

*Commonwealth of Massachusetts*  
**EXECUTIVE OFFICE OF  
ENERGY and ENVIRONMENTAL AFFAIRS**

**SITING AND MONITORING PROTOCOLS  
FOR  
DESALINATION PLANTS**

*Draft*  
July 2007

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The Executive Office of Energy and Environmental Affairs (EOEEA) recognizes that municipalities seeking to diversify their water supply options and proponents seeking permits for commercial desalination ventures will benefit from a consistent, coordinated process that clearly establishes the minimum data collection and performance criteria required. The following two sections on sampling and monitoring outline the performance standards, and the minimum data collection requirements applicable to desalination proposals that will be reviewed by EOEEA agencies.

## **1. SITING AND OPERATING PROTOCOLS**

The following protocols offer a menu of data collection, siting, and technology options to proponents of a desalination facility. These protocols provide greater predictability to proponents and will help in developing a more thorough monitoring plan. The protocols were drawn from requirements in previous and ongoing permits, and also in consultation with various state and federal agencies. Each plan should reflect the specific conditions of the area where the project is to be developed, however, proponents meeting these protocols can expect a well-defined process that will facilitate Massachusetts Environmental Policy Act (MEPA) and permit review processes. Text in italics below indicates potential streamlined requirements associated with implementation of these minimum protocols. All monitoring plans are subject to agency review before sampling begins and additional information may be requested based on site-specific conditions. Sampling should be designed to minimize fish trauma/mortality and the frequencies of sampling should be species specific. A proponent should also provide maps of key resource areas during the pre-application process so that EOEEA agencies can provide technical guidance on potential intake and discharge siting. At least one year of monitoring will be required. The duration of operational monitoring will be decided on a case by case basis.

These protocols are not regulatory requirements. However, proponents choosing not to implement these protocols may experience a less well-defined and, therefore, lengthier review process. These sampling protocols apply to a desalination-only facility, including intake and outfall. Co-location with another facility may involve additional requirements.

### **A. Intake**

#### **I. Siting**

In order to avoid or minimize adverse impacts to the environment, EOEEA strongly recommends that the intake of saline water for the desalination process be located outside of areas of critical natural resource value such as, estuaries, Area of Critical Environmental Concern (ACECs), Outstanding Resource Water (ORWs) and areas of fish passage.

For a proponent proposing an intake outside of these areas, and provided that the proponent demonstrates that the intake will not impact spawning and nursery habitat, land containing shellfish, other benthic fishery resources, will not obstruct navigation, and will not interfere with endangered or threatened species, the Commonwealth will consider:

- i. reducing the frequency of baseline ichthyoplankton and pelagic fish monitoring from three times per week to once per week between March 1 and November 15, and from twice per week to once per month between November 16 and February 28 (there will be no change in frequency of benthic fish, shellfish, and other invertebrate sampling);*

- ii. *reducing the frequency of ambient baseline water quality monitoring from three times per week to once per week between March 1 and November 15, and from twice per week to once per month between November 16 and February 28; and,*
- iii. *reducing or eliminating long-term monitoring for ichthyoplankton, pelagic and benthic fish species, shellfish, and benthic invertebrates other than shellfish in the area of proposed intake.*

## II. Operation

The operation of a desalination plant must be sensitive to the physical, biological and chemical conditions of the estuarine and coastal environment. It should also not affect the hydrological regime of the area where the intake occurs. Where there are appropriate sediments (as determined by agencies, and a proponent's scientists and engineers), substratum intake systems (i.e. intakes drilled underground from shore into saltwater aquifers beneath the seabed) with a through-sediment intake velocity that is not measurable (i.e. zero) are preferred. Resource protection efforts must address all life stages (egg, larvae, juvenile, adult) subject to intake exposure. If a substratum intake is not feasible and a barrier or screening device is to be used, the proponent must ensure that organisms and life stages impinged on the barrier or screen are returned to the water in a way that maximizes survival. The operation of a desalination plant intake should attain the lowest approach/through-media velocity technologically achievable (~ 0.01-0.02 feet per second or less) at all tides, and utilize the smallest intake opening technologically available. Entrainment and impingement should be avoided or minimized at all times.

Overall, the withdrawal of saline water should not adversely affect:

- i. areas of fish passage, spawning, and/or nursery habitat;
- ii. land containing shellfish and/or other benthic fishery resources;
- iii. wetlands;
- iv. endangered or threatened species;
- v. natural salinity structure such as a tidal salt wedge; and,
- vi. adjacent well, lake, pond or stream levels (e.g. due to beach well or upland brackish groundwater withdrawal that is hydrologically connected to adjacent waters).

## III. Control Technologies for mitigating impingement and entrainment

It is expected that the substratum intake and filter fabric barrier control technologies outlined below can meet the desired environmental protocols of this policy (for e.g. see I.B. "Intake Operation"). Currently, wedgewire screen technology does not meet all the protocols and therefore is not preferred.

A proponent that meets all the protocols will likely benefit from defined monitoring requirements.

