

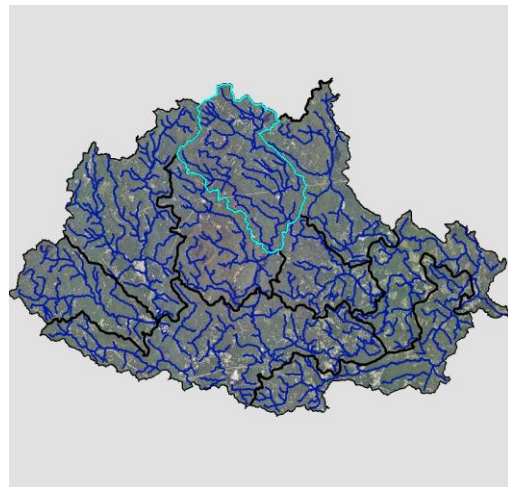
APPENDIX A. Fish Survey Summary by Subwatershed

common name	scientific name	abbr
alewife	<i>Alosa pseudoharengus</i>	AW
American eel	<i>Anguilla rostrata</i>	AE
banded sunfish	<i>Enneacanthus obesus</i>	BDS
black crappie	<i>Pomoxis nigromaculatus</i>	BC
blacknose dace	<i>Rhinichthys atratulus</i>	BND
bluegill	<i>Lepomis macrochirus</i>	BG
bridle shiner	<i>Notropis bifrenatus</i>	BS
brook trout	<i>Salvelinus fontinalis</i>	EBT
brown bullhead	<i>Ameiurus nebulosus</i>	BBH
chain pickerel	<i>Esox niger</i>	ECP
common shiner	<i>Luxilus cornutus</i>	CS
common white sucker	<i>Catostomus commersoni</i>	CWS
creek chubsucker	<i>Erimyzon oblongus</i>	CCS
fallfish	<i>Semotilus corporalis</i>	FF
golden shiner	<i>Notemigonus crysoleucas</i>	GS
largemouth bass	<i>Micropterus salmoides</i>	LMB
longnose dace	<i>Rhinichthys cataractae</i>	LND
marginated madtom	<i>Noturus insignis</i>	MMT
pumpkinseed	<i>Lepomis gibbosus</i>	CSF
redbreast sunfish	<i>Lepomis auritus</i>	RBS
redfin pickerel	<i>Esox americanus americanus</i>	RFP
smallmouth bass	<i>Micropterus dolomieu</i>	SMB
swamp darter	<i>Etheostoma fusiforme</i>	SD
yellow bullhead	<i>Ameiurus natalis</i>	YBH
yellow perch	<i>Perca flavescens</i>	YP

Bean River

Sixteen fish surveys were conducted in the Bean River subwatershed. Aquatic habitat was largely intact, with well forested riparian zones. Stream habitat ranged from flashy boulder and cobble substrates dominated by fallfish to warm wetland streams and beaver impoundments containing golden shiners, largemouth bass, and chain pickerel.

The Bean River subwatershed has the second lowest impervious surface coverage in the Lamprey River watershed,



estimated at 9.29% of land surface area. Only the Pawtuckaway Pond subwatershed, a large part of which is protected by Pawtuckaway State Park, has less impervious surface. Although the subwatershed remains relatively unfragmented compared to faster growing parts of the region, impervious surface coverage has nearly doubled since 1990, when it was estimated at 5.15%.

Efforts to protect land in the Bean River subwatershed will benefit healthy fish communities and downstream water quality. Much of the central part of the subwatershed has been protected by the Mulligan Forest conservation easement. Connecting this property with Pawtuckaway State Park to the south would help prevent future impacts to aquatic habitat in local streams while expanding one of the largest unfragmented forest areas in southeastern New Hampshire.

The Bean River subwatershed has an estimated 48 stream crossings. While many of these crossings are undersized, perched, or contributing to erosion or sediment deposition, the cumulative impact of these crossings is less noticeable than in subwatersheds with higher road densities. Stream crossings should be replaced opportunistically in this subwatershed, but large inventories and restoration efforts focused on reducing the impacts of stream crossings in the Lamprey River watershed should be focused elsewhere.

