the change was not explained in detail, the substantive intent behind this provision remained the same. EPA characterized the revision as ―minor wording changes." 45 Fed. Reg. at 33346 (Table VII: ―Relationship of June 7[, 1979] Part 122 to Today's Regulations"). The central point again is that under any past or present regulatory incarnation, municipal satellite collection systems, as POTWs, are not within the definition of ―indirect discharger," which is limited to non-domestic sources subject to section 307(b) that introduce pollutants to POTWs.

(5) How is the Region's rationale consistent with the references to "municipality" in the regulatory definition of POTW found at 40 C.F.R. § 403.3(q), and the definition's statement that "[t]he term also means the municipality….which has jurisdiction over the Indirect Discharges to and the discharges from such a treatment works?"

There is no inconsistency between the Region's view that municipally-owned satellite collection systems fall within the definition of POTW, and the references to municipality in 40 C.F.R. § 403.3(q), including the final sentence of the regulatory definition of POTW in the pretreatment regulations.

The Region's co-permitting rationale is consistent with the first part of the pretreatment program's regulatory definition of POTW, because the Region is only asserting NPDES jurisdiction over satellite collection systems that are owned by a ―State or municipality (as defined by section 502(4) of the Act)." The term ―municipality" as defined in CWA § 502(4)

―means a city, town, borough, county, parish, district, association, or other public body created by or pursuant to State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes…" Thus, in order to qualify under this definition, a wastewater collection system need only be ―owned by a State or municipality." There is no requirement that the constituent components of a regionally integrated POTW, *i.e.*, the collection system and regional centralized POTW treatment plant, be owned by the same State or municipal entity.

Furthermore, there is no inconsistency between the Region's view that a satellite collection system is part of a POTW, and the final sentence of the regulatory definition of POTW in the pretreatment regulations. As noted above, the sentence provides that ―POTW" may ―also" mean a municipality which has jurisdiction over indirect discharges to and discharges from the treatment works. This is not a limitation because of the use of the word ―also" (contrast this with the ―only if" language in the preceding sentence of the regulatory definition).

(6) How does the Region's rationale comport with the permit application and signatory requirements under NPDES regulations?

―Any person who discharges or proposes to discharge pollutants"… must comply with permit application requirements set forth in 40 C.F.R. § 122.21 (―Application for a Permit"), including the duty to apply in subsection 122.21(a). It is the operator's duty to obtain a permit. *See* 40 C.F.R. § 122.21(b). An operator of a sewage collection system in a regionally integrated treatment works is operating a portion of the POTW and thus can be asked to submit a separate permit application pursuant to § 122.21(a) (requiring applicants for ―new and existing POTWs" to submit information required in 122.21(j)," which in turn requires ―all POTWs," among others, to provide permit application information). In the Region's experience, however, sufficient information about the collection system can be obtained from the treatment plant operator's permit application. The NPDES permit application for POTWs solicits information concerning portions of the POTW beyond the treatment plant itself, including the collection system used by the treatment works. *See* 40 C.F.R. § 122.21(j)(1). Where this information is not sufficient for writing permit conditions that apply to a separately owned municipal satellite system, EPA can request that the satellite system to submit an application with the information required in 122.21(j), or alternatively use its authority under CWA section 308 to solicit the necessary information. Because Region 1 believes that it will typically receive information sufficient for NPDES permitting purposes from the POTW treatment plant operator's application, the Region will formalize its historical practice by issuing written waivers to exempt municipal satellite collection systems from permit application and signatory requirements in accordance with 40 C.F.R. § 122.21(j).[13] To the extent the Region requires additional information, it intends to use its information collection authority under CWA § 308.

<u>IV. Basis for the Specific Conditions to which the Municipal Satellite Collection Systems are Subject as Co-permittees</u>

---

[13] EPA may waive applications for municipal satellite collection systems, when requiring such applications may result in duplicative or immaterial information. The Regional Administrator (―RA") may waive any requirement of this paragraph if he or she has access to substantially identical information. 40 C.F.R. § 122.21(j). *See generally*, 64 Fed. Reg. 42440 (August 4, 1999). The RA may also waive any application requirement that is not of material concern for a specific permit. *Id.*

Section 402(a) of the CWA is the legal authority for extending NPDES conditions to all portions of the municipally-owned treatment works to ensure proper operation and maintenance and to reduce the quantity of extraneous flow into the POTW. This section of the Act authorizes EPA to issue a permit for the "discharge of pollutants" and to prescribe permit conditions as necessary to carry out the provisions of the CWA, including Section 301 of the Act. Among other things, Section 301 requires POTWs to meet performance-based requirements based on secondary treatment technology, as well as any more stringent requirements of State law or regulation, including water quality standards. *See* CWA § 301(b)(1)(B),(C).

The Region imposes requirements on co-permittees when it determines that they are necessary to assure continued achievement of effluent limits based on secondary treatment requirements and state water quality standards in accordance with sections 301 and 402 of the Act, and to prevent unauthorized discharges of sewage from downstream collection systems. With respect to achieving effluent limits, the inclusion of the satellite systems as co-permittees may be necessary when high levels of I/I dilute the strength of influent wastewater and increase the hydraulic load on treatment plants, which can reduce treatment efficiency (*e.g.*, result in violations of technology-based percent removal limitations for BOD and TSS due to less concentrated influent, or violation of other technology-based or water quality-based effluent limitations due to reduction in treatment efficiency). Excess flows from an upstream collection system can also lead to bypassing a portion of the treatment process, or in extreme situations make biological treatment facilities inoperable (*e.g.*, wash out the biological organisms that treat the waste).

By preventing excess flows, the co-permittee requirements will also reduce water quality standards violations that result from SSOs by lessening their frequency and extent. *See Exhibit B* (Analysis of extraneous flow trends and SSO reporting for representative systems). SSOs that reach waters of the U.S. are discharges in violation of section 301(a) of the CWA to the extent not authorized by an NPDES permit.

Imposing standard permit conditions on the satellite communities may be necessary to give full effect to some of the standard permit conditions applicable to all NPDES permits at 40 C.F.R. § 122.41 . To illustrate, NPDES permitting regulations require standard conditions that "apply to all NPDES permits," pursuant to 40 C.F.R. § 122.41, including a duty to mitigate and to 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 the permit." *Id.* at § 122.41(d), (e). If the owner or operator of a downstream POTW treatment plant is unable, due to legal constraints for example, or unwilling to ensure that upstream collection systems are implementing requirements concerning the collection system, such as I/I requirements, making the upstream POTW collection system subject to its own permit requirements may be the only or best available option to give full effect to these permit obligations.

V. Conclusion

For all the reasons above, Region 1 has determined that it is reasonable to, as necessary, directly regulate municipal satellite collection systems as co-permittees when issuing NPDES permits for discharges from regionally integrated treatment works.