### i. Substratum intake

Substratum intakes are preferred over other intake systems because they eliminate entrainment and impingement. All references to substratum intakes in the desalination policy and sampling protocols refer to those that have been designed and demonstrated to have a through-sediment velocity that is not measurable (i.e. zero).

EOEEA agencies will consider a monitoring plan consisting of the following from a proponent that proposes substratum intakes:

- o *frequency of baseline ichthyoplankton and pelagic fish monitoring reduced from three times per week to once per week between March 1 and November 15, and from twice per week to once per month between November 16 and February 28;*
- o *location of pelagic and benthic species baseline monitoring only at the proposed discharge;*
- o *reduction or elimination of baseline velocity data collection; and,*
- o *reduction or elimination of long-term monitoring for ichthyoplankton, pelagic and benthic fish species, shellfish, and benthic invertebrates other than shellfish.*

There are several options for siting a substratum intake system. These include locating the intake in sediments directly beneath the source water (i.e. horizontal or angular drilling under an ocean, embayment, or river bottom), locating the intake in an upland brackish water well, and locating the intake either horizontally or vertically in beach sediments. Horizontal directional drilling is the preferred method for constructing horizontally-oriented substratum intakes because there are minimal construction impacts with this method.

#### ii. Filter fabric barrier

Filter fabric screens hanging from booms, cartridge screens, or fixed panel screens may all meet the sampling protocols for intakes if they have sufficient sweeping flows, either induced or natural, and have a passive fish return system to remove impinged organisms. Filter fabric barriers are preferred over metal screens (e.g., wedgewire screens) because they are soft barriers. However, they are less preferred than substratum intake systems because they will not completely eliminate entrainment and impingement.

#### iii. Wedgewire screen

If a wedgewire screen is the only feasible option, it should:

- o have a 0.5 mm slot opening or smaller;
- o be located above the river, embayment, or ocean bottom to protect benthic organisms; and,
- o have sufficient sweeping flows, either induced or natural, or another passive fish return system to remove impinged organisms.

iv. Other intake control technologies can also be proposed if they meet the siting and operation sampling protocols above and demonstrate resource protection equivalent to substratum intakes or filter fabric barriers.

### **B. Discharge**

#### I. Siting

In order to minimize and eliminate adverse impacts to the environment, EOEEA strongly recommends that the discharge of concentrated brine be outside of estuaries, ACECs, ORWs, areas of fish passage and Ocean Sanctuaries. Siting a discharge near an Ocean Sanctuary will require determinations of whether the discharge is within an Ocean Sanctuary boundary, and if it can be permitted under the Ocean Sanctuary regulations.

#### II. Operation

It is recommended that the salinity of the effluent meet ambient receiving water salinity at the point and time of discharge. A proponent that blends brine with wastewater or cooling water to achieve ambient receiving water salinities may have the benefit of needing only one NPDES

discharge permit if both waste streams use the same outfall pipe and there is sufficient flow capacity in the outfall pipe.

If the proponent commits, through its NPDES discharge permit, to discharging effluent at salinity equal to ambient salinity at time of discharge,

- i. modeling of plume will not be required—only a mathematical description of effluent mixing will be necessary;*
- ii. sampling of fish, shellfish, or benthic invertebrates at the discharge site will be reduced or eliminated; and,*
- iii. long-term ambient water quality monitoring will be relaxed from three times per week to once per week between March 1 and November 15, and from twice per week to once per month between November 16 and February 28 (this relaxation of long-term ambient monitoring does not preclude more frequent monitoring at the “end of pipe” to satisfy NPDES permit requirements).*

Additionally, mixing zones are recommended only in well-flushed areas with a minimum ambient salinity of 30 Practical Salinity Units (PSU) or greater. Mixing zones should be as small as possible and should not be bank to bank. A mixing zone shall cover < 50% of the receiving water cross-section and not affect fish passage, spawning and/or nursery habitat, land containing shellfish, and/or other benthic fishery resources.

### III. Toxicity

The discharge of brine should not be toxic to organisms exposed to the discharge effluent and should not interfere with endangered or threatened species.

## 2. MONITORING and MODELING PROTOCOLS

The monitoring and modeling protocols reflected in this section are derived from agency data requirements for siting and operating desalination plants as determined through previous (and ongoing) MEPA processes. In general, a proponent should demonstrate that the desalination alternative avoids or causes minimum environmental impacts. The extent of impacts can be gauged by comparing the monitoring data of the potential intake and discharge sites and their environs prior to installation of the structures with model simulations projecting future impacts and with the monitoring data after the structures are built and the plant is online. Note that additional monitoring requirements, for parameters such as endangered or threatened species, will be determined on a case-by-case basis

### A. Baseline monitoring

Proponents are encouraged to conduct baseline monitoring as close in time to the permit application submissions as possible to ensure that the data are representative of current ambient conditions. The baseline monitoring plan must be approved by the relevant agencies before sampling begins and should have an agency-approved Quality Assurance / Quality Control Plan. Also, at least one year of baseline monitoring is required. If there is an interruption of data in that year, then the proponent should make sure to fill in the gaps with additional monitoring so as to represent all seasons of the year. The monitoring should be based upon site-specific considerations and the frequencies of sampling may be species specific. All individuals sampled must be identified to the species level. Sampling must be designed to minimize fish trauma/mortality. These protocols apply to a desalination-only facility, including intake and outfall. Co-location with another facility may involve additional requirements.

