

City of Brockton, Massachusetts

Resource Management Plan Scope of Work (Draft)

Task 1 – Project Scoping and Regulatory Coordination

Summary

This task includes preparation of the Resource Management Plan (RMP) scope of work, a public comment period and public meeting, compilation of public comments and response to public comments. Included in this work are meetings between the City of Brockton and MassDEP (Massachusetts Department of Environmental Protection) intended to define project requirements and objectives, identify information sources, and specify any procedural/regulatory guidelines or requirements that must be satisfied. This task addresses the requirements of Administrative Consent Order (ACO) Item 34.

Detailed Scope of Work

- Meet with MassDEP representatives to review the requirements ACO for the Resource Management Plan (RMP) and discuss specific requirements of the draft RMP scope of work.
- Prepare a draft scope of work that addresses the RMP requirements of the ACO.
- Publish the draft RMP scope of work for public review and comment. The draft RMP scope of work will be available for public review online on the City of Brockton website, and copies of the document will be available at Brockton City Hall, and the Halifax and Hanson Town Halls. Written public comments will be accepted until February 26, 2018. Details are included in the public notification.
- Publish a notification of the availability of the RMP scope of work and solicit public comment in the Environmental Monitor, Brockton Enterprise and Patriot Ledger.
- Hold a public meeting to present the draft RMP scope of work and solicit public comment. The public meeting will be on February 6, 2018. Details are included in the public notification.
- Collate public comments on the draft RMP scope of work and prepare a response to comments.
- Finalize the proposed RMP scope of work, with modifications as warranted based on review of public comments received.
- Submit the proposed RMP scope of work, public comments, and response to comments to MassDEP for review and approval.
- Meet with MassDEP to discuss the proposed RMP scope of work, public comments, and response to comments.
- Meet with MassDEP to formally kick off the project.

Task 2 – Document Target Pond Water Levels

Summary

This task addresses ACO Item 33a by documenting the City of Brockton's current and historic operating practices, and reviewing specific triggers, timing and respective water levels related to overall Monponsett Pond management, releases to Stump Brook, diversions to Silver Lake and flood control.

Possible changes to operating practices will also be examined that consider current pond uses water quality issues, and water supply needs. Input will be solicited from MassDEP, Massachusetts Division of Fisheries & Wildlife, local Boards of Health, and literature searches to develop monthly target pond elevations to accommodate existing uses.

Detailed Scope of Work

- Brockton Water Department and Veolia (water treatment plant contract operator) staff will review historical operations practices and issues, and summarize historical average monthly Monponsett Pond water levels. Historical operations will include specific requirements of the Acts, water level management, diversions to Silver Lake, releases to Stump Brook, flood control measures, water quality restrictions, water supply requirements, recreational uses and agricultural requirements.
- Solicit input from MassDEP related to overall knowledge of the area, Monponsett Pond water quality data, cranberry growers' operations, and historical documents on file.
- Solicit input from the Division of Fisheries & Wildlife, Department of Fish & Game regarding boating, fishing and bathing uses at Monponsett Pond, and required depths to support these uses.
- Solicit input from the Division of Fisheries & Wildlife, MassWildlife Natural Heritage & Endangered Species Program (NHESP) regarding habitat requirements for listed species present at Monponsett Pond.
- Solicit input from the Halifax and Hanson Boards of Health regarding requirements and actions regarding septic systems near the Monponsett Pond shoreline.
- Solicit input from the University of Massachusetts regarding cranberry agriculture management.
- Review data on flood related diversions. Data should include elevations of Monponsett Pond, Silver Lake and local groundwater table for the week leading to the diversion event. The amount of the diversion should also be documented. For groundwater data, local USGS data will be reviewed.
- Perform a literature search for reports and/or articles on Monponsett Pond, including documents prepared for/by MassDEP, the towns of Halifax and Hanson, the Monponsett Pond Watershed Association, and the Jones River Watershed Association.
- Brockton Water Department and Veolia staff will explore possible changes to operating procedures that could:

- improve flushing in West Monponsett Pond to help control algal blooms/cyanobacteria impacts,
 - reduce the potential degradation of East Monponsett Pond, minimizing control of flow from West Monponsett Pond to East Monponsett Pond, especially during algal blooms.
 - allow adequate water supply and water quality for diversion to Silver Lake,
 - provide for better flood control (including timing, benefits and/or impacts of flood control diversions to Silver Lake),
 - provide adequate water depth for bathing, boating, fishing and cranberry cultivation (agriculture),
 - support habitat for NHESP species of concern, and
 - support future fish migration in Stump Brook.
- Develop monthly target pond elevations to accommodate existing uses noted above based on anticipated inflow and withdrawal patterns, and suggested water depths.

