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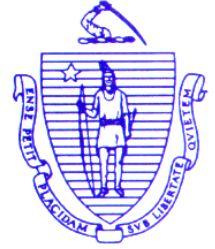
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Stream Channel Maintenance Protocols for Diadromous Fish Passage - 2016

Introduction

The Massachusetts Division of Marine Fisheries (*Marine Fisheries*) is authorized to maintain passageways for diadromous fish in the Commonwealth of Massachusetts, and routinely provides related guidance to property owners and municipalities. This activity includes the construction of fishways, removal of obstructions, and maintenance of stream channels to allow safe and efficient fish passage. The relevant authorities include M.G.L Chapter 130 §19 on maintaining sea-run fish passage, the Wetlands Protection Act (WPA, M.G.L Chapter 131 §40), and Massachusetts regulations (principally CMR 310 10.35). With regards to stream channel maintenance, the recommended actions are mainly limited to hand cutting vegetation and debris removal that will offer enough relief from channel obstructions to allow fish passage with no alteration or impedance of wetland functions or WPA performance standards.

Historically, stream maintenance work was conducted by municipal herring wardens. With the adoption of state sea-run fish statutes in the 1930s and 1940s, herring wardens continued stream maintenance within the process and authority of M.G.L Chapter 130 §94 with technical support from *Marine Fisheries*. The WPA enactment in 1972 provided municipal Conservation Commissions with authority to regulate activities within 100 feet of wetlands and streams. However, the integration of Conservation Commission review to stream channel maintenance activities for sea-run fish passage occurred slowly and intermittently. This interaction was influenced by the preexisting process under M.G.L Chapter 130 §94 and the longstanding tradition of stewardship by herring wardens. In recent years, local maintenance of river herring runs by herring wardens has included Conservation Commission approval through Administrative Review or a Determination of Applicability. In the recent era of a statewide harvest ban on river herring (since 2006), both local incentives and municipal funding for herring wardens have diminished. This has contributed to a loss of continuity and familiarity in stream maintenance practices, and to the obstruction of passageways in some coastal rivers from overgrowth and debris jams.

Stream Channel Maintenance Plan

Objective. This guidance document was prepared to clarify the goals of *Marine Fisheries* for stream channel maintenance as a necessary natural resource management practice and assist municipalities in fulfilling our mutual interest of providing safe and efficient passage for sea-run fish.

Season. Two periods should be targeted for annual inspection of stream channels for passage impediments to migratory fish: fall (October to mid-December) to identify significant obstructions and conduct maintenance; and winter (February to mid-March) to continue maintenance and clear obstructions before the spring diadromous fish runs. This approach allows for a second round of work if dense growth or large fallen trees are found during the first visit. During the river herring, American eel and white perch migratory period of March 15 to June 15, in-stream activities should be minimized to emergency actions necessary for fish passage. The summer can be a third option for maintenance activities given the

availability of seasonal labor, although summer heat and high plant growth can make the work difficult (see *Brook Trout Habitat* for seasonal exceptions).

Inspection Frequency. Stream locations that are known to be problematic for debris accumulation should be inspected at a higher frequency. In such cases, weekly or biweekly inspections may be needed during the spring migratory period.

Methods. In-channel maintenance should be limited to the removal of trash, debris that can directly impinge and block fish, and mid-channel rooted vegetation that threatens to reduce water flow, snag debris, or impede fish passage. Hand tools, saws, and clippers are suitable for most conditions. The cutting of riparian vegetation and stream canopy should be limited. The riparian buffer provides value for a wide range of aquatic life, while the canopy provides wildlife habitat, shades the stream for lower water temperature and algal growth, and reduces access for predators of river herring.

Live Vegetation Removal. Enthusiasm can often lead to more live vegetation removal than necessary. Care should be taken to remove only live vegetation that can limit fish passage or has that potential with higher growth and debris accumulation. Root masses in the stream channel can be considered for removal if their continued growth could threaten fish passage or encourage channel braiding. Stream bank growth has high ecological value and should be minimally disturbed, except in rare cases such as the uprooted trunks of large caliper trees that can destabilize and erode banks leading to diversions from main stem flow.

Dead Vegetation Removal. As described above, vegetation debris that can impede fish, impinge fish, or encourage additional accumulation can be removed. Logs or stumps within stream banks can provide valuable habitat for aquatic resources and should be altered only as necessary to provide fish passage. The growing practice of installing woody debris in rivers has become a valuable tool for enhancing river habitat restoration. Strategic bank and near-bank placement of woody debris instead of removal should be part of all individual stream maintenance plans.