Baseline monitoring requirements are applicable to both intakes and discharges unless otherwise noted. They are also applicable if a proponent chooses to monitor multiple potential intake and discharge locations.

### I. Fish (in waterbody adjacent to proposed intake and discharge)

#### 1. Ichthyoplankton

Baseline monitoring for ichthyoplankton should be conducted three times per week between March 1 and November 15 and twice per week between November 16 and February 28. *For a proponent who sites outside estuaries, ACECs, ORWs, areas of fish passage, land containing shellfish, fish and shellfish spawning and nursery habitat, and/or utilize substratum intakes<sup>1</sup> agencies will relax the frequency of baseline ichthyoplankton monitoring to once per week between March 1 and November 15 and twice per month between November 16 and February 28.* All samples must be collected at least 24 hours apart and at least one collection per week or month (depending upon time of year) must be collected at night (i.e., the period from one hour after predicted sunset to one hour prior to predicted sunrise). The following are additional protocols:

- i. Sample with a mesh net between 0.333 mm or 0.202 mm;
- ii. Perform oblique tows or use a multiple opening/closing net environmental sampling system;
- iii. Filter at least 100 m<sup>3</sup> during each tow (record sampling durations, start and finish time);

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<sup>1</sup> Substratum Intakes--A substratum intake that is demonstrated to have zero through-sediment velocity is preferred over other intake systems because it eliminates entrainment and impingement.

- iv. Record tow speed;
- v. Sample upgradient, at proposed intake structure, and at proposed discharge. *For a proponent who utilizes substratum intakes, only the discharge site needs to be sampled;* and,
- vi. Establish a Quality Assurance/Quality Control plan for identifying fish and invertebrates, including archived samples.

## 2. Pelagic species (juveniles and adults)

Baseline monitoring for pelagic species should be conducted twice per week between March 1 and November 15, and twice per month between November 16 and February 28. *For a proponent who sites outside estuaries, ACECs, ORWs, areas of fish passage, land containing shellfish, fish and shellfish spawning and nursery habitat, and/or utilize substratum intakes the frequency of pelagic species baseline monitoring will be once per week between March 1 and November 15, and between November 16 and February 28 baseline monitoring will be once per month.* All weekly samples must be collected at least 24 hours apart and all monthly samples can be no closer than 10 days apart. Additionally, at least one net set per week or per month (depending on time of year) shall be at night.

Other considerations are as follows:

- i. The methods for sampling could include any of the following (not all may be necessary)
  - seine (one to two tidal cycle soak time);
  - gill net (one to two tidal cycle soak time);
  - fyke net (one to two tidal cycle soak time); and,
  - push-net.
- ii. At least three sites should be sampled: upgradient, at the proposed intake structure, and at the proposed discharge (more sites may be necessary on a case-by-case basis). *For a proponent who utilizes substratum intakes, only the discharge site needs to be sampled;*
- iii. Steps should be taken to return all organisms to the water as quickly as possible to minimize mortality; and,
- iv. Subsampling may be conducted when a catch of one species exceeds 50 fish.

## 3. Benthic species

Baseline monitoring for benthic species should be conducted twice per month throughout the year with one sample per month at night. The sampling could be conducted using one of several methods – shrimp or otter trawl, seine, pot fishing (if necessary), or SCUBA observations (if necessary). Sampling should be upgradient, at the proposed intake structure, and also at the proposed discharge. *For a proponent who utilizes substratum intakes, only the discharge site needs to be sampled.* Steps should be taken to return all organisms to the water as quickly as possible to minimize mortality. Additionally, subsampling shall be conducted when a catch of one species exceeds 50 fish.

## II. Shellfish

Shellfish should be surveyed at the proposed intake and discharge site. Steps should be taken to return all organisms to the water as quickly as possible to minimize mortality.



### III. Benthic invertebrates other than shellfish (e.g., infauna and epifauna)

Benthic invertebrates should be surveyed at the proposed intake and discharge site. The grain size should be measured at sites where infauna are sampled. Steps should be taken to return all organisms to the water as quickly as possible to minimize mortality.

### IV. Ambient Water Quality

Baseline monitoring of ambient water characteristics should occur three times per week between March 1 and November 15, and twice per week between November 16 and February 28. The samples must be at least 24 hours apart and the sampling protocol must include one weekly sample at night (e.g. coinciding with ichthyoplankton sampling). At least three stations should be sampled (discharge site, upgradient and downgradient) and the suite of samples must cover the full depth of the water column. At a minimum the following characteristics should be sampled – salinity, dissolved oxygen concentration, dissolved oxygen percent saturation, temperature, turbidity or total suspended solids (TSS), and pH.