Task 3 – Research Historical Pond Elevations

Summary

ACO Item 33b requires that the City “research historical pond elevation information using available data from United States Geological Survey (USGS) and other agencies....” In addition to the City’s historical Monponsett Pond level data, this task will include a cursory review of pond levels shown on historical mapping to compare pre-water supply and water supply pond elevations.

Detailed Scope of Work

- Review historical City of Brockton pond elevations and trends for Monponsett Pond for the last 20 years.
- Review historical USGS Hanover, MA Quadrangles that indicate Monponsett Pond elevation. One source of such mapping is <http://docs.unh.edu/nhtopos/Hanover7.5MA.htm>.
- Review historical pond elevations in 1923 Chapter 91 license (ACO requirements for the RMP). It is understood that this document refers to a reference point that most likely has been disturbed/lost. Information will be gleaned from this document, to the extent practicable.
- Solicit historical mapping of Monponsett Pond from town engineers and/or historical commissions in Halifax and Hanson. An extensive document search is not included in this task.
- A search of the Registry of Deeds is not included in this task.
- Based on available historical (pre-water supply) mapping, compare pre-water supply pond elevations to historical water supply operating elevations.

Task 4 – Collect Flow Data at the Route 58 Box Culvert

Summary

ACO Item 33c requires “collection of flow data to correlate Silver Lake diversion rates with flow rates from West Monponsett Pond to East Monponsett Pond during diversions to Silver Lake.” The intent of this requirement is to assess the potential for flow of degraded water from West Monponsett Pond to East Monponsett Pond given that the City of Brockton’s diversions are from the east pond. The City will collect data that will be used to estimate the flow patterns in the Route 58 box culvert between East and West Monponsett Ponds under varied conditions. Flow measurements would aid in understanding the hydraulic connection between the ponds. The flow measurement methodology is expected to be, by necessity, simplistic given that typical continuous flow metering would have limited accuracy due to the, culvert configuration and wind and kayak/canoe interference.

Detailed Scope of Work

- Develop a protocol for City or Veolia staff use. Flow measurement methodology is envisioned to track the rate of travel of an orange or other object through the Route 58 box culvert. A round object, like an orange, will be less influenced by wind than a flat object floating at the water surface.
- Collect field measurements of the box culvert to define an average cross-sectional area and traverse length at different pond water levels. Install a staff gage on the structure; the gage should be surveyed to a local benchmark that the local water elevation at the time of flow measurements.
- Flow measurement observations will be performed in a manner that does not conflict with the requirements of the Acts of 1964 and as amended by the Acts of 1981, such that at least 900,000 gallons per day (gpd) is released to Stump Brook during times of diversion to Silver Lake. It is understood that releases to Stump Brook may be temporarily reduced when there is no diversion to Silver Lake, with written approval of MassDEP. Allow two days for the ponds to stabilize under test conditions prior to data collection. Data will be collected for each flow condition specified below with the goal of obtaining several measurements during each season, when the condition is allowed per requirements of the Act. Data will be collected will target calm, dry weather and open water (at the culvert as minimum) conditions:
 - Full diversion rate to Silver Lake with at least 900,000 gpd release to Stump Brook (October to May)
 - 75 percent diversion rate to Silver Lake with at least 900,000 gpd release to Stump Brook (October to May)
 - 50 percent diversion rate to Silver Lake with at least 900,000 gpd release to Stump Brook (October to May)
 - No diversion to Silver Lake with at least 900,000 gpd release to Stump Brook (year-round)

- No diversion to Silver Lake with at least 600,000 gpd release to Stump Brook (June to September)
 - No diversion to Silver Lake with at least 300,000 gpd release to Stump Brook (June to September)
 - No diversion to Silver Lake and no release to Stump Brook (June to September)
 - Flood control and/or pond flushing scenarios, as negotiated in advance with MassDEP. The intent would be to simulate flood conditions and/or a late spring flush period for water quality purposes. MassDEP has indicated that it may allow impounding of water (by temporarily waiving the ACO-required 900,000 gpd release to Stump Brook) when there is no diversion to Silver Lake.
- Correlate diversion rate and Stump Brook release rate with observed flow rates at the Route 58 culvert. Tabulate and graph findings.

