

## Appendix D: Topics for Future Consideration

Since the Lamprey River was initially designated as a protected river in 1990 by the NHRMPP, several topics have been added that NHDES requires to be addressed in river management plans per [RSA 483:10](#). Some of these topics affect most or all rivers, while others are not necessarily pertinent to all New Hampshire rivers.

### Aquatic Connectivity:

*Goal: Take advantage of culvert and bridge repairs to advocate for improved aquatic passage in our reviews of proposed projects.*

Aquatic connectivity refers to the ability of fish to migrate freely up and down streams. Natural waterways usually lack rigid barriers and connectivity is high. When people develop the landscape, barriers become more common. Dams are obvious obstacles, but culverts can also become barriers, especially when they become “perched”, meaning that the water exiting the downstream end of the pipe causes erosion and the pipe becomes suspended over the water, preventing fish from swimming upstream.

The greatest single obstacle to aquatic connectivity in the Lamprey River watershed is the breached dam at Wadleigh Falls in Lee. NH Fish and Game personnel have meticulously documented that alewives cannot pass the falls here. Despite multiple attempts to work with the landowner to soften the slope of the falls to enable fish passage, correction of the problem is unlikely in the near future.

The NH Fish and Game Department funded research in 2017 that assessed 169 stream crossings in the Lamprey River watershed. [Lamprey Watershed Stream Crossing Assessment Summary Southeastern New Hampshire May 19, 2017](#). The overall goal of the project was to assess and prioritize crossings in the Lamprey River, including all coldwater stream tributaries with wild brook-trout populations.

The report and [Maps of Hydraulic Rating Results by Town](#) were shared with all towns in the watershed. Unfortunately, the results were largely ignored by municipal public works departments. We found that most towns had already identified at-risk crossings and had set their own agendas for prioritizing and addressing them. NHDES has recently worked with partner agencies to create the [New Hampshire Stream Crossing Initiative mapper](#) to help communities identify geomorphic compatibility and aquatic organism passage issues and opportunities. We hope that municipalities will find this new tool helpful. Correcting ineffective stream crossings is a big expense for communities. Public infrastructure often takes precedence over aquatic passage for fish, but if the two can be combined into one project, we might make progress.

## Dams, Bridges, and Other Water Structures

*Goal: Take advantage of project review to help protect natural flows, prevent habitat loss, protect habitat functions, and retain important historical features when dams, bridges, or other water structures are repaired, replaced, or removed.*

The Lamprey River historically had over 100 mills and associated dams. Most of these mills have vanished, as well as active dams. No active dams in the Lamprey River watershed are used for hydroelectric power. Several are used to provide impoundments for recreation and water supply: Wiswall Dam in Durham, Macallen Dam in Newmarket, Mendum's Pond Dam in Barrington, Drown's Dam on Pawtuckaway Lake, Drown's Dike on Pawtuckaway Lake, Gove Dike on Pawtuckaway Lake, Dolloff Dam on Pawtuckaway Lake, and Meadow Lake Dam in Northwood.

The LRAC funded research in 2012 to assess [dams on the lower Lamprey River](#), [Data sheets](#). The report included condition and assessment of removal potential with associated benefits to aquatic passage.

We are aware of one bridge that has the potential to cause problems upstream and possibly downstream. As part of the study that considered options for the Macallen Dam in Newmarket (2013), engineers determined that the dam is not the cause of constriction in the lower Lamprey River; the cause is the Route 108 bridge that crosses the river just upstream of the dam. To date, we are unaware of any studies that indicate that the bridge is in need of repair or replacement.

## Fluvial Geomorphology

*Goal: Incorporate fluvial geomorphology when considering NHDES permit applications to protect natural river conditions and prevent problems with water quality, habitat, wildlife, and recreation whenever possible.*

Fluvial geomorphology is the science of describing the processes that affect the formation and evolution of a river. The shape (morphology) of a stream's channel is influenced by interrelated variables including slope, width, depth, velocity, discharge, boundary roughness, sediment size and sediment load. A change in any variable, whether naturally occurring or altered by humans, leads to adjustments in other variables and stream morphology as a whole. Data derived from fluvial geomorphology studies help to reveal vulnerabilities in and along the river, such as potential of riverbank collapse, deposition of new sand bars, likelihood of river channel relocation during flood conditions, etc..

