City of Quincy

Commonwealth of Massachusetts
Division of Marine Fisheries
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Paul J. Diodati
Director

March 23, 2006

Mayor William J. Phelan
City of Quincy, City Hall
1305 Hancock Street
Quincy, MA 02169

Re: Town Brook Flood Control

Dear Mayor Phelan:

We would like to express appreciation for your response to concerns over the health of the rainbow smelt run in Town Brook, Quincy. Your staff did a tremendous job prior to this season's spawning run to troubleshoot potential causes of the chronic diversion of stream flow. We learned much about the flood control structures from their efforts and their cleaning of the stream channel downstream of the Centre Street junction box this February caused an immediate and substantial increase in stream flow reaching the spawning habitat. This act alone was a vital moral boost to the Town Brook Smelt Conservation Team that has worked for eight years to assist the brook with limited success.

The Town Brook Smelt Conservation Team meeting last month was perhaps the most encouraging and positive meeting to date. However, the Town Brook smelt run has suffered negative impacts following the construction of the flood control project. The degradation of the brook from reduced stream flow, sedimentation and eutrophication continues this season. There is much more work to do to restore stream flow and the smelt run in Town Brook. We again ask for your assistance to continue the progress on the two critical topics of flood control structure maintenance and retrieving the chronic diversions of base flows.

Maintenance

The Team has agreed that the removal of sediment at the upstream entrance to the deep rock tunnel and the Centre Street junction box needs to occur annually. We request that your Department of Public Works staff schedules the cleaning of these structures each summer. We have seen severe consequences to infrequent maintenance at these structures. Excessive sediment build-up associated with the Centre Street junction box will increase brook flow diversions into the tunnel. A similar affect can occur at the sedimentation basin. In addition,

maintenance at these locations can reduce the sediment accrual at the downstream spawning habitat, which has increased greatly since the tunnel became operation in 1998.

Stream Flow Diversions

The maintenance concerns will help reduce extreme low flow conditions and the severe sedimentation of spawning habitat. However, because of chronic flow diversions, maintenance alone will not bring the brook back to a healthy status. This is because stream flow is diverted constantly by two sources from the main stem brook into the deep rock tunnel. Stream flow from Crown Colony now flows directly to the tunnel via the Burgin Parkway conduit, and the weir in the Centre Street junction box is diverting flows routinely at very low levels of base flow. The retrieval of these freshwater flows could bring Town Brook flow back to the range of average base flows that occurred prior to the construction of the flood control structures.

The flood control project was permitted and originally designed to only divert storm event flows (target range was 100 cfs and 10-year event), and was not intended to divert any dry weather flows or impact smelt spawning habitat. These conditions have not been met. The restoration of the smelt run in Town Brook depends on your routine maintenance efforts and recapturing these stream flow losses. We believe this can be done by redesigning the Centre Street junction box and diverting the Burgin Parkway conduit flow from the tunnel and back to the main stem brook. We recommend that we enter into a partnership with Quincy and other interested agencies to work on these solutions.

In-Channel Sediment Sump

We have restoration funds available to do small-scale anadromous fish restoration projects in the Boston Harbor region. We propose to fund the construction of a in-channel sediment sump downstream of the Centre Street junction box to collect sediments that routinely degrade the brook and have exacerbated the diversion of flow at the junction box by creating a backwater effect. This location close to Route 93 receives large amounts of sediments and will always need annual maintenance. The in-channel sump may be an efficient approach to maintain this critical location on the brook. We would like to work closely with the City of Quincy to develop this proposal or identify another feasible restoration option.

Town Brook Flow Analysis

We are pleased to inform you that we will soon contract the U.S. Geological Service to conduct an analysis of Town Brook flows before and after the construction of the flood control structures. The nominal flow data indicate that flows have been depressed since 1997 and the chronic flow diversions would bring this expectation. Our goal is to document this occurrence and develop recommendations for correcting the flow losses. We hope to work closely with Quincy and the Town Brook Smelt Conservation Team once this information becomes available.

We thank the City of Quincy again for the outstanding effort to assist the smelt run this season. Please do not hesitate to contact Brad Chase at our Gloucester office (978-282-0308 ext. 111) for further details or meeting arrangements.