Task 5 – Estimate Variable Seasonal Releases to Stump Brook

Summary

ACO Item 33d requires an evaluation of high spring flushing rates to potentially reduce stagnation and algal blooms. The analysis will define the maximum water level at which the Monponsett Pond can be held without causing flooding and possible pond flushing scenarios considering the release constraints of the Stump Brook Dam, the natural sill of West Monponsett Pond and the invert of the Route 58 box culvert dividing the ponds. The outcome sought will be the change in water residence time for various scenarios and a qualitative assessment as to whether this might change water quality in West Monponsett Pond.

Detailed Scope of Work

- Define the maximum water level at which the pond can be held without causing flooding.
- Based on available drawings and data, assess release types, flow relationships and constraints for flows from the Stump Brook Dam structure.
- Based on available drawings and measurements collected in Task 4, assess flow relationships and constraints for flows through the Route 58 box culvert connecting East and West Monponsett Pond
- Field reconnaissance will be conducted to identify the natural sill elevation of West Monponsett Pond.
- Assess stage/storage relationship for volumes of water that could be released considering vertical constraints of Stump Brook Dam release points, the natural sill of West Monponsett Pond, and the invert of the culvert dividing the ponds.
- Surface and groundwater inflow rates of East and West Monponsett will be approximated using readily available information including work done in previous studies. The estimates may be annual or seasonal depending on their use in the subsequent analyses

- Construct a spreadsheet and perform a high-level desktop analysis of potential seasonal pond operation changes to induce increased spring release rates to Stump Brook for pond flushing. The analysis will consider bounding scenarios where flow from East Monponsett Pond minimally and fully mixes with the waters of West Monponsett Pond, and additional scenarios where the East Monponsett Pond flow mixes with the upper waters (defined by the controlling vertical constraint and the typical summer epilimnion depth). A seasonally appropriate steady inflow from groundwater/surface water will be assumed based on previous studies of the pond by others. Water entering West Monponsett Pond from East Monponsett Pond and the groundwater would have less phosphorus, which would hopefully reduce algal blooms.
- Based on the desktop analysis, consider the change in water residence time for various operations scenarios and make a qualitative assessment as to whether each scenario might change/improve water quality in West Monponsett Pond. Consider also the water supply impacts that may occur due to changes to Silver Lake diversion timeframe and minimum pond depth required to accommodate these scenarios.

Task 6 – Operating Procedures for Silver Lake Diversion & Stump Brook Dam

Summary

As required by ACO Items 33e and 33f, Monponsett Pond operating procedures manuals will be prepared for the Silver Lake diversion infrastructure and the Stump Brook dam. The results of Tasks 2 through 5 above will be used as the basis for developing separate operating guideline procedures manuals for Stump Brook dam and Silver Lake diversion structure.

Detailed Scope of Work

- Prepare separate operating procedures manuals for Stump Brook Dam and Silver Lake Diversion. Based on the results of Tasks 2 through 5, modify and expand existing operations protocols to include goals, timeframes, and triggers for operations decisions regarding:
 - pond water elevations,
 - water supply diversions to Silver Lake, and
 - releases to Stump Brook.

Task 7 – Draft Report Preparation and Public Comment

Summary

In accordance with ACO Item 36, this task includes preparation of the draft RMP, a meeting between the City and MassDEP to present the findings prior to public review, a public comment period with a public meeting, compilation of public comments, a response to comments, and a meeting between the City and MassDEP to discuss the comments prior to finalizing the RMP.

Detailed Scope of Work

- Prepare the draft RMP based on the results of Tasks 2 through 6.
- Prepare for and attend a meeting between the City and MassDEP to present the draft RMP prior to its release for public review.

- Publish the draft RMP for public review and comment. The draft RMP will be available for public review online on the City of Brockton website, and copies of the document will be available at Brockton City Hall, and the Halifax and Hanson Town Halls. Written public comments shall be accepted for 30 days from the publish date.
- Publish a notification of the availability of the draft RMP to solicit public comment in the Environmental Monitor, Brockton Enterprise and Patriot Ledger.
- Hold a public meeting to present the draft RMP and solicit public comment.
- Collate public comments on the draft RMP and prepare a response to comments.
- Prepare for and attend a meeting with MassDEP to discuss the public comments and response prior to finalizing the RMP.
- Finalize the RMP and submit the document to MassDEP.