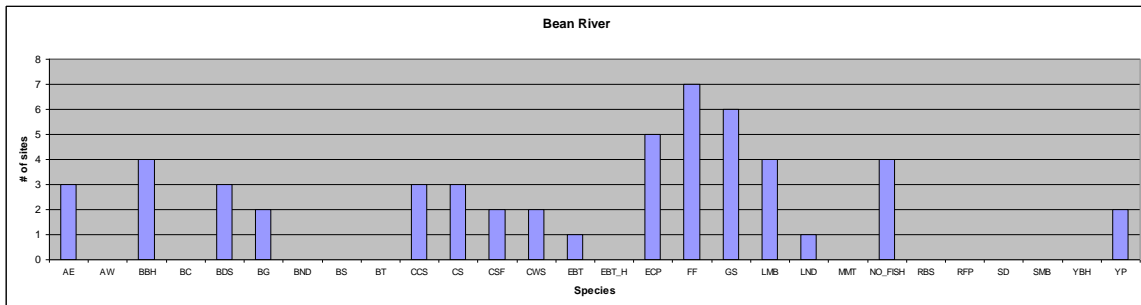


Figure A.1 - Number of species recorded at 16 sites surveyed in the Bean River subwatershed.

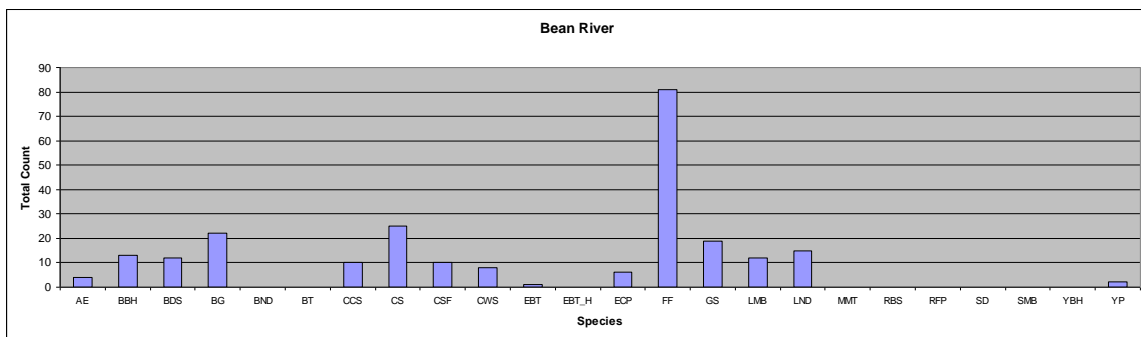


Figure A.2 - Total counts of each species captured at 16 sites in the Bean River subwatershed.



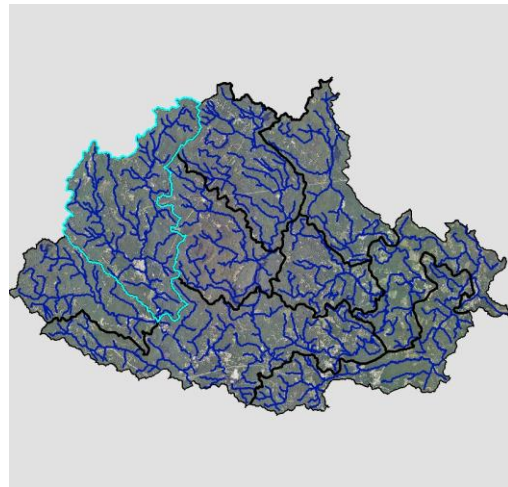
Figure A.3 - Rocky section of the Bean River with intact riparian zone.

Lamprey River Headwaters

Sixteen surveys were conducted in the Lamprey River Headwaters subwatershed.

The small headwater tributaries in the subwatershed were dominated by fallfish and common white sucker. Fish diversity increased with stream size moving south along the upper mainstem of the Lamprey River, where common shiners and longnose dace became more prevalent.