Exhibit A

Name	Issue Date
Massachusetts Water Resources Authority – Clinton (NPDES Permit No. MA0100404)	September 27, 2000
City of Brockton (NPDES Permit No. MA0101010)	May 11, 2005
City of Marlborough (NPDES Permit No. MA0100480)	May 26, 2005
Westborough Wastewater Treatment Plant (NPDES Permit No. MA0100412)	May 20, 2005
Lowell Regional Wastewater Utilities (NPDES Permit No. MA0100633)	September 1, 2005
Town of Webster Sewer Department (NPDES Permit No. MA0100439)	March 24, 2006
Town of South Hadley, Board of Selectmen (NPDES Permit No. MA0100455)	June 12, 2006
City of Leominster (NPDES Permit No. MA0100617)	September 28, 2006
Hoosac Water Quality District (NPDES Permit No. MA0100510)	September 28, 2006
Board of Public Works, North Attleborough (NPDES Permit No. MA0101036)	January 4, 2007
Town of Sunapee (NPDES Permit No. 0100544)	February 21, 2007
Lynn Water and Sewer Commission (NPDES Permit No. MA0100552)	March 3, 2007
City of Concord (NPDES Permit No. NH0100331)	June 29, 2007
City of Keene (NPDES Permit No. NH0100790)	August 24, 2007
Town of Hampton (NPDES No. NH0100625)	August 28, 2007
Town of Merrimack, NH (NPDES No. NH0100161)	September 25, 2007
City of Haverhill (NPDES Permit No. MA0101621)	December 5, 2007
Greater Lawrence Sanitary District (NPDES Permit No. MA0100447)	August 11, 2005
City of Pittsfield, Department of Public Works (NPDES No. MA0101681)	August 22, 2008

City of Manchester (NPDES No. NH0100447)	September 25, 2008
City of New Bedford (NPDES Permit No. MA0100781)	September 28, 2008
Winnipesaukee River Basin Program Wastewater Treatment Plant (NPDES Permit No. NH0100960)	June 19, 2009
City of Westfield (NPDES Permit No. MA0101800)	September 30, 2009
Hull Permanent Sewer Commission (NPDES Permit No. MA0101231)	September 1, 2009
Gardner Department of Public Works (NPDES Permit No. MA0100994)	September 30, 2009

Exhibit B

Analysis of extraneous flow trends and SSO reporting for representative systems

I. Representative POTWS

The **South Essex Sewer District (SESD)** is a regional POTW with a treatment plant in Salem, Massachusetts. The SESD serves a total population of 174,931 in six communities: Beverly, Danvers, Marblehead, Middleton, Peabody and Salem. The **Charles River Pollution Control District (CRPCD)** is a regional POTW with a treatment plant in Medway, Massachusetts. The CRPCD serves a total population of approximately 28,000 in four communities: Bellingham, Franklin, Medway and Millis. The CRPCD has been operating since 2001 under a permit that places requirements on the treatment plant to implement I/I reduction programs with the satellite collection systems, while SESD‘s existing permit does not include specific I/I requirements related to the satellite collection systems, in contrast to Region 1‘s current practice of including the satellite collection systems as co-permittees.

II. Comparison of flows to standards for nonexcessive infiltration and I/I

Flow data from the facilities‘ discharge monitoring reports (DMRs) are shown in comparison to the EPA standard for nonexcessive infiltration/inflow (I/I) of 275 gpcd wet weather flow and the EPA standard for nonexcessive infiltration of 120 gallons per capita per day (gpcd) dry weather flow; the standards are multiplied by population served for comparison with total flow from the facility. See *I/I Analysis and Project Certification*, EPA Ecol. Pub. 97-03 (1985); 40 CFR 35.2005(b)(28) and (29).

Figures 1 and 2 show the daily maximum flows (the highest flow recorded in a particular month) for the CRPCD and SESD, respectively, along with monthly precipitation data from nearby weather stations. Both facilities experience wet weather flows far exceeding the standard for nonexcessive I/I, particularly in wet months, indicating that these facilities are receiving high levels of inflow and wet weather infiltration.

Figure 1. CRPCD Daily Maximum Flow Compared to Nonexcessive I/I Standard

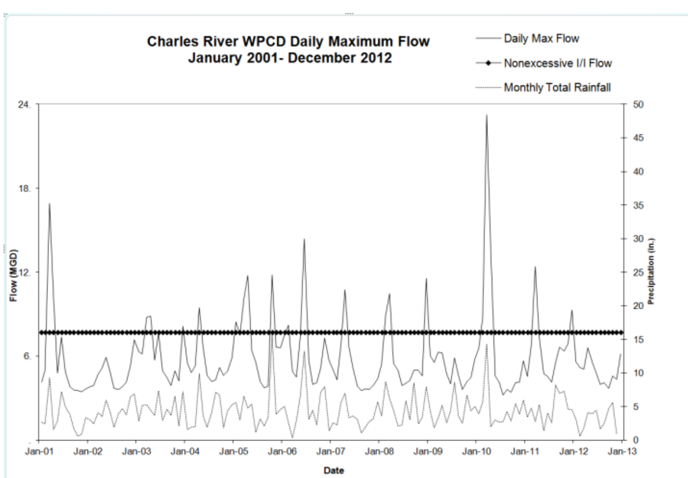
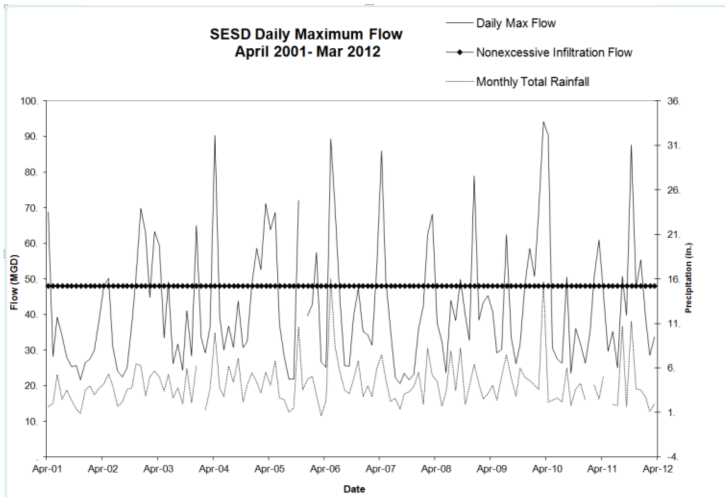


Figure 2. SESD Daily Maximum Flow Compared to Nonexcessive I/I Standard



Figures 3 and 4 shows the average flows for the CRPCD and SESD, which exceed the nonexcessive infiltration standard for all but the driest months. This indicates that these systems experience high levels of groundwater infiltration into the system even during dry weather.