Sincerely,

Paul Diodati
Director

cc:

Colonel Thomas Koning, USACE
Corrine Young, Office of Congressman William Delahunt
Eric Hutchins, NMFS
Brian Carlisle and David Murphy, City of Quincy
Lealdon Langley, DEP
Paul DiPietro, DCR
Cunningham, Chase, and Malkoski, DMF
PJ Foley, Quincy

Attachment: Town Brook Smelt Conservation Team meeting summary, 2/16/06

Town Brook Smelt Conservation Team

Summary of March 7, 2007 Meeting, Quincy.

Prepared by: Bradford Chase, Mass. Division of Marine Fisheries

The summary highlights important topics discussed at the March 7th meeting of the Town Brook Smelt Conservation Team meeting. The team was established by a MADEP permit condition in 1998 to coordinate the protection of the rainbow smelt run in Town Brook and to evaluate habitat impacts related to the Town Brook flood control project. The meeting was hosted by the City of Quincy. This document does not represent minutes of the meeting or a list of consensus agreements.

The meeting agenda was brief and attendance was light, in part due to recent progress made by the City of Quincy that had diminished the urgency of several topics. In 2006, the Quincy Department of Public Works (DPW), lead by Superintendent, Brian Carlisle, spent an unprecedented amount of time and effort on maintenance of the flood control structures. Their diligent effort has resulted in some direct improvements to Town Brook flows and sediment management and has shed some light on topics that have been poorly understood since the flood control tunnel became operational in 1998.

Status of 2006 Spawning Season. DMF staff made weekly or biweekly visits to the Town Brook smelt spawning habitat in 2006 and found smelt eggs for much of the expected spawning period. The egg densities and spatial coverage observed were low and indicated a below-average spawning run.

Status of 2006 Town Brook Flows. Complete discharge records are not yet available from the US Geological Service for 2006. Town Brook flows during spring were improved over the poor conditions found in 2005. The 2005 discharge records have been finalized, and as expected, were the lowest flows experienced during the spawning run since records began in 1973. The mean daily discharge for the months of March (1.5 cfs) and April (3.3 cfs) were both the lowest on record. This occurred despite augmentation of Town Brook flows from the Quincy Reservoir. Maintenance efforts in 2005 and 2006 by Quincy DPW were directly responsible for reducing the flow losses at the Centre Street junction box.

Smelt Habitat Improvement. This winter, Quincy DPW in consultation with DMF and the Quincy Conservation Commission, removed a berm of sediment from the prime smelt spawning riffles adjacent to Miller Stiles Road. This build-up of sediment had increased dramatically since the deep-rock tunnel was built. The DPW also removed several CY of sediment from the pool immediately downstream of Miller Stiles Road. During post-meeting site visits, we inspected the habitat improvement. With the sediment removed and flows at 5.5 cfs, the spawning riffles are in the best physical shape that I have seen in several years. This comment is encouraging but should come with the qualifier that the spawning substrate has been in very poor condition at the start of recent spawning seasons and water depths are still less than a half foot over much of the riffle, another indication that higher base flows are needed.

Maintenance Status.

1. Tunnel In-flow Sediment Basin. The sediment basin along the diversion weir at the deep rock tunnel opening was cleaned in December 2006, removing 50-60 CY of sediment. The cleaning was not easy because of poor access and full removal of all sediment in the basin was not possible. Quincy DPW has committed to do this annually and removal of 50-60 CY the last two Decembers demonstrates the annual need.

2. Brook Channel Clearing. The Quincy DPW crew spent much time during this winter to isolate locations along Town Brook where debris and sediment build-up could cause water to back-up and be diverted at the Centre Street junction box. Presently, the DPW crew believes they have the constricted locations under control and will focus on brook clearing as an annual maintenance step for the flood control structures. The Team also discussed a proposal from Lowe's to construct a store along the brook downstream of Centre Street. This proposal could present an opportunity to increase vegetative buffer along the brook and reduce sedimentation. The Team agreed to keep this opportunity in mind as permitting progressed.