The New Hampshire Geologic Survey did an assessment of 63 miles of the Lamprey River watershed rivers in 2011. The research identified the following vulnerable areas to watch and address if and when funding allows:

- Mainstem Lamprey River:
  - Epping– Camp Lee Road: This location was documented in the field as having active channel migration and was directly downstream of a debris accumulation (debris jam) at the time the data were collected in 2010-2011. The Lamprey River has taken multiple flow paths over time in this area. Though a very small possibility, it is possible for any of the former flood chutes to be captured by the Lamprey River as a result of a high flow event.
  - Lee – Parallel to Tuttle Road: This location was documented in the field as experiencing active channel migration (meandering within a floodplain). An examination of LiDAR shows the multiple flow paths that the Lamprey River has taken through this area over time. The possibility, though small, exists that one of these flood chutes could be recaptured by the river during a high flow event.
  - Raymond – Eroding bluff adjacent to Riverview Manor Apartment complex at the right meander bend north of the McCusker Road: There is a high bluff directly adjacent to the Lamprey River on the outside of the left (facing downstream) meander bend adjacent to Routes 27/107 north of Raymond center. Atop the bluff is the Riverview Manor apartment complex. The bank, with its highly erodible sand face, is completely exposed to the forces of river water, which has been experiencing erosion. Erosion and sloughing of the material at the site might continue, and monitoring the situation is warranted.
- Little River:
  - Lee – Adjacent to Tuttle Road: Erosion was documented on the outside bend of the Little River directly adjacent to where Tuttle Road runs close to the outside meander bend. Given the road's position on the outside of the meander bend, monitoring might be appropriate.
  - Nottingham – Kennard Road Stream Crossing: This culvert, based on stream crossing assessments, has been scored as having poor aquatic organism passage and is mostly incompatible with geomorphic processes. This might be a candidate for a stream crossing replacement.
- North Branch River:
  - Candia- West of the Raymond town line and north of Route 27: The site has multiple features, based on the data, suggestive that the river might be susceptible to geomorphic activity. There were multiple locations of noted migration during the time of data collection. Multiple headcuts are present, suggesting that erosion of the channel bed in the upstream direction was occurring at the time of data collection. Erosion of material can be transported downstream and redeposited, potentially altering flow dynamics. Given the multiple points of migration noted, and the presence of infrastructure and development in relatively close proximity to the channel, this reach is identified as one to potentially consider for long-term observation.
- Piscassic River:
  - Newmarket- South of the Grant Road stream crossing on the outside of one of the meander bends: Erosion suggests the site might be considered for monitoring.

## Protection of Meander Belts

*Goal: Use project review to advocate against or minimize fluvial and habitat harm from altering floodplains and meander belts.*

In close concert with fluvial geomorphology, meander belts show where rivers have historically flowed and where future changes are most likely. The Lamprey River is rich in floodplains. The tributaries have not been assessed to the degree that the main stem Lamprey River has. Several NHDES permit applications have come before the committee seeking to fill or alter floodplains. The new on-line LRAC mapper includes FEMA 100-year and 500-year flood zones, so we can scrutinize plans even when applicants do not include floodplains. Protection of these floodplains is a high priority for habitat protection, flood water storage, and preventing the loss of infrastructure and human lives. We have always argued against permitting activities in and near floodplains and will continue to do so.

## Dredging, Filling, Mining, and Earth Moving

*Goal: Using project review, make recommendations that minimize harm to water quality, wildlife, habitats, and historical resources from dredging, filling, and mining activities in and around the Lamprey River and its designated tributaries.*

The Lamprey River includes 2 miles of tidal water and this area is the most likely location for dredging activities. The Town of Newmarket experienced a sewer main break under the Lamprey River in early 2024. The break was repaired, but subsequent assessment of the pipe showed that additional breaks can be expected. The town applied for federal financial assistance, but whether that assistance will be forthcoming any time soon is unknown. Given the industrial history of Newmarket harbor, it is reasonable to assume that the sediments might be heavily contaminated. We are unaware of any plans by Eversource to install underwater cables, as happened in the Oyster River a few years ago.

Most filling activities in the Lamprey River watershed have been limited to projects in wetlands and shoreland that surround the river. We are unaware of any plans to build new dams or expand existing dams. Expanding or building new dams in the National Wild and Scenic River section of the Lamprey River is forbidden by law. Dams upstream and downstream of this section might be subject to National Park Service review in addition to normal state and federal agency reviews.

To date, mining activities in the watershed have been limited to sand and gravel operations and there does not seem to be a plan to increase these activities. The mining of other materials seems unlikely at this time.

## State-owned Lands Within the Corridor and Tributary Drainage Areas

*Goal: When the State of New Hampshire seeks a permit to manage its properties or desires to relinquish control of its properties, the LRAC will consider values inherent in those parcels as part of project review or commenting on proposed disposition of those properties.*

The Lamprey River Advisory Committee is unique in New Hampshire in that its jurisdiction covers not only the Lamprey River but five tributaries that are also designated under the NHRMPP. This gives the committee the ability to comment on many projects that are otherwise outside the jurisdictional area of other LACs. In practical terms, LACs cannot ask or tell the state how to manage its land, but when the state needs a permit from NHDES for these parcels, the project review process enables LACs to have input which NHDES must, by law, take into consideration.

When the state seeks to sell or otherwise relinquish control of state-owned lands in designated river corridors, LACs are asked to provide input. Since each site is unique and the reason for relinquishing control is unique, recommendations for each site must be customized.

NHDES hosts the [RMAC/LMAC State Lands Mapper](#) and provides a score for each parcel based on 10 aspects such as water access, habitat and size. This map is useful when considering permits or proposed disposition.