Figure 3. CRPCD 12 Month Average Flow Compared to Nonexcessive Infiltration Standard

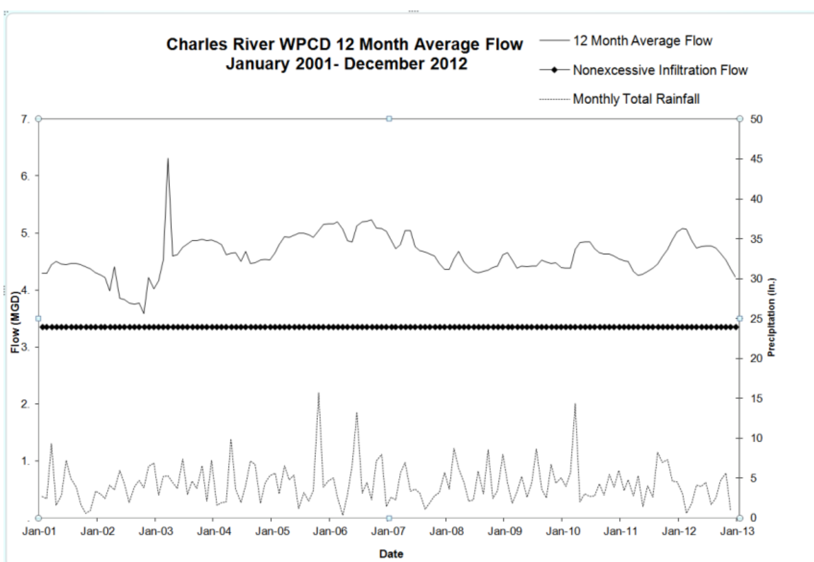
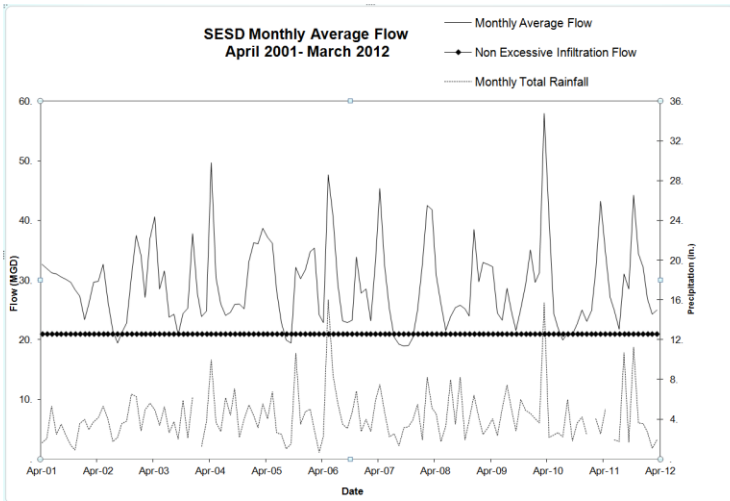


Figure 4. SESD Monthly Average Flow Compared to Nonexcessive Infiltration Standard

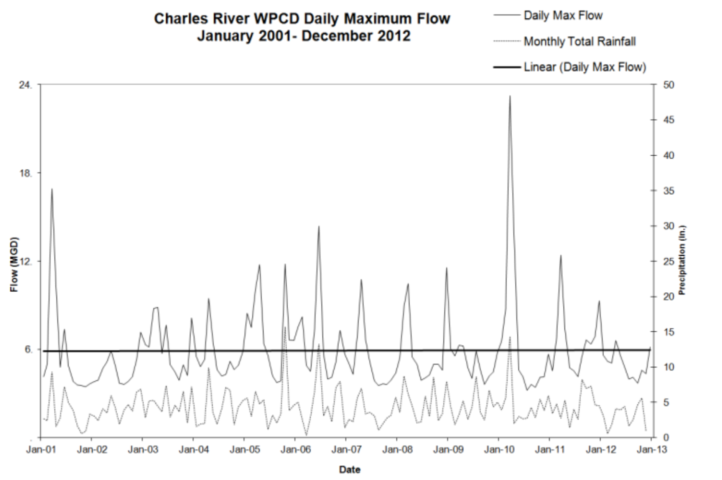


II. <u>Flow Trends</u>

Successful I/I reduction programs should result in decreases in wet weather flows to the treatment plant over the long term. Figures 5 and 6 show the trend in maximum daily flows since 2001. The maximum daily flow reflects the highest wet weather flow for each month. Charts are shown for both the reported maximum daily flow and for a one year rolling average of the maximum daily flow (provided to reduce the impact of seasonality on the regression results). The linear regressions indicates a weak trend over this time period of increasing maximum daily flow; while most of the variability from year to year is due to changes in precipitation, the trends are generally inconsistent with reduction in maximum daily flow over this time period. This indicates that I/I has not been reduced in either system.

Figure 5. CRPCD Daily Maximum Flow Trends

a. Reported Daily Maximum Flows



b. One Year Rolling Average of Daily Maximum Flows

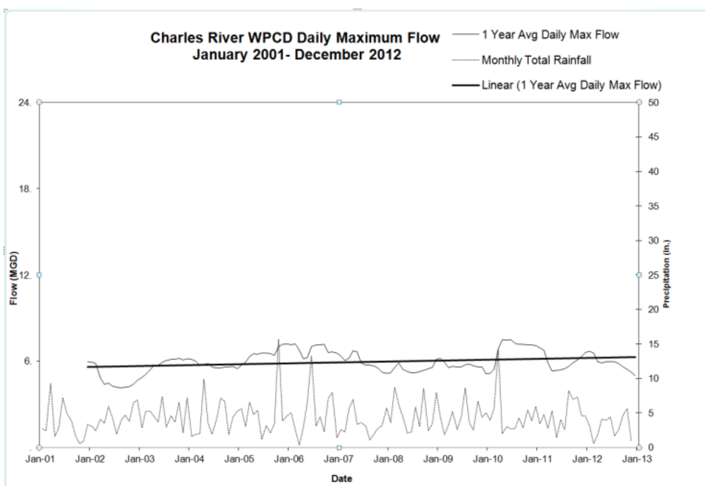
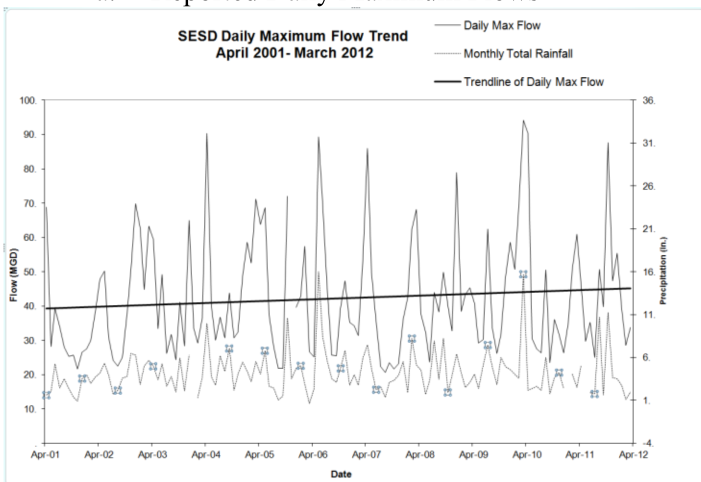
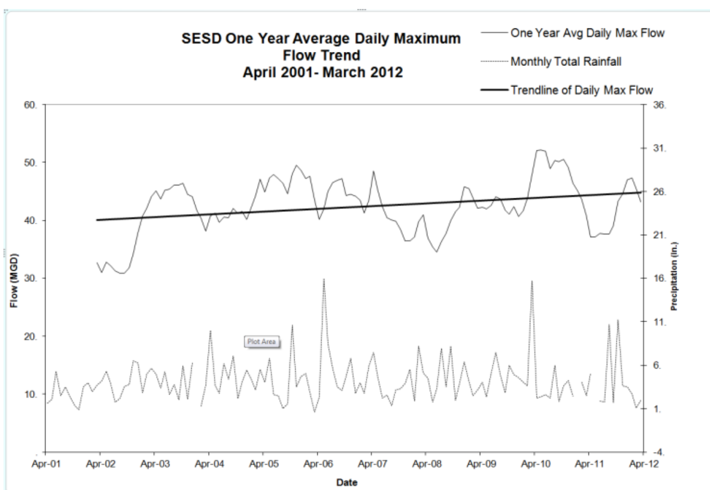