Three of the four sites containing blacknose dace, a species common throughout most of New Hampshire, but relatively rare in the Lamprey River watershed, were recorded in the Lamprey River Headwaters. The longnose dace population reached its upstream limit in this subwatershed. Reductions in the distribution of longnose dace, which depend on rocky riffle habitat with year round flow, in the upper mainstem of the Lamprey River might have been an early indicator of impacts to in-stream flow. American eels were recorded at 2 sites in the Lamprey River Headwaters subwatershed. Their numbers and distributions were expected to increase with the construction of fish passage at the Wiswall Dam and the removal of the Bunker Pond Dam.



The Lamprey River Headwaters remain relatively forested. The estimated impervious surface coverage in 2010 was 9.5% compared to 4.8% in 1990. Riparian zones remain largely intact, despite the significant increase in impervious surfaces over the last 20 years. Very little land in the Lamprey River Headwaters subwatershed has been protected outside of a patchwork of conservation easements that surround Northwood Meadows State Park. Land protection efforts in the headwaters of Hartford Brook and Nicholls Brook would benefit local fish populations and downstream water quality.

The Lamprey River Headwaters subwatershed has an estimated 81 stream crossings. The cumulative effects of these stream crossings, many of which were washed out multiple times during floods over the past 6 years, might have contributed to the excessive sediment deposition that has contributed to declines in freshwater mussels downstream (Nedeau 2011). A stream crossing inventory that documents and prioritizes stream crossings in need of restoration would be beneficial in this subwatershed.

Freese’s Pond Dam is the next upstream barrier to river herring migration. If fish passage at Wadleigh Falls is created, Freese’s Pond Dam might become a candidate for construction of river herring passage (or dam removal) in the future. The dam would also be a suitable site for an elver trap to monitor eel passage. This would make an excellent project for middle school or high school students.

Wild brook trout were found at two sites in the Lamprey River Headwaters subwatershed. The source of groundwater appears to be a valley fill aquifer formed from glacial outwash deposited in low lying areas of southern Deerfield, Raymond, and eastern Candia. Other cold water streams in the area that were missed by this survey effort might exist. Brook trout habitat was marginal at both sites and the streams should be resurveyed before any restoration work is considered. Driveway and road crossings were causing impacts, especially in the small unnamed stream that borders Grout Farm Road in northwestern Raymond. Reducing fragmentation in this stream by replacing undersized crossings would benefit the resident brook trout population if it were determined to be sustainable. Flow was extremely low in the stream on July 15, when it was surveyed in 2010. Seven trout were captured in pools that were only a few inches deep.

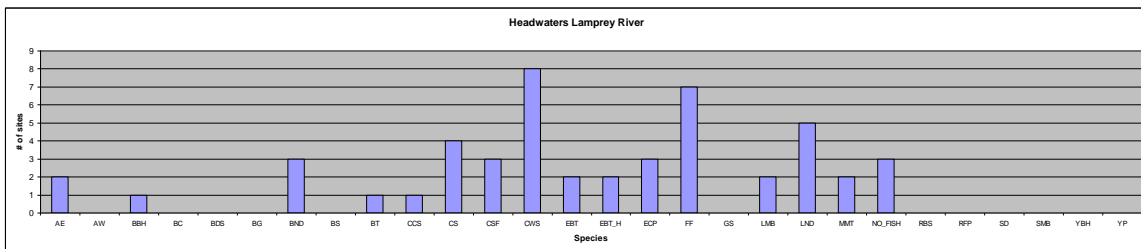


Figure A.4 - Number of species recorded at 16 sites surveyed in the Lamprey River Headwaters subwatershed.