*For a proponent who sites outside of estuaries, ACECs, ORWs, areas of fish passage, land containing shellfish, fish and shellfish spawning and nursery habitat, and/or utilize substratum intakes, the frequency of baseline ambient water quality monitoring will be relaxed to once per week between March 1-November 15 and once per month between November 16-February 28.*

### V. Hydrological Characteristics

In order to determine the hydrological characteristics at the proposed site of intake, characterization of the flow and velocity of water is necessary. Flow should be measured over full tidal cycles for a period of one year. Velocity should be measured:

- i. during time periods when larvae and eggs are expected to be in the vicinity of the proposed intake (time of year and tidal cycle are important);
- ii. at the depth of the proposed intake;
- iii. over full tidal cycles; and,
- iv. during high and low flow months (if on a tidal river).

*Velocity data collection will be reduced or eliminated if a substratum intake is utilized.*

### VI. Bathymetry

Bathymetric maps should be produced in the vicinity of both the proposed intake and discharge. If the project is on a river, the proponent should identify fish passage habitat in relation to the intake and discharge as well as identify notable features and resources such as submerged aquatic vegetation, oyster beds, and wrecks.

## **B. Modeling**

Modeling should occur during the planning, and design phases, prior to installation of any structures. All modeling inputs are subject to agency review.

### I. Plume

The plume should be modeled relative to the tidal cycle and receiving water body salinity, including at a minimum – maximum flood (mid-tide coming in), slack flood (high tide), maximum ebb (mid-tide going out), and slack ebb (low tide). If the proposal is for a site on a river, the plume should be modeled under spring and summer (high and low flow) conditions. If the proposal is for a site in the ocean and if stratification is important, the plume should be

modeled under summer (stratified) and winter (unstratified) conditions. The model must predict the plume under worst-case conditions and depict the plume relative to fish passage habitat, shorelines, submerged aquatic vegetation, shellfish beds, and other sensitive habitats and resources.

## II. Withdrawal

The duration of withdrawal should be proposed relative to the tidal cycle. Salinity should be modeled at the intake location at all points of the tidal cycle during which withdrawal is proposed to occur. Additionally, the proponent should demonstrate that the withdrawal will not affect groundwater or surface water flow, depth, or the hydrographic salinity structure.

### C. **Long-term monitoring**

The long-term monitoring protocol should be based upon site-specific considerations. The monitoring plan should be submitted along with permit applications and must be approved by the relevant agencies before sampling begins. The frequencies of sampling may be altered to reflect species-specific conditions.

#### I. Fish (in waterbody adjacent to proposed intake and discharge)

##### 1. Ichthyoplankton

Long-term monitoring of ichthyoplankton should be conducted three times per week between March 1 and November 15, and twice per week between November 16 and February 28. The monitoring must coincide with the tidal period when water withdrawal is proposed to occur. Additionally, all samples must be collected at least 24 hours apart and at least one collection per week or month (depending upon time of year) must be collected at night. The following are additional protocols:

- i. Sample with a mesh net between 0.333 mm or 0.202 mm;
- ii. Use oblique tows or multiple opening/closing net environmental sampling system;
- iii. Filter at least 100 m<sup>3</sup> during each tow;
- iv. Measure tow speed; and,
- v. Sample upgradient, at proposed intake structure, and at proposed discharge.

*For a proponent who sites outside of estuaries, ACECs, ORWs, areas of fish passage, land containing shellfish, fish and shellfish spawning and nursery habitat, and/or utilize substratum intakes, long-term monitoring for ichthyoplankton can be reduced or eliminated (entrainment and impingement sampling, except when substratum intakes are used, will not be reduced).*

##### 2. Pelagic species (juveniles and adults)

Long term monitoring of pelagic species should be conducted twice per week between March 1 and November 15, and twice per month between November 16 and February 28. Sampling should occur upgradient, at the proposed intake structure, and at the proposed discharge. All weekly samples should be at least 24 hours apart and all monthly samples no closer than 10 days apart. At least one net set per week or per month (depending upon time of year) should be at night. The types of nets used for sampling could include any of the following (not all may be necessary) – seine, gill net, fyke net (one to two tidal cycles soak time), and/or push-net. *For a proponent who sites outside of estuaries, ACECs, ORWs, areas of fish passage, land containing shellfish, fish and shellfish spawning and nursery habitat, and/or utilizes substratum intakes, long-term monitoring for pelagic species will be reduced or eliminated.*

## II. Benthic species

Long-term monitoring for benthic species should be conducted twice per month throughout the year, and include one sample per month at night. Samples should be taken upgradient, at the intake structure, and at the discharge site. The sampling could use one of the following methods – shrimp or otter trawl (tow duration and speed must be measured), seine, pot fishing, SCUBA observations. Additionally, steps shall be taken to return all organisms to the water as quickly as possible to minimize mortality. *For a proponent who sites outside of estuaries, ACECs, ORWs, areas of fish passage, land containing shellfish, fish and shellfish spawning and nursery habitat, and/or utilizes substratum intakes, long-term monitoring for benthic species may be reduced or eliminated.*