Figure 6. SESD Daily Maximum Flow Trend

a. Reported Daily Maximum Flows



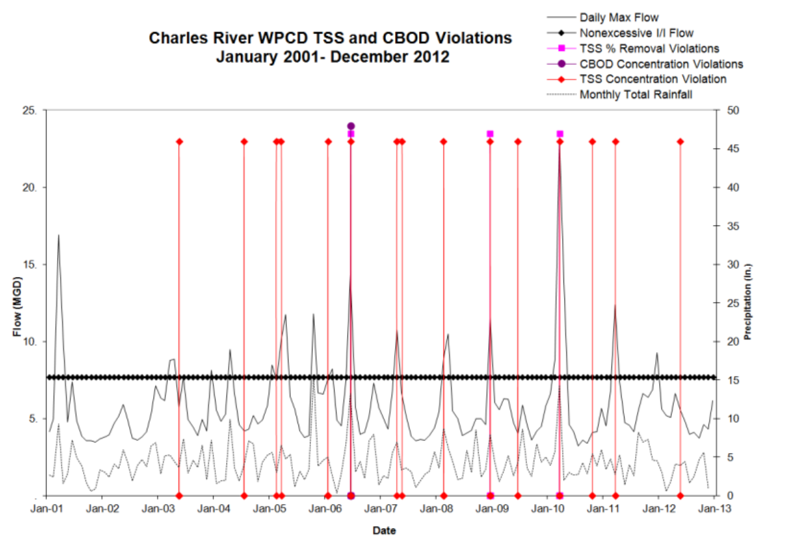
b. One Year Rolling Average of Daily Maximum Flows



III. Violations Associated with Wet Weather Flows

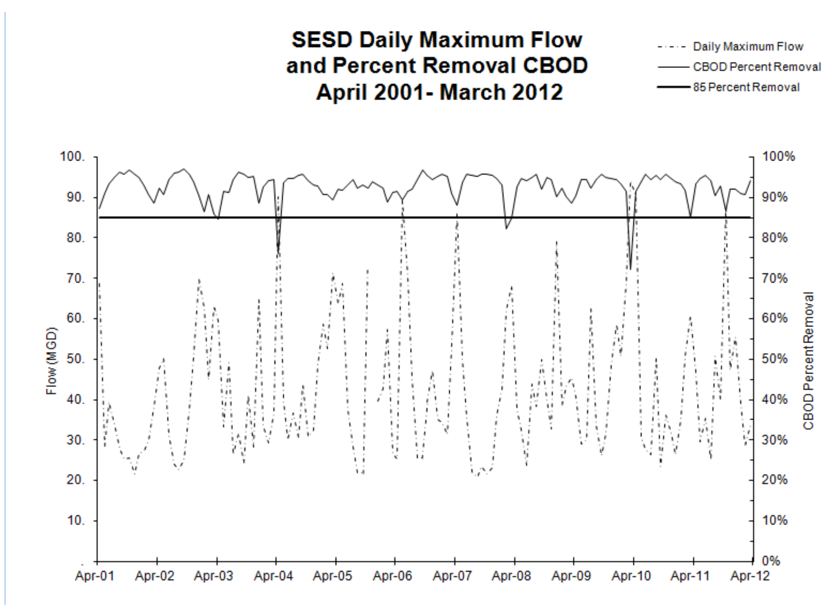
The CRPCD has experienced permit violations that appear to be related to I/I, based on their occurrence during wet weather months when excessive I/I standards are exceeded. Figure 7 shows violations of CRPCD‘s effluent limits for CBOD (concentration) and TSS (concentration and percent removal). Thirteen of the nineteen violations occurred during months when daily maximum flows exceeded the EPA standard.

Figure 7. CRPCD CBOD and TSS Effluent Limit Violations



In addition, SESD has been unable to achieve the secondary treatment requirement of 85% CBOD removal, also related to I/I. Figure 8 shows SESD's results for removal of CBOD, in percentage, as compared to maximum daily flow. SESD had three months where CBOD removal fell below 85%, all during months with high maximum daily flows. While SESD's current permit requires 85% removal in dry weather, so that these excursions did not constitute permit violations, SESD's proposed draft permit does not limit this requirement to dry weather. Relief from the 85% removal requirement is allowed only when the treatment plant receives flows from CSOs or if it receives less concentrated influent wastewater from separate sewers that is not the result of excessive I/I (including not exceeding the 275 gpcpd nonexcessive I/I standard). 40 CFR § 133.103(a) and (d).

Figure 8. SESD CBOD Percent Removal



IV. SSO Reporting

In addition, both of these regional POTWs have experienced SSOs within the municipal satellite collection systems. In the SESD system, Beverly, Danvers, Marblehead and Peabody have reported SSOs between 2006 and 2008, based on data provided by MassDEP. In the CRPCD system, Bellingham reported SSOs in its system between 2006 and 2009.

Exhibit C

Form of Regional Administrator's or Authorized Delegate's Waiver of Permit Application Requirements for Municipal Satellite Collection Systems

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

Re: Waiver of Permit Application and Signatory Requirements for [Municipal Satellite Sewage Collection System]

Dear ______:

Under NPDES regulations, all POTWs must submit permit application information set forth in 40 C.F.R. § 122.21(j) unless otherwise directed. Where the Region has –access to substantially identical information," the Regional Administrator [or Authorized Delegate] may waive permit application requirements for new and existing POTWs. *Id.* Pursuant to my authority under this regulation, I am waiving NPDES permit application and signatory requirements applicable to the above-named municipal satellite collection systems.

Although EPA has the authority to require municipal satellite collection systems to submit individual permit applications, in this case I find that requiring a single permit application executed by the regional POTW treatment plant owner/operator will deliver –substantially identical information," and will be more efficient, than requiring separate applications from each municipal satellite collection system owner/operator. Municipal satellite collection system owners/operators are expected to consult and coordinate with the regional POTW treatment plant operators to ensure that any information provided to EPA about their respective entities is accurate and complete. In the event that EPA requires additional information, it may use its information collection authority under CWA § 308. 33 U.S.C. § 1318.

This notice reflects my determination based on the specific facts and circumstances in this case. It is not intended to bind the agency in future determinations where a separate permit for municipal satellites would not be duplicative or immaterial.

If you have any questions or would like to discuss this decision, please contact [EPA Contact] at [Contact Info].

Sincerely,

Regional Administrator

Endangered Species Act Assessment

Section 7(a) of the Endangered Species Act of 1973, as amended (ESA) grants authority to and imposes requirements upon Federal agencies regarding endangered or threatened species of fish, wildlife, or plants ("listed species") and habitat of such species that has been designated as critical (a "critical habitat"). The ESA requires every Federal agency, in consultation with and with the assistance of the Secretary of Interior, to insure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. The United States Fish and Wildlife Service (USFWS) administers Section 7 consultations for freshwater species. The National Marine Fisheries Service (NMFS) administers Section 7 consultations for marine species and anadromous fish.