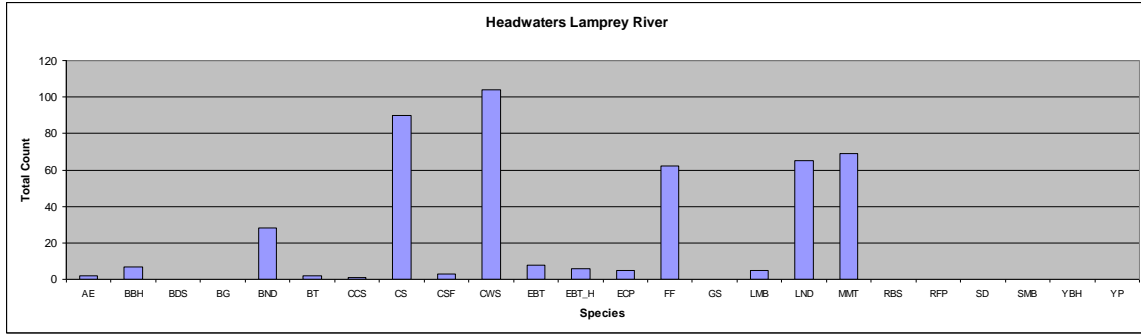


Figure A.5 - Total counts of each species captured at 16 sites in the Lamprey River Headwaters subwatershed.



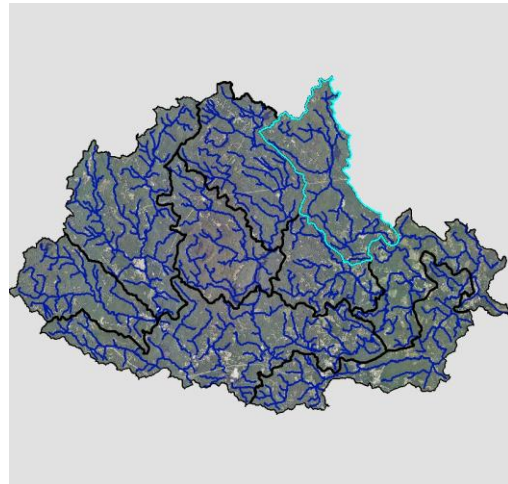
Figure A.6 - One of three driveway culverts impacting fish passage on a coldwater stream in the Lamprey River Headwaters subwatershed.



Figure A.7 - Wild brook trout captured in unnamed stream that borders Grout Farm Road in northwest Raymond.

Little River

Eleven surveys were conducted in the Little River watershed. Fallfish, common white sucker, and golden shiners were the most commonly encountered species. The high occurrence of golden shiners was due to the presence of wetland or beaver impounded streams upstream or downstream of the sample site.



Habitat in the Little River is generally a meandering stream channel surrounded by broad floodplains with sand, gravel, and cobble substrate. Two significant dams are found in the watershed, one at Nottingham Lake and another at Mendum's Pond. These dams are barriers to upstream fish migration. Both dams might be good candidates for eel passage. While eels have been documented in Mendum's Pond, these dams probably reduce the eel population in the headwaters of the Little River. These dams might also be contributing to warmer temperatures in the Little River.

A small cold water stream was discovered behind the Lee Motor Speedway. Twenty-one wild brook trout were captured in a stream that was on the USGS topographic map for the area. This illustrates the importance of protecting even the smallest streams in areas known to have productive aquifers. Streams within a mile buffer of Route 125 should be given special attention during the permitting process for commercial or residential development. Fifteen meter protected riparian buffers and LID stormwater management techniques should be required within the watersheds of all cold water streams. Groundwater extraction should be limited to avoid affecting summer base flows in cold water stream habitat.

Although most of the riparian zone along the mainstem of the Little River remains intact, impervious surfaces have nearly doubled between 1990 (6.6%) and 2010 (12.2%). The subwatershed has the second lowest estimated number of stream crossings, at 33. Despite the increase in impervious surfaces, much of the headwaters of the Little River remain undeveloped. Protection of the large unfragmented forest area which drains into Mendum’s Pond should be a high conservation priority.

One of only two swamp darter records occurred in the Little River at a site downstream of Mendum’s Pond near the Route 4 Bridge. More information is needed on the distribution and status of swamp darters in southern New Hampshire. The Little River might be the focus of future survey work.