## III. Shellfish

Shellfish should be surveyed at the site of the proposed intake as well as discharge. Steps should be taken to return all organisms to the water as quickly as possible to minimize mortality. *For a proponent who sites outside of estuaries, ACECs, ORWs, areas of fish passage, land containing shellfish, fish and shellfish spawning and nursery habitat, and/or utilizes substratum intakes, long-term monitoring for shellfish may be reduced or eliminated.*

## IV. Benthic invertebrates other than shellfish (infauna and epifauna)

Benthic invertebrates should be surveyed at the proposed intake and discharge site. The grain size should be measured at sites where infauna are sampled. Additionally, steps should be taken to return all organisms to the water as quickly as possible to minimize mortality. *For a proponent who sites outside of estuaries, ACECs, ORWs, areas of fish passage, land containing shellfish, fish and shellfish spawning and nursery habitat, and/or utilizes substratum intakes, long-term monitoring for benthic invertebrates may be reduced or eliminated.*

## V. Ambient Water Quality

Long-term monitoring of ambient water characteristics should be three times per week between March 1 and November 15, and twice per week between November 16 and February 28. Sampling should cover the full depth of the water column and should include at least three stations (upgradient, at intake structure, and at discharge). One weekly sample is required at night (e.g., coinciding with ichthyoplankton sampling) and each sample should be at least 24 hours apart. At least one year of post-operational monitoring will be required. At a minimum the following characteristics should be sampled – salinity, dissolved oxygen concentration and dissolved oxygen percent saturation, temperature, and turbidity or TSS. *If the proponent commits to discharging at salinity equal to ambient salinity at the time of discharge, long-term ambient water quality monitoring will be relaxed to once per week between March 1 and November 15, and to once per month between November 16 and February 28 (occurring midway through the time of discharge).*

## VI. Intake

In the case of entrainment (i.e. samples drawn off from an intake line) the frequency of long-term monitoring should be three times per week between March 1 and November 15, and twice per week between November 16 and February 28. The monitoring protocol should identify all eggs and larvae, convert eggs and larvae of representative important species (to be determined by agencies) to equivalent adults, and determine exclusion rate. *For a proponent who utilizes substratum intakes, entrainment sampling will likely be reduced or eliminated.*

In the case of impingement (i.e. at all barriers) the frequency of long term monitoring should be three times per week between March 1 and November 15, and twice per week between November 15 and February 28. When there are multiple screens, the screens furthest from the intake should be sampled twice per week, year round. The following additional protocols should be adopted:

- i. Collect individuals via baskets and/or vacuum suction;
- ii. Identify all fish and invertebrates;
- iii. Convert representative important species (to be determined by agencies) to equivalent adults;
- iv. Determine exclusion rate;
- v. Take steps to return all organisms to the water as quickly as possible to minimize mortality;
- vi. Report unusual impingement events (i.e., a large number of a single species that exceeds the historical normal impingement rate, e.g., > 25 fish/hour) to the Division of Marine Fisheries of the MA Department of Fish and Game, the MA Department of Environmental Protection, the US Environmental Protection Agency, and MA Coastal Zone Management; and,
- vii. Measure *in situ* approach velocity and channel velocity.

*For a proponent who utilizes substratum intakes, impingement sampling will likely be reduced or eliminated.*

#### VII. Discharge

At the site of discharge measure the following characteristics of the plume – extent (width, length, depth), salinity, dissolved oxygen, temperature, turbidity or TSS, and pH.

## APPENDIX A. POTENTIAL PERMIT REQUIREMENTS FOR DESALINATION FACILITIES IN MASSACHUSETTS

| Agency  | Permit / Review  | Facility Feature   | Regulation                         | Schedule  | Website   |
|---|--|--|------------------------------------|---|---|
| United States Army Corps of Engineers (USACE)   | Section 404 Permit   | Discharge of dredge/fill material in wetlands for intake and discharge piping construction | Clean Water Act (CWA)              | 9 months from application – includes 3 months for resolution of public comments   | <a href="http://www.usace.army.mil/inet/functions/cw/cecwo/reg/sec404.htm">http://www.usace.army.mil/inet/functions/cw/cecwo/reg/sec404.htm</a>   |
| USACE <sup>2</sup>                              | Section 10 Permit  | Placement of structures in navigable waters  | Rivers and Harbors Act             |   | <a href="http://www.usace.army.mil/inet/functions/cw/cecwo/reg/rhsec10.htm">http://www.usace.army.mil/inet/functions/cw/cecwo/reg/rhsec10.htm</a> |
| USEPA Region 1 and DEP                          | National Pollutant Discharge Elimination System (NPDES) Permit | Discharge into surface water   | 314 CMR 2.00, 3.00, 5.00, and 7.00 | File ≥180 days prior to discharge   | <a href="http://www.mass.gov/dep/water/laws/regulati.htm#wl">http://www.mass.gov/dep/water/laws/regulati.htm#wl</a>                               |
| Water Resources Commission                      | Interbasin Transfer Act (IBTA) Approval <sup>1</sup>           | Transfer of water out of donor basin   | 313 CMR 4.00                       | File as part of the MEPA process; ≤60 days after MEPA compliance or all requested additional information is received, whichever is later, to conduct public hearings; ≤60 days after the close of the final public hearing to complete review, and approve or deny the requested action | <a href="http://www.mass.gov/dcr/waterSupply/intbasin/lawsregs.htm">http://www.mass.gov/dcr/waterSupply/intbasin/lawsregs.htm</a>                 |
| Department of Conservation and Recreation (DCR) | Ocean Sanctuaries Act (OSA)                                    | Structures and activities that significantly alter the ecology of the ocean sanctuaries    | 302 CMR 5.00                       | Comment on MEPA filings and on DEP Chapter 91 license applications during the respective public comment periods   | <a href="http://www.mass.gov/czm/envpermитоceansanctuaries.htm">www.mass.gov/czm/envpermитоceansanctuaries.htm</a>                                |