EPA has reviewed the federal endangered or threatened species of fish, wildlife, or plants to determine if any listed species might potentially be impacted by the re-issuance of this NPDES permit. The only listed species that have the potential to be present in the vicinity of the facility is the Atlantic sturgeon (*Acipenser oxyrinchus)*. Based on the analysis of potential impacts to Atlantic sturgeon presented below, EPA has determined that impacts to Atlantic sturgeon from the Taunton WWTP, if any, will be insignificant or discountable.

Atlantic Sturgeon Information

The following information was taken from the Status Review of Atlantic Sturgeon (Atlantic Sturgeon Status Review Team. 2007. Status Review of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). Report to National Marine Fisheries Service, Northeast Regional Office. February 23, 2007.)

> Taunton River – Massachusetts and Rhode Island (page 11)
>
> "Historical records indicate that Atlantic sturgeon spawned in the Taunton River at least until the turn of the century (Tracy 1905). A gill net survey was conducted in the Taunton River during 1991 and 1992 to document the use of this system by sturgeon. Three subadult Atlantic sturgeon were captured but were determined to be non-natal fish (Burkett and Kynard 1993). In June 2004, a fisherman fishing in state waters noted that the first three fathoms of towed up gear held three juvenile Atlantic or shortnose sturgeon (Anoushian 2004). Trawlers fishing in state waters (less than three miles offshore) also occasionally report Atlantic sturgeon captures. Since 1997, only two sturgeon have been captured by the Rhode Island Department of Environmental Management Trawl Survey (RIDEM), one measuring 85 cm TL was captured in 1997 in Narragansett Bay, and another (130 cm TL) was captured in October 2005 in Rhode Island Sound (A. Libby, RIDEM, Pers. Comm. 2006). The NMFS observer program has also documented Atlantic sturgeon bycatch off the coast of Rhode Island in Federal waters. Since spawning adults were not

found during the expected spawning period of May and June, it is likely that a spawning population of Atlantic sturgeon does not occur in the Taunton River, though the system is used as a nursery area for Atlantic sturgeon (Burkett and Kynard 1993)."

New York Bight DPS [Distinct Population Segment]
Taunton River – Rhode Island and Massachusetts (page 42)

"Historic upstream migration of Atlantic sturgeon in the Taunton River is unknown. Currently, Atlantic sturgeon are restricted to the lower 70 km of the river as a result of the Town River Pond Dam, allowing access to 89% of the river. However, there has been no evidence of Atlantic sturgeon spawning in this river in recent years (last 15 years). Though spawning habitat is likely available, it is unlikely that water quality conditions are favorable for supporting nursery habitat as the river suffers from low DO (< 5 mg/L) and high ammonia-nitrogen levels (> 0.2 mg/L) (Taunton River Journal 2006). Surveys conducted in 1970 for American shad noted DO levels as low as 0.3 mg/L and ammonia-nitrogen levels as high as 1.22 mg/L (Taunton River Journal 2006). Low DO and excessive nutrient levels are still observed in the river, but water quality has slightly improved since 1970 (Taunton River Journal 2006). The river passes through several municipalities from which 23 million gallons of treated wastewater is added to the river daily; the majority of which is produced from a single treatment facility in the city of Brockton. In 2003, the EPA noted the Brockton facility was in violation of its discharge permit on many occasions, when it released water with excessive nutrient loads."

Ammonia-nitrogen discharges have been addressed through permit limits on ammonia-nitrogen for facilities on the Taunton River and its tributaries, including the Taunton WWTP. The permit violations at the Brockton facility referenced in the Status Review document have been addressed through an facility upgrade and Infiltration/Inflow reduction plan implemented at the Brockton facility, which have resulted in reduced wet weather-related high flows and improved permit compliance.

Based on the information included in the Status Review document, Atlantic sturgeon are present in the Taunton River, although it is unclear whether the range extends upstream to the location of the Taunton WWTP discharge. For purposes of this analysis, EPA assumes that Atlantic sturgeon may be present in the vicinity of the discharge. While spawning activity is not likely to take place in the river, the species is expected to use this habitat as a nursery.

<u>Facility Description</u>

The Taunton Wastewater Treatment Facility is engaged in the collection and treatment of municipal wastewater, including industrial wastewater from 12 non-categorical significant industrial users and 10 categorical industrial users (including a semiconductor manufacturer, battery manufacturer and metal finishers). The facility provides advanced treatment and single stage ammonia-nitrogen removal. Figure 2. The wastewater treatment processes are as follows:

At the headworks, wastewater passes through one of two mechanically cleaned bar screens or a bypass bar rack. Lime is added for pH control and flocculation. After screening, the wastewater passes through a distribution structure and then to one of three primary settling tanks. Grit is removed by pumping primary sludge to a cyclone degritter. After settling, the flow continues on through one of two parallel treatment trains. Each treatment train, or "Battery," consists of a bank of three aeration tanks and two secondary settling tanks. Battery 2 is twice the size of Battery 1 and the flow is split approximately 2/3 to 1/3, with adjustments depending on treatment performance. After settling, the recombined flow is sent to the chlorine contact chamber where it is disinfected with the flow paced addition of liquid hypochlorite and dechlorinated with bisulfate. Defoamer is added for suppression of foam at the discharge. The effluent passes through a reaeration cascade to a 36" pipe leading to a headwall on the bank of the Taunton River. Sludge is dewatered by centrifuge and is sent for co-disposal at the Taunton Municipal Sanitary Landfill.

The treatment process described reflects a treatment plant rehabilitation and upgrade project completed in 2004. The rehabilitation and upgrade included the construction of increased pumping capacity, conversion of the activated sludge aeration facilities from pure oxygen to air, addition of two new aeration tanks, replacement of the influent screens, and rehabilitation of the primary clarifiers.

The sewage collection system is partially combined, with over 150 miles of sewer and 20 pump stations in the municipalities of Taunton, Raynham, Dighton and Norton. Table 2 below shows the number of households served in each municipality.

Under this proposed action, the facility is permitted to discharge from two outfalls. Outfall 001 is the wastewater treatment plant outfall and is located on the west bank of the Taunton River at the end of West Water Street in Taunton. Outfall 004 is the single remaining combined sewer overflow (CSO), located north of the WWTP, behind the Taunton Municipal Light plant on West Water Street. Discharges from Outfall 004 are intermittent (i.e. 3 activations in 2010) and occur only in wet weather conditions. Pursuant to a 2008 Adminstrative Order from EPA, the City is required to work on improving its collection system and to evaluate its ability to eliminate the CSO outfall through the collection system improvements. If the collection system improvements by themselves will not eliminate the CSO outfall, the AO requires that the City submit and plan and schedule for additional options.

Receiving Water Description

The Taunton WWTP discharges to segment MA62-02 of the Taunton River, extending from the Rte 24 Bridge to the Berkley Bridge in Dighton/Berkley. The Massachusetts Surface Water Quality Standards (314 CMR 4.06 – Table 18) classify this segment of the River as Class SB-Shellfishing (R) and CSO.