Sediment Management. Road crossings should be inspected at each winter visit for sediment accumulation and bank erosion. If sand accumulation threatens passage by reducing water depth or degrades spawning riffles (see *Rainbow Smelt Habitat*), the excess sand can be removed by hand with shovels. Observations of sedimentation and erosion should be noted to assist future management efforts. Remediation plans should be developed for chronic sources of sedimentation and coordinated with the municipal Department of Public Works or the Massachusetts Department of Transportation as needed. The management of barrier beach outlets at diadromous fish runs will be addressed separately through case-by-case operation and management plans.

Channel Improvements. Relocation of large rocks and cobble occurring naturally in the stream is allowed during stream maintenance. The purpose should be to reduce passage impediments, and to create in-stream weirs when necessary to improve water depth and assist fish access to the entrance of fish passageways. Rock weirs should create changes of no more than 6 inches in water surface elevation from above to below the weir crest.

Documentation. An annual log of stream inspection and maintenance activities should be recorded. The log should include dates of inspections, brief notation of activities, and observations of the presence of diadromous fish, noteworthy flora and fauna, invasive plants, or other observations of issues that may need future attention.

Safety Practices. Stream maintenance work should be conducted by coordinated teams and not by individuals working alone. For deeper stream channels, waders with wader belts should be worn.

Private Property Access. Nearly all coastal rivers that support river herring runs are the property of the Commonwealth of Massachusetts. Municipal and State officials charged with marine resource management and enforcement responsibilities can access private property to reach the waterways and tidelands of the Commonwealth. Coordination is recommended with private property owners to reach consensus on stream access, especially if volunteers are used. If access is contested, *Marine Fisheries* is

available to consult with private property owners to describe their responsibility to provide passage for sea-run fish and the benefits of working cooperatively with municipal officials to achieve this goal.

Brook Trout Habitat. Consideration should be made for coastal streams that provide spawning and nursery habitat for native brook trout. Brook trout target groundwater seeps close to tidal influence for spawning during November and December. The eggs hatch in January and February. Juvenile trout need heterogeneity in channel morphology for protection from predation and to provide habitat for their primary prey, aquatic insects. Therefore, the development of stream channel maintenance plans for diadromous fish passage should include inquiries to the Massachusetts Division of Fish and Wildlife (*MassWildlife*) to confirm the status of brook trout in targeted streams (*MassWildlife* contact: Steve Hurley, 508-759-3406, steve.hurley@state.ma.us).

If native brook trout spawning habitat is present, the location of spawning habitat should be documented in the plan with specific language to adjust stream channel maintenance practices to avoid impacts to spawning and nursery habitats. Specifically, no work should be conducted at brook trout spawning and nursery habitat from November 1 through February 29, except for reconnaissance to identify later stream maintenance and emergency action to remove debris jams that fully block the stream channel.

Locations with brook trout spawning and nursery habitat have a truncated period in which work can be conducted in the stream channel and the removal of live and dead vegetation is reduced relative to that specified above (*Live Vegetation Removal* and *Dead Vegetation Removal*).

Season. In-stream work should be conducted from March 1 to March 15, and from June 16 to October 31.

Vegetation Removal. Channel maintenance should be limited to the removal of trash and debris jams that directly impede diadromous fish passage. Vegetation removal should be minimal and woody debris should be left alone, except for cases where passage is fully blocked and the debris jams are negatively impacting passage and stream continuity for all aquatic life. This approach will require a higher inspection frequency: at least weekly during the diadromous fish migration period.

Rainbow Smelt Habitat. Rainbow smelt deposit adhesive, demersal eggs in stream riffles upstream of tidal influence. Spawning occurs in the spring between March 1 and May 30. The eggs incubate for 2–3 weeks before hatching. Foot traffic during stream maintenance can directly impact deposited smelt eggs in stream riffles. Therefore, for in-stream locations identified as rainbow smelt spawning habitat (refer to *Marine Fisheries* Technical Report No. 30), the time period designated for emergency action only (see *Season*) begins on March 1 instead of March 15. While the time-of-year guidance for rainbow smelt appears to be in contradiction with the brook trout guidance for early March, there are presently no known locations where both species spawn. As plans are developed, coordination with *Marine Fisheries* and *MassWildlife* will be essential to integrate new information in watersheds where both species occur.

Stream Channel Maintenance Plan Development. *Marine Fisheries* recommends that Stream Channel Maintenance Plans are developed for each municipality with diadromous fish runs and, in some cases, for each individual coastal river. These protocols can be used to customize plans for each location. *Marine Fisheries* will work with municipalities to develop plans and assist in the Conservation Commission review process for plan approval.

Marine Fisheries Coordination. *Marine Fisheries* fully supports the practice of annual stream maintenance to sustain diadromous fish passage during their obligatory stream migrations. Our Fishway Crew is available to assist local efforts on all matters related to diadromous fish resources and passage. If assistance is needed, please contact Project Leader, Brad Chase at 508-990-2860 x118, brad.chase@state.ma.us.