| <b>Agency</b>                                    | <b>Permit / Review</b>                        | <b>Facility Feature</b>   | <b>Regulation</b>                   | <b>Schedule</b>   | <b>Website</b>  |
|--|---|---|-------------------------------------|---|---|
| Executive Office of Environmental Affairs        | Massachusetts Environmental Policy Act (MEPA) | State agency action that requires a permit  | 301 CMR 11.00                       | MEPA review occurs before permitting agencies act   | <a href="http://www.mass.gov/envir/mepa/thirdlevelpages/meparegulation/301cmr11.pdf">http://www.mass.gov/envir/mepa/thirdlevelpages/meparegulation/301cmr11.pdf</a> |
| Coastal Zone Management (CZM)                    | Federal Consistency Review                    | Projects that require federal permits or that have federal funding  | 301 CMR 21.00                       | Issues concurrence that a project is consistent with its Program Policies contingent on prior receipt of all other necessary state licenses, permits, and certifications                    | <a href="http://www.mass.gov/czm/frczcmregs.htm">http://www.mass.gov/czm/frczcmregs.htm</a>   |
| Massachusetts Historical Commission (MHC)        | Historical Review                             | New construction projects or renovations that require funding, licenses, or permits from any state or federal governmental agency | 950 CMR 71                          | Response ≤30 days of receipt  | <a href="http://www.sec.state.ma.us/mhc/mhcidx.htm">www.sec.state.ma.us/mhc/mhcidx.htm</a>  |
| Massachusetts Division of Fisheries and Wildlife | Natural Heritage and Endangered Species       | Protection of rare species and their habitat  | MGL c. 131A                         | Respond to information request within ≤30 days; Massachusetts Endangered Species Act (MESA) Project Review ≤30 days; NHESP review ≤60 days; and Conservation and Management Permit ≤30 days | <a href="http://www.mass.gov/legis/laws/mgl/gl-131a-toc.htm">http://www.mass.gov/legis/laws/mgl/gl-131a-toc.htm</a>   |
| Department of Environmental Protection (DEP)     | Water Withdrawal Permit                       | New or expanded water withdrawal above threshold volume <sup>3</sup>  | Water Management Act: 310 CMR 36.00 | Not specified   | <a href="http://www.mass.gov/dep/service/regulations/310cmr36.pdf">http://www.mass.gov/dep/service/regulations/310cmr36.pdf</a>                                     |
| DEP Division of Wetlands and Waterways           | Section 401 Water Quality Certification       | Dredge and/or fill projects in waters and wetlands; Also applies to NPDES permit issued by EPA <sup>4</sup>                       | 314 CMR 4.00 and 9.00               | <sup>4</sup>  | <a href="http://www.mass.gov/dep/water/laws/regulati.htm#wmgt">http://www.mass.gov/dep/water/laws/regulati.htm#wmgt</a>   |