3. Centre Street Junction Box. The DPW crew continued to clear the channel downstream of the Centre Street junction box following the Team's site visit in February 2006. Sediment and *Phragmites* removal in the channel last year reduced the backwater effect at the junction box and immediately reduced flows losses at the junction box weir. The DPW crew has made an interesting observation on brook flow diversions in the junction box. Last year, brook flow was being diverted over the weir to the deep-rock tunnel at low flow levels (6 cfs at USGS gauge). After additional cleaning efforts in 2006, no dry weather diversions are now observed at the junction box. This result is a direct benefit from the diligent maintenance and troubleshooting of the DPW crew. This observation diminishes the focus on the junction box as a location responsible for chronic stream flow diversion and highlights the need for annual maintenance and to recapture flow losses from Crown Colony. The Team agreed the junction box is still diverting flows well below the project design and the weir dimensions should be evaluated for potential re-sizing to maintain healthy flows in Town Brook.

4. Quincy Reservoir (Braintree). Quincy DPW has been in contact with the City of Braintree over operations of the Old Quincy Reservoir in Braintree. If flows drop below 2 cfs, flow augmentation will be requested between the DPWs. The Team did discuss the potential for augmenting flows before the 2 cfs threshold is reached. It is becoming clear that 2 cfs represents very low flows in Town Brook. Flows that are optimal for smelt spawning and egg survival are probably much higher than this, possibly in the range of 8-12 cfs. The team agreed to explore the potential to begin augmenting flows during the peak of smelt spawning when it could be beneficial to add a few cfs to protect a large egg set. If there are no storage issues at the reservoir, the Team should explore proactive use of flow augmentation and the possibility of raising the low flow threshold to 4-6 cfs during the period when spawning peaks (March 15th – May 15th).

Crown Colony Flow Diversion. With no present flow diversion (March 7th - 5.5 cfs) at the Centre Street junction box, the Team realized that gains in dry weather flows in Town Brook will depend on recapturing the chronic flow losses from the Crown Colony development. These flows are piped via the Burgin Parkway conduit and do not interact

with the Centre Street junction box. These dry weather flows are in the range of 1-2 cfs and appear to have good water quality. The Team discussed a construction project that could interact with the brook near the Crown Colony diversion and Centre Street junction box. The construction of the Rt. 3 ramp will likely expose parts of Town Brook. Unfortunately, the opportunity to correct flow diversions during project construction did not surface during project planning and permitting. The project is fully permitted and construction bids will be opened this June. The Team agreed to seek out project plans and investigate opportunities to work on recapturing this important loss of flow.

Town Brook Flow Spikes. Some resolution has been found to the long-perplexing issue of flow spikes in the discharge records of Town Brook. In 2005, DMF placed a water chemistry logger in Town Brook to document flow spikes and evaluate the water chemistry. The flow spikes were found to clearly originate from the MBTA pump station in downtown Quincy and water quality was relatively good from this groundwater source. The water quality during spikes was similar to Town Brook flows with only turbidity changing significantly (increasing during spikes). These data were presented to the MADEP and US EPA review of MBTA's NPDES permit renewal in 2006. The regulators agreed to require MBTA to install float switches that would double the pumping frequency, resulting in about 14 moderate flow spikes per day instead of the potentially disruptive 7 flow spikes (averaged over 200% of brook flow) that had been occurring. This topic is a success for the Team as concern over the flow spikes originated with the Team. The higher frequency and lower volume of flow spikes should reduce the potential for smelt eggs to be exposed to air and act to supplement Town Brook flows with relatively clean water.

Town Brook Flow Analysis. DMF consulted with USGS during the summer of 2006 to explore contracting USGS to evaluate flow dynamics in Town Brook before and after the construction of Town Brook flood control structures. USGS provided DMF with a cost estimate for the analysis, but unfortunately, the costs exceeded DMF's budget and the analysis was not contracted. The Team maintains an interest in this analysis, for the purpose of documenting flow losses that have occurred since the flood control structures were build and to identify potential remediation strategies.

Team Communications. Letters were sent in 2006 from DMF to the City of Quincy and MADEP asking for assistance in resolving long-standing concerns over chronic flow losses in Town Brook due to the operation and maintenance of the flood control structures. The response received from Quincy on maintenance issues has been exceptional and is producing clear benefits. No response was received from MADEP. For 2007, it was agreed to have Team members stay in contact this spawning season in order to coordinate efforts to improve flows and responses if low flow conditions occur.

Attendees:

Brian Carlisle, David Tamulis, George Clark, City of Quincy
Brad Chase, Mass. DMF
PJ Foley, Quincy