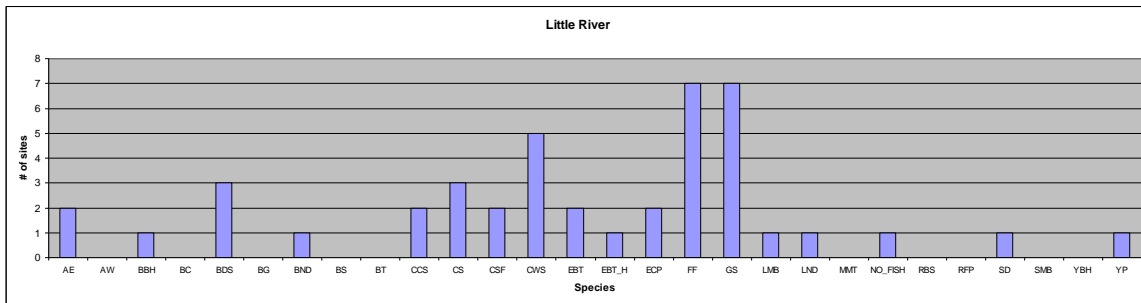


Figure A.8 - Number of species recorded at 11 sites surveyed in the Little River subwatershed.

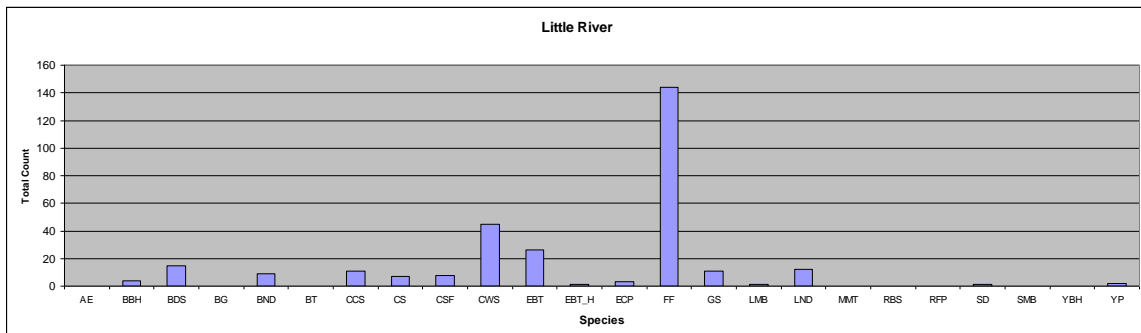


Figure A.9 - Total counts of each species captured at 11 sites in the Little River subwatershed.

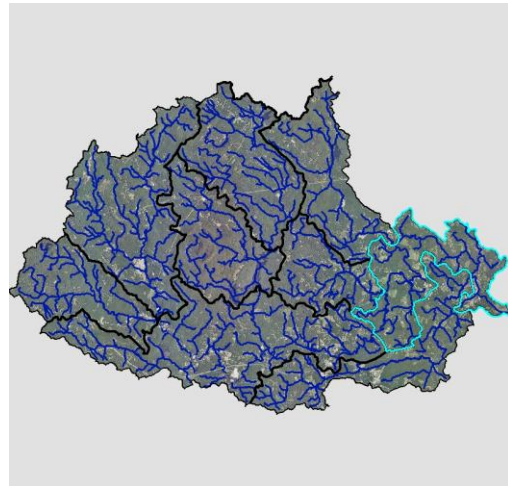


Figure A.10 - A typical reach of the Little River, with its wide channel, broad floodplains, and sandy substrate mixed with gravel and cobble.

Lower Lamprey River

Eleven surveys were conducted in the Lower Lamprey River subwatershed. The smaller tributaries were dominated by fallfish and common white sucker, while the mainstem river exhibited the emergence of redbreast sunfish and smallmouth bass as common species. Much of the river was deep and sandy with broad floodplains, but shallow riffle sections contained abundant populations of longnose dace, common shiner, fallfish, and margined madtom.

American eel were present throughout the mainstem, but the greatest number (53) occurred below the Wiswall Dam. American eel numbers dropped significantly (5) at the next site upstream, below the Lee Hook Road bridge. This site could be an index site for detecting changes in eel numbers after the construction of a fishway at the Wiswall Dam in 2011.