> Class SB - These waters are designated as a habitat for fish, other aquatic life and wildlife and for primary and secondary contact recreation. In approved areas they shall be suitable for shellfish harvesting with depuration (Restricted Shellfish Areas). These waters shall have consistently good aesthetic value. (314 CMR 4.05(4)(b))
>
> Restricted shellfishing areas are designated as "(R)". These waters are subject to more stringent regulation in accordance with the rules and regulations of the Massachusetts Division of Marine Fisheries pursuant to M.G.L. c. 130, § 75. These include applicable criteria of the National Shellfishing Sanitation Program. (314 CMR 4.06(4))
>
> CSO - (314 CMR 4.06(10)) These waters are identified as impacted by the discharge of combined sewer overflows in the classification tables in 314 CMR 4.06(3). Overflow events may be allowed by the permitting authority without a variance or partial use designation provided that:
>
> > a. an approved facilities plan under 310 CMR 41.25 provides justification for the overflows;
> > b. the Department finds through a use attainability analysis, and EPA concurs, that achieving a greater level of CSO control is not feasible for one of the reasons specified at 314 CMR 4.03(4);
> > c. existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected; and
> > d. public notice is provided through procedures for permit issuance and facility planning under M.G.L. c. 21, §§ 26 through 53 and regulations promulgated pursuant to M.G.L.c. 30A. In addition, the Department will publish a notice in the *Environmental Monitor*. Other combined sewer overflows may be eligible for a variance granted through permit issuance procedures. When a variance is not appropriate, partial use may be designated for the segment after public notice and opportunity for a public hearing in accordance with M.G.L. c. 30A.

The current permit incorrectly lists the Taunton River segment at the point of discharge as Class B (freshwater). The draft permit corrects this error. Effluent limitations for fecal coliform and total copper have been made more stringent based on the SB criteria.

The Massachusetts 2010 303(d) list (Category 5 of the Year 2010 Integrated List of Waters) lists this segment of the Taunton River, Segment MA62-02, as impaired due to pathogens. The segments of the River downstream of this segment, to the mouth of the River at the Braga Bridge in Fall River, are listed as impaired for pathogens and organic enrichment/low dissolved oxygen.

Mount Hope Bay, which receives the discharge of the Taunton River, is listed as impaired for fishes bioassessments, total nitrogen, dissolved oxygen, temperature, fecal coliform and chlorophyll-a.

Pollutant Discharges Permitted and Potential Effects on Atlantic Sturgeon

The draft permit includes water quality based effluent limitations on all pollutants for which the Taunton WWTP has a reasonable potential to cause, or contributes to, an exceedance of water quality standards in the receiving water. These include effluent limitations on carbonaceous biochemical oxygen demand ($CBOD_5$), total suspended solids (TSS), pH, DO, total residual chlorine, bacteria, total nitrogen, copper, and whole effluent toxicity. The derivation of these permit limits is discussed below.

Biochemical Oxygen Demand (BOD_5) and Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)

Limits for BOD_5 and $CBOD_5$ are the same as in the current permit. Publicly Owned Treatment Works (POTWs) are subject to the secondary treatment requirements set forth at 40 CFR Part 133. The permit alternates BOD_5 and $CBOD_5$ limits seasonally. For November through March the standard secondary treatment requirements for BOD_5 (30 mg/l avg monthly; 45 mg/l avg weekly) apply based on the requirements set forth at 40 C.F.R. § 133.102(a)(1), (2), (3), and 40 CFR § 122.45(f). For April through October, the permit contains more stringent water quality based limitations for $CBOD_5$. The limits are an average monthly concentration of 15 mg/l, and a weekly average concentration of 15 mg/l, with accompanying mass limitations. These were established by the MassDEP as a wasteload allocation for BOD_5. These limits are more stringent than those required in 40 CFR §133.102(a)(4).

EPA has determined that these effluent limits are sufficient to ensure that discharges from this facility do not cause an excursion below the Massachusetts water quality standard, which requires that Class B waters attain a minimum DO saturation of 5.0 mg/l. While information regarding the impact of DO levels on Atlantic sturgeon specifically are not available, the related species shortnose sturgeon are known to be adversely affected by DO levels below 5 mg/l (Jenkins et al. 1994, Niklitschek 2001), the same threshold established in the Massachusetts WQS. As such, the BOD criteria are protective of Atlantic sturgeon in the Taunton River.

Total Suspended Solids (TSS)

Limits for TSS are the same as in the current permit. The draft permit includes average monthly and average weekly TSS limitations that are based on secondary treatment requirements set forth at 40 C.F.R. §133.102(b)(1), (2), and (3), and 40 CFR § 122.45(f) for November through March. For April through October, the TSS limits are based on the wasteload allocation. The maximum daily concentration shall continue to be reported.

TSS can affect aquatic life directly by killing them or reducing growth rate or resistance to disease, by preventing the successful development of fish eggs and larvae, by modifying natural movements and migration, and by reducing the abundance of available food (EPA 1976). These effects are caused by TSS decreasing light penetration and by burial of the benthos. Eggs and larvae are most vulnerable to increases in solids, but this area is not considered spawning habitat for Atlantic sturgeon.

Studies of the effects of turbid waters on fish suggest that concentrations of suspended solids can reach thousands of milligrams per liter before an acute toxic reaction is expected (Burton 1993). The studies reviewed by Burton demonstrated lethal effects to fish at concentrations of 580mg/L to 700,000mg/L depending on species. Sublethal effects have been observed at substantially lower turbidity levels. For example, prey consumption was significantly lower for striped bass larvae tested at concentrations of 200 and 500 mg/L compared to larvae exposed to 0 and 75 mg/L (Breitburg 1988 in Burton l993). Studies with striped bass adults showed that pre-spawners did not avoid concentrations of 954 to 1,920 mg/L to reach spawning sites (Summerfelt and Moiser 1976 and Combs 1979 in Burton l993). While there have been no directed studies on the effects of TSS on Atlantic sturgeon, another species of sturgeon, the shortnose sturgeon, have been documented in turbid water in the juvenile and adult stage. Dadswell (1984) reports that shortnose sturgeon are more active under lowered light conditions, such as those in turbid waters. As such, sturgeon species are assumed to be as least as tolerant to suspended sediment as other estuarine fish such as striped bass. Based on this information, it is likely that the stormwater discharge from the site will have an insignificant effect on Atlantic sturgeon.

pH

The draft permit includes pH limitations required as a condition of state certification, that are protective of pH standards set forth at Title 314 CMR 4.05(4)(b)(3), for Class SB waters.

The biological nitrification process uses alkalinity, which tends to lower the pH of wastewater leaving the activated sludge process. Lime is added to supplement alkalinity during the nitrification season, but there are still occasional periods when the pH is depressed below 6.5 SU. The MassDEP has stated that a permitted pH range of 6.0-8.5 SU is protective of State water quality standards, and this range has been included in the draft permit. These pH limits are more stringent than those required under 40 C.F.R. §133.102(c). The monitoring frequency remains once (1) per day.

A pH of 6.0 – 9.0 is harmless to most marine organisms (Ausperger 2004) and is within the normal range of pH for freshwater. As such, no adverse effects to Atlantic sturgeon are likely to occur as a result of the discharge of this pH into the Taunton River.

Bacteria

The Massachusetts Water Quality Standards include criteria for two bacterial indicators for Class SB waters. Fecal coliform bacteria are applicable in water designated for shellfishing and enterococci criteria have been established to protect recreational uses.