| Agency                           | Permit / Review                           | Facility Feature   | Regulation    | Schedule   | Website   |
|----------------------------------|---|--|---------------|--|---|
| DEP Waterways Regulation Program | Chapter 91 Waterways License              | Activities that propose dredging, placement of structures, change in use of existing structures, and placement of fill, or alteration of existing structures | 310 CMR 9.00  | Determination within 60 days of receipt of the request or the close of public comment  | <a href="http://www.mass.gov/dep/service/regulations/310cmr09.pdf">http://www.mass.gov/dep/service/regulations/310cmr09.pdf</a> |
| DEP Division of Water Supply     | New Source Approval                       | Construction of a new water supply system or significantly modify an existing system <sup>5</sup>  | 310 CMR 22.00 |  | <a href="http://www.mass.gov/dep/service/regulations/310cmr22.pdf">http://www.mass.gov/dep/service/regulations/310cmr22.pdf</a> |
| DEP Division of Water Supply     | New Source Approval: Water Supply (WS) 13 | Site a source and conduct pumping tests for sources <70 gallons per minute   | 310 CMR 22.00 | Administrative Completeness (AC) 30 days Technical Review #1 (T1) 60 days; T2* 60 days (*2 <sup>nd</sup> technical review only if necessary) | <a href="http://www.mass.gov/dep/service/regulations/310cmr22.pdf">http://www.mass.gov/dep/service/regulations/310cmr22.pdf</a> |
| DEP Division of Water Supply     | New Source Approval: WS20                 | Construction of source >70 gallons per minute  | 310 CMR 22.00 | AC 30; T1 60; T2* 60 (*2 <sup>nd</sup> technical review only if necessary)   | <a href="http://www.mass.gov/dep/service/regulations/310cmr22.pdf">http://www.mass.gov/dep/service/regulations/310cmr22.pdf</a> |
| DEP Division of Water Supply     | Water Treatment Plants: WS21 <sup>6</sup> | Conduct water treatment pilot studies on drinking water systems  | 310 CMR 22.04 | T1 60; T2* 60 (*2 <sup>nd</sup> technical review only if necessary)  | <a href="http://www.mass.gov/dep/service/regulations/310cmr22.pdf">http://www.mass.gov/dep/service/regulations/310cmr22.pdf</a> |
| DEP Division of Water Supply     | Water Treatment Plants: WS22              | Pilot study report on a treatment process or technology  | 310 CMR 22.04 | T1 60; T2* 60 (*2 <sup>nd</sup> technical review only if necessary)  | <a href="http://www.mass.gov/dep/service/regulations/310cmr22.pdf">http://www.mass.gov/dep/service/regulations/310cmr22.pdf</a> |
| DEP Division of Water Supply     | Water Treatment Plants: WS24              | Construct a water treatment facility to treat ≥1 million gallons per day   | 310 CMR 22.04 | Individual Rule Project subject to 310 CMR 4.05  | <a href="http://www.mass.gov/dep/service/regulations/310cmr22.pdf">http://www.mass.gov/dep/service/regulations/310cmr22.pdf</a> |

| Agency                                 | Permit / Review                          | Facility Feature   | Regulation   | Schedule  | Website  |
|--|--|--|--|---|--|
| DEP Division of Water Supply           | Distribution Systems Modifications: WS32 | Distribution modifications for systems that serve >3,300 people                      | 310 CMR 22.04  | AC 30; T1 60; T2* 60 (*2 <sup>nd</sup> technical review only if necessary)                | <a href="http://www.mass.gov/dep/service/regulations/310cmr22.pdf">http://www.mass.gov/dep/service/regulations/310cmr22.pdf</a>  |
| DEP Division of Water Supply           | Salt Water Withdrawal Policy (WS)        | Withdrawal of saline or brackish water <sup>7</sup>                                  | MGL c. 21G; 310 CMR 36.00                            |   | <a href="http://www.mass.gov/dep/service/regulations/310cmr36.pdf">http://www.mass.gov/dep/service/regulations/310cmr36.pdf</a><br><a href="http://www.mass.gov/legis/laws/mgl/gl-21g-toc.htm">http://www.mass.gov/legis/laws/mgl/gl-21g-toc.htm</a> |
| DEP Division of Water Supply           | Water Supply Cross-connection Permit     | Connection to distribution system  | 310 CMR 22.22  |   | <a href="http://www.mass.gov/dep/service/regulations/310cmr22.pdf">http://www.mass.gov/dep/service/regulations/310cmr22.pdf</a>  |
| DEP                                    | Standards and requirements               | Drinking water protection  | 310 CMR 22.00 (land use); 310 CMR 22.20 (reservoirs) |   | <a href="http://www.mass.gov/dep/service/regulations/310cmr22.pdf">http://www.mass.gov/dep/service/regulations/310cmr22.pdf</a>  |
| DEP                                    | Ground Water Discharge Permit            | Discharge >10,000 gallons per day of pollutants into groundwaters from point sources | 314 CMR 2.00, 5.00 and 6.00                          | Application must be submitted ≥180 days before the date on which discharge is to commence | <a href="http://www.mass.gov/dep/water/laws/regulati.htm#wmgt">http://www.mass.gov/dep/water/laws/regulati.htm#wmgt</a>  |
| DEP                                    | Additional requirements <sup>8</sup>     | Outstanding Resource Waters (ORW)  | 314 CMR 4.04   |   | <a href="http://www.mass.gov/dep/service/regulations/314cmr04.pdf">http://www.mass.gov/dep/service/regulations/314cmr04.pdf</a>  |
| DEP Wetlands Restriction Program       | Notice of Intent                         | Wetland deed restrictions which prohibit activities that impair their function       | 310 CMR 12.00 and 13.00                              |   | <a href="http://www.mass.gov/dep/water/laws/regulati.htm#wmgt">http://www.mass.gov/dep/water/laws/regulati.htm#wmgt</a>  |
| DEP Division of Solid Waste Management | Solid Waste Permit                       | Disposal of dredged material in approved landfill                                    | 310 CMR 19.00  | Not specified   | <a href="http://www.mass.gov/dep/service/regulations/310cmr19.pdf">http://www.mass.gov/dep/service/regulations/310cmr19.pdf</a>  |