Redfin pickerel and banded sunfish were documented in the tributaries of the Lower Lamprey River subwatershed, but attempts to confirm a previous record of bridge shiners above Wadleigh Falls were unsuccessful. Two explanations were possible. One, this section might have supported stands of aquatic vegetation in

the past, but the stands were gone at the time of study. Two, bridle shiners might have been incorrectly identified in previous research. Records of bridle shiners below Packers Falls have so far been unconfirmed (Harrington 1946).

Impervious surfaces increased from 11.1% in 1990 to 17.8% in 2010, mostly due to population growth in the town of Newmarket. The Lower Lamprey River subwatershed had 39 stream crossings, many of which were undersized and were impacting local stream habitat. Water quality in the mainstem river has been influenced as much by subwatersheds upstream as by local development along the river banks.

Seventy brook trout were counted at Wednesday Hill Brook, a productive, cold water stream that flows into the Lamprey River in the town of Lee. The trout, many of which were young-of-year fish, were a sign of a sustainable population. Students and faculty from UNH have been monitoring temperature and flow in Wednesday Hill Brook to improve understanding of the dynamics of cold water streams. Another stream in the town of Newmarket had temperatures and habitat suitable for brook trout, yet redbfin pickerel were the only fish species captured. Future surveys might be warranted.

The Lower Lamprey subwatershed is a high priority for diadromous fish restoration. River herring, sea lamprey, and a small number of American shad are counted by NHFG staff at the fish ladder on the McCallen Dam, at the head of tide in Newmarket, each spring. Until 2012, diadromous fish migration was blocked by the Wiswall Dam. Construction of a fish ladder at the dam allowed for the successful passage of river herring in the spring of 2012. Construction was timely, for many fish were observed passing through the new fishway in a record return year of over 90,000 river herring counted at the McCallen Dam. Large numbers of river herring were observed schooling below the ruins of Wadleigh Falls Dam, which might be the next upstream barrier to migration. A rock ramp or nature-like fishway constructed at this site would open up many miles of river habitat in the middle Lamprey River, North Branch River, Lamprey River headwaters, North River, and Little River subwatersheds.

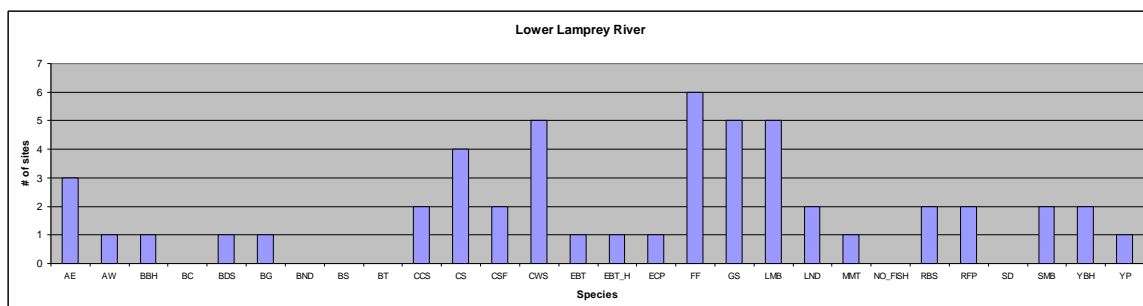


Figure A.11 - Number of species recorded at 11 sites surveyed in the Lower Lamprey River subwatershed.

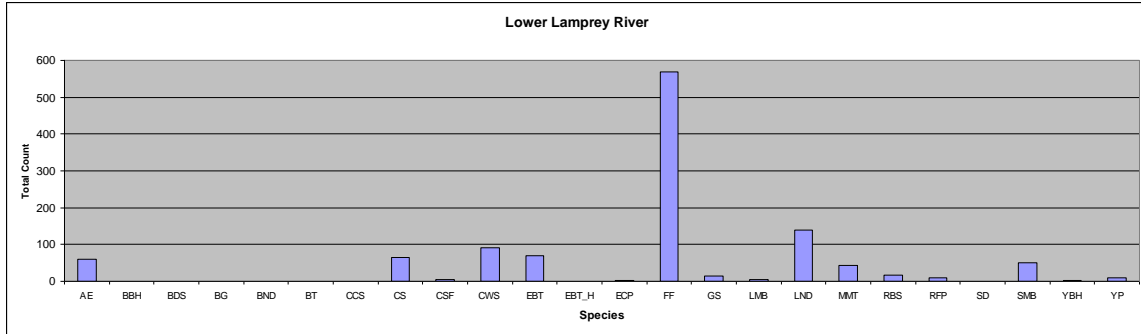


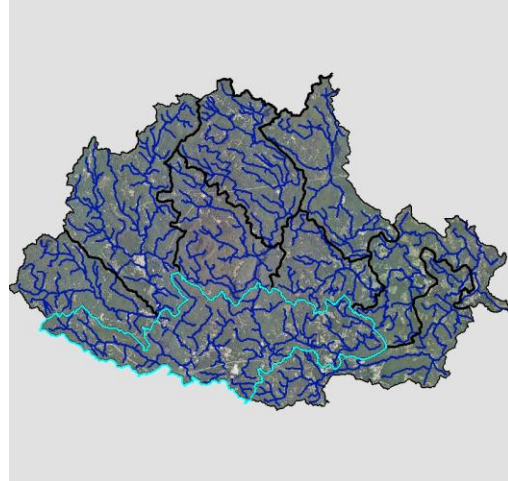
Figure A.12 - Total counts of each species captured at 11 sites in the Lower Lamprey River subwatershed.



Figure A.13 - Two alewives (top) and two blueback herring (bottom). River herring numbers are expected to increase with improvements to fish passage in the lower Lamprey River.

Middle Lamprey River

Fourteen surveys were conducted in the Middle Lamprey River subwatershed. This was the most diverse watershed in terms of fish species, with 24 species recorded.



The river becomes wide and deep as it passes through the town of Raymond, with limited sites for electrofishing. Habitat consists of riffles and pools with gravel, boulder, and sand substrate, alternating with deep, slow flowing reaches with silt bottom and stands of aquatic vegetation in shallow areas. The small tributaries flowing into the mainstem of the Lamprey River are noticeably more impacted in this subwatershed. An estimated 143 stream crossings are found in the Middle Lamprey subwatershed, which is the largest number of crossings out of the nine subwatersheds in the Lamprey River drainage area. This would be an excellent subwatershed to begin a stream crossing assessment that documents the existing conditions of all crossings and identifies stream crossing replacements that would have the most benefit to aquatic organism passage and habitat quality. The Middle Lamprey River subwatershed also has the greatest coverage of impervious surfaces, at 21.7% in 2010 compared to 12.2% in 1990. Some studies show that impacts to aquatic habitat and water quality can occur at impervious surface covers of less than 4% (Cuffney et al. 2010; Stranko et al. 2008). Expanding development in the Middle Lamprey subwatershed has left its mark on smaller streams in the form of washed out roads, bank and stream bed erosion, and sediment deposition in slower moving reaches. Mussel abundance and diversity has been severely depleted in this subwatershed (Nedeau 2011).

The Middle Lamprey River subwatershed contains the only remaining populations of the state threatened bridle shiner in the Lamprey River watershed. The populations occur at five distinct reaches of the mainstem where slow moving water allows for the growth of aquatic vegetation, such as floating heart, which bridle shiners need for spawning and cover. The rate of dispersal, if any, between populations is unknown. Despite the presence of suitable habitat, bridle shiners were not found downstream of the Main Street Bridge in Raymond. Housing density increases significantly at this point along the river stormwater runoff might be impacting the water quality. This would be a good location for a water quality monitoring station. A map of stormwater outfalls should be developed for the town of Raymond with recommendations for improvements to stormwater management that would benefit water quality in the Lamprey River.

Two potential spring-fed streams were identified in the Middle Lamprey River subwatershed. Rum Brook, where more than 28 wild brook trout were counted, appears to be a relatively healthy cold water stream and should be protected.

Three juvenile brook trout were also found at an unnamed stream just south of Rum Brook. Although habitat was marginal at this site, it appears better upstream and future surveys are warranted. Streams within a one mile buffer on either side of Route 125 have the potential to contain brook trout populations due to the