Criteria for enterococci were first promulgated for Massachusetts coastal waters by EPA on November 16, 2004 (see 40 CFR 131.41). Massachusetts subsequently adopted enterococci criteria for marine waters into its water quality standards that were approved by EPA on September 19, 2007.

The fecal coliform criteria for SB water designated for shellfishing require that the median or geometric mean MPN not exceed 88 organisms/100 ml, and that no more than 10% of the samples may exceed an MPN of 260/100 ml. The draft permit includes a monthly average (geometric mean) effluent limit of 88 MPN and a maximum daily limit of 260 MPN.

The enterococci criteria require that no single sample exceed 104 colonies per 100 ml and that geometric mean of all samples taken within the most recent six months based on a minimum of five samples shall not exceed 35 colonies per 100 ml. MassDEP views the use of the 90% upper confidence level of 276 cfu/100ml as appropriate for setting the maximum daily limit for enterococci in the draft permit. Therefore EPA has established monthly average (geometric mean) effluent limit of 35 cfu/100ml and daily maximum effluent limit of 276 cfu/100ml for enterococci in the draft permit in order to ensure that the discharge does not cause or contribute to exceedances of Massachusetts Surface Water Quality Standards found at 314 CMR 4.05 (4)(a)4b.

Fecal bacteria are not known to be toxic to aquatic life and are expected to have no direct effect on Atlantic sturgeon.

Dissolved Oxygen

The instantaneous minimum effluent dissolved oxygen limit of 6.0 mg/l or greater is carried forward from the current permit. The limit ensures that dissolved oxygen levels depleted during wastewater treatment process are restored prior to discharge to the Taunton River. The limit is established to protect the dissolved oxygen minimum Water Quality Criteria of 5.0 mg/l for waters designated by the State as Class SB.

While information regarding the impact of DO levels on Atlantic sturgeon specifically are not available, the related species shortnose sturgeon are known to be adversely affected by DO levels below 5 mg/l. Therefore discharges from the Taunton WWTP with DO concentrations of at least 6.0 mg/l are not expected to have an adverse effect on Atlantic sturgeon.

Total Residual Chlorine (TRC)

Chlorine compounds resulting from the disinfection process can be extremely toxic to aquatic life. The instream chlorine criteria are defined in *National Recommended Water Quality Criteria: 2002*, EPA 822R-02-047 (November 2002), as adopted by the MassDEP into the state water quality standards at 314 CMR 4.05(5)(e). The criteria establish that the total residual chlorine in the receiving water should not exceed 7.5 ug/l (chronic) and 13 ug/l (acute). The following is a water quality based calculation of chlorine limits:

Acute Chlorine Salt Water Criteria = 13 ug/l

Chronic Chlorine Salt Water Criteria = 7.5 ug/l

(acute criteria * dilution factor) = Acute (Maximum Daily)
13 ug/l x 3.4 = 44.2 ug/l X 1000 = **0.044 mg/l Maximum Daily**.

(chronic criteria * dilution factor) = Chronic (Average Monthly)
7.5 ug/l x 3.4 = 25.5 ug/l X 1000 = **0.026 mg/l Average Monthly**

There are a number of studies that have examined the effects of TRC (Post 1987; Buckley 1976; EPA 1986) on fish; however, no directed studies that have examined the effects of TRC on Atlantic sturgeon. The EPA has set the Criteria Maximum Concentration (CMC or acute criteria; defined in 40 CFR 131.36 as equals the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1 hour average) without deleterious effects) at 13 ug/l mg/L, based on an analysis of exposure of 24 saltwater animals in 21 genera (EPA 1986) where acute effect values ranged from 26 ug/L for the eastern oyster to 1,418 ug/l for a mixture of two shore crab species. The CMC is set well below the minimum effect values observed in any species tested. As the water quality criteria levels have been set to be protective of even the most sensitive of the 24 saltwater species tested, it is reasonable to assume that the criteria are also protective of Atlantic sturgeon. As such, the discharge of the permitted concentrations of TRC is likely to have an insignificant effect on Atlantic sturgeon.

Total nitrogen

EPA conducted an extensive analysis of the impact of nitrogen loads from the Taunton WWTP and other facilities in the Taunton River Watershed to cause or contribute to eutrophication-related water quality violations in the Taunton River Estuary and Mount Hope Bay and included a seasonal average total nitrogen limit of 3.0 mg/l (May to October) in the new draft permit.[1] The analysis is set forth in pages 12-35 of the Fact Sheet and is not repeated here. The seasonal limit shall be applied on a rolling basis (e.g. the average reported for June shall include May and June of the reporting year as well as July through October of the preceding year). Also, in accordance with 40 CFR 122.45(f), EPA is imposing a monthly average mass limit of 210 lbs/day, also applicable during the months of May through October. This mass limit is based on the monthly average concentration limit and the design flow of the facility, and represents the highest load that the facility can discharge consistent with achieving water quality standards.

[1] The May to October seasonal period is consistent with other Narragansett Bay-related nitrogen limits. See Upper Blackstone Water Pollution Abatement District, MA01002369. The Mount Hope Bay Monitoring Program did not include May and October sampling, so those months were not explicitly included in the loading analysis. However, the Narragansett Bay Fixed Site Monitoring Program extends through October and includes limited data at the end of May and supports the need for permit limits in those months. For example, in 2006 chlorophyll-a concentrations in the last week of May averaged 13 ug/l with a maximum of 25 ug/l, with an average DO at the surface sonde of less than 5.0 mg/l. In 2005, chlorophyll-a concentrations from October 1 through 5 averaged 15 ug/l, with a maximum of 45 ug/l; DO concentrations measured at the near-bottom datasonde were less than 5.0 mg/l for approximately 5% of that time.

The sampling frequency is three times per week. The permit contains a compliance schedule for meeting the nitrogen limits (See Permit Section 1.G).

The total nitrogen limits in the draft permit are designed to address a significant water quality issue and are expected to significantly improve Atlantic sturgeon habitat in the Taunton River and Mount Hope Bay.

Ammonia-nitrogen

The draft permit also carries over the ammonia-nitrogen limits of the current permit of 1 mg/l average monthly and average weekly, and 2 mg/l maximum daily, in the June to September period. EPA notes that the new 3 mg/l total nitrogen limits, once in effect, should be sufficient to ensure that ammonia-nitrogen concentrations are below these limits. The ammonia limits are based on DO impacts and are lower than would be required to meet water quality criteria for ammonia toxicity, While there is a lack of available literature on the impact of ammonia-nitrogen on Atlantic sturgeon, available data with respect to shortnose sturgeon, a related species, indicate that an acute LC50 of 151 mg/l, well above the permit limits. As such, the discharge of the permitted concentrations of TRC is likely to have an insignificant effect on Atlantic sturgeon

Copper

The current permit for this facility contains an effluent limit for total recoverable copper based on the freshwater criteria for class B waters. The correct criteria for SB waters is set forth below in terms of dissolved metals (form used for water quality standard) and total recoverable metals (used for permit limits). See 314 CMR 4.05(5)(e).