| Agency  | Permit / Review   | Facility Feature  | Regulation                                      | Schedule | Website  |
|---|---|---|---|----------|--|
| DEP Drinking Water Program, Watershed Permitting Program, and the DCR Office of Water Resources | Area of Critical Environmental Concern (ACEC)   | Consider ACEC issues when reviewing water withdrawal permit applications pursuant to the WMA  | 301 CMR 12.00                                   |          | <a href="http://www.mass.gov/dcr/stewardship/acec/acecRegs.pdf">http://www.mass.gov/dcr/stewardship/acec/acecRegs.pdf</a>  |
| DEP and local Conservation Commission <sup>9</sup>  | Massachusetts Wetlands Protection Act (WPA) Permit. Notice of Intent (NOI)/Request for Determination of Applicability | Work in a wetland or within 100' buffer of wetlands; Access way to the water withdrawal as well as drilling, pumping and filling wetlands | 310 CMR 10.00                                   |          | <a href="http://www.mass.gov/dep/service/regulations/310cmr10a.pdf">http://www.mass.gov/dep/service/regulations/310cmr10a.pdf</a><br><a href="http://www.mass.gov/dep/service/regulations/310cmr10b.pdf">http://www.mass.gov/dep/service/regulations/310cmr10b.pdf</a> |
| Conservation Commission   | Orders of Conditions (OOC) as specified in the WPA  | Work in the riverfront area, wetlands, wetlands buffer zone, floodplain   | River Protection Act Chapter 258; 310 CMR 10.00 |          | NA   |
| Planning Board  | Site Plan Review Approval   | Construction and land use   | Established locally                             |          | NA   |

<sup>1</sup> Water subject to desalination can be subject to the Interbasin Transfer Act because the Act's regulations define water that originates below the mean high tidal zone as the Massachusetts Coastal Basin. Water that crosses basin lines but stays within a municipality does not require an IBTA review.

<sup>2</sup> The Corps has signed a Memoranda of Understanding with federal agencies to ensure that it considers compliance with other federal laws that are not directly regulated by a separate permit process. The Corps considers the following laws in its final permit: the Endangered Species Act administered by the US Fish and Wildlife Service and the National Marine Fisheries Service (NOAA Fisheries), Essential Fish Habitat provisions of the Magnuson Stevens Fishery Conservation and Management Administered by NMFS, Marine Mammal Protection Act administered by NOAA Fisheries, and §106 of the National Historic Preservation Act administered by the Massachusetts Historical Commission. For example, NOAA Fisheries can request an assessment of how the project will affect a managed species as part of its consultation with the Army Corps.

<sup>3</sup> In cases where DEP determines that the water to be withdrawn will be brackish or saline, no permit will be required under the WMA. Where the Department determines that the withdrawal will be of fresh water, the permitting requirements of MGL c. 21G and 310 CMR 36.00 will apply.

<sup>4</sup> The regulations for the 401 Water Quality Certification Program has been coordinated with the WPA regulations. As a result, most projects approved by the local conservation commission under the WPA do not need further state review under the 401 Program. These projects are automatically certified when they obtain an OOC. However, some types of projects, including those with potentially large wetland impacts and those that are not subject to the WPA, require a 401 application review. The 401 Program and wetlands program procedures have been coordinated to streamline review. When appropriate, proponents are encouraged to submit both applications simultaneously and to design projects that meet the standards of both programs.

<sup>5</sup> DEP reviews proposed drinking water sources under drinking water regulations; *Guidelines and Policies for Public Water Systems* outlines the process for approval of a new surface water supply.

<sup>6</sup> The approval is to construct a well. All the requirements of 310 CMR 22.21 and the Division of Water Supply's *Guidelines and Policies for Public Water Systems* should have been satisfactorily addressed. This is the last approval in the New Source Approval process. Approval to construct a source is an indication that all the requirements of the New Source Approval process have been satisfactorily addressed.

<sup>7</sup> The Salt Water Withdrawal Policy states that a WMA permit will not be required for water withdrawals where the source water has a specific conductivity greater than 1,000 µmhos/cm. DEP determines the applicability of the Policy upon its review of water sample data from the withdrawal location.

<sup>8</sup> The Massachusetts Surface Water Quality Standards contain antidegradation provisions to maintain existing uses of surface waters. ORW have more stringent requirements than other waters including the virtual prohibition of new or increased discharges of pollutants (i.e., 401 Water Quality Certification). The most recent listing of ORW is found in the publication, *Designated Outstanding Resource Waters of Massachusetts, 1990*.

<sup>9</sup> The WPA requires that no one shall remove, fill, dredge, or alter any of the coastal or inland (freshwater) wetlands resource areas listed in the WPA without filing a NOI to do so with the local Conservation Commission. Conservation Commissions are required to issue an OOC designed to protect the specific interests of the Act. For coastal resource areas within ACECs, the performance standard is raised to "no adverse effect" on the interests of the Act, except for maintenance dredging for navigational purposes of "land under the ocean." The DEP Wetland Program Policy recommends that Conservation Commissions request a proponent to compile a minimum amount of information to assess whether plant species composition will be effected.

\* Federal permits may also be required from the United States Bureau of Reclamation and the Coast Guard. Other agencies that may have desalination requirements include the Department of Public Utilities, the Massachusetts Bay Transit Authority (MBTA), the Executive Office of Transportation and Construction, and the Massachusetts Highway Department.