Dissolved Criteria CMC ug/l	Dissolved Criteria CCC ug/l	Translator	Total Criteria CMC ug/l	Total Criteria CCC ug/l
4.8	3.1	0.83	**5.8**	**3.7**

Permit limits are calculated based on the meeting the criteria in the receiving water under 7Q10 conditions after accounting for the background concentration in the receiving water.

Mass balance:

$$\frac{\text{(Upstream 7Q10 flow)*(Background) + (Taunton WWTP design flow)*(permit limit)}}{\text{(Upstream 7Q10 flow + Taunton WWTP flow)}} = \text{Criteria}$$

Where: Upstream flow = 31.6 cfs
Taunton flow = 13 cfs
Background copper = 2 ug/l(tr) (median of upstream concentration from WET reports)
Criteria = CCC (3.7 ug/l tr) for average monthly permit limit

CMC (5.8 ug/l tr) for daily maximum permit limit

The resulting permit limits are:

Average monthly = 8 ug/l
Maximum Daily = 15 ug/l

Average Monthly Mass Loading Limits = (constant)(chronic criteria mg/l)(design Q mgd)

(8.34)(0.008 mg/l)(8.4 mgd) = 0.56 lbs/Day

The average monthly limit for total recoverable copper based on the chronic water quality criteria will be 8 ug/l and the maximum daily limit, based on the acute criteria, will be 15 ug/l. These limits are made more stringen than those in the existing permit based upon the use of salt water criteria and revised dilution.

Very few toxicity tests have been conducted with Atlantic sturgeon. In the absence of species-specific chronic and acute toxicity data, EPA has identified the EPA aquatic life criteria as the best available scientific information in this case. The draft permit is designed to ensure that the Taunton WWTP discharge will not cause or contribute to conditions exceeding these criteria in the Taunton River. As such, the discharge of the permitted concentrations is likely to have an insignificant effect on Atlantic sturgeon.

Other metals

EPA also reviewed analytical data submitted in connection with the Taunton WET Reports to determine whether the facility discharges other toxic metals. Data from samples of the effluent and receiving water for the period February 2008 through August 2011 are set forth in Table 11 (attachment), along with the relevant water quality criteria for each parameter. The facility discharges none of these metals at concentrations above the water quality criteria, so no limits are required.

As noted above, in the absence of species-specific chronic and acute toxicity data, EPA has identified the EPA aquatic life criteria) as the best available scientific information in this case. As none of these metals are discharged at concentrations above the water quality criteria, these discharges are not expected to adversely affect Atlantic sturgeon.

Whole Effluent Toxicity – (WET)

In addition to analysis of specific toxic pollutants, EPA and MassDEP as a matter of policy include effluent limitations and monitoring requirements for toxicity bioassays (Whole Effluent Toxicity testing) in wastewater treatment facility permits. The principal advantages of such biological techniques are: (1) the effects of complex discharges of many known and unknown constituents can be measured only by biological analyses; (2) bioavailability of pollutants after discharge is best measured by toxicity testing including any synergistic effects of pollutants; and

(3) pollutants for which there are inadequate chemical analytical methods or criteria can be addressed. The draft permit therefore requires the permittee to conduct four chronic (modified acute) WET tests per year, using the species, Ceriodaphnia dubia, to ensure that the discharge does not present toxicity problems. The permit requires an acute LC_{50} limit of ≥100%. The chronic no observable effects concentration (C-NOEC) limit is calculated to be greater than or equal to the effluent concentration in the receiving water. The inverse of the receiving water concentration (chronic dilution factor) multiplied by one hundred is used to calculate the chronic C-NOEC as a percent limit. (1/3.4)(100) ≥ 29%.

The Taunton WWTP has had no violations of either WET limit in the past five years; in fact, while the CNOEC limit is 29%, the facility has achieved a CNOEC of 100% for every WET test in the past five years. These permit limits are designed to prevent toxicity of the effluent and therefore will avoid adverse effects on Atlantic sturgeon.

Dilution and Extent of Discharge Plume

The water quality based effluent limitations for total residual chlorine, copper and whole effluent toxicity discussed above were calculated using a dilution factor calculated based on 7Q10 conditions for the freshwater component of the Taunton River flow in the vicinity of the discharge. The 7Q10 flow is the lowest mean river flow for seven consecutive days to be expected once in ten years. EPA did not include in the calculation of available dilution the additional seawater component of the receiving water, which is transient depending on tidal conditions.

A CORMIX type dilution model or plume mapping study was not performed to characterize the discharge plume from the Taunton WWTP, but given the tidal nature of the receiving water transient plume conditions may develop in the receiving water. In the absence of specific discharge plume information at this facility, EPA reviewed a thermal plume characterization study from a nearby facility to assess the maximum potential extent of a discharge plume in the Taunton River.

The Taunton Municipal Lighting Plant – Clear Flood Power Generating Station is located approximately one mile downstream of the Taunton WWTP, also on the West Bank of the Taunton River. A thermal plume characterization was conducted for the Cleary Flood Station in 2011 in connection with the application for reissuance of its NPDES Permit. This study utilized the Flow-3D model and incorporated calibration data collected in September 2010 to assess the facility's operation at a flow of 18.7 mgd (twice the design flow from the Taunton WWTP) from a forty foot wide surface discharge channel. At low slack tide, determined to be "worst case" conditions, the plume extended across the surface of the river averaging two feet deep and approximately 400' in length, leaving a large zone of passage in the deeper portions of the river (approximately 12 feet deep in that location). While detailed results for non-"worst case" conditions were not presented, the charts presented in the report indicate that the maximum downstream or upstream distance of the plume from the discharge point under any condition studied was approximately 1500 feet. The report noted that 85% of the river's cross sectional area remained as a zone of passage under the "worst case" conditions. These "worst case" conditions were conservatively estimated and are transient, present only for slack tide conditions expected to last on the order of ten minutes.

In addition the Aquaria desalinization plant, located approximately two miles downstream in Dighton on the opposite bank of the Taunton River, conducted plume modeling in 2005 to support its proposed 33.2 mgd submerged discharge. That study found that under buoyant conditions the plume became laterally mixed at approximately 200 meters with a plume thickness on the order of 2 feet (although this study considered only high tide conditions). The Taunton WWTP discharge is expected to be buoyant because it has lower salinity and higher temperature than the receiving water.

As reported earlier in this letter, the design flow of the Taunton WWTP is 8.14 mgd, less than half that of the Cleary Flood Station and one-fourth that of the Aquaria discharge. While an exact correlation between these discharge plumes is not possible due to a number of variables that are not quantified, it is reasonable to assume that Taunton WWTP's discharge influences the river a distance less than an upstream or downstream distance of 1,500 feet and allows a zone of passage of at least 85% of the river's cross sectional area.

Finding

Based on the analysis of potential impacts to Atlantic sturgeon presented in this letter, EPA has determined that impacts to Atlantic sturgeon from the Taunton WWTP discharge, if any, will be insignificant or discountable. Therefore, EPA has judged that a formal consultation pursuant to Section 7 of the ESA is not required. EPA is seeking concurrence from NMFS regarding this determination through the information in this letter, as well as supporting information contained in the Fact Sheet and the Draft Permit.

Reinitiation of consultation will take place: (a) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in the consultation; (b) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the consultation; or (c) if a new species is listed or critical habitat is designated that may be affected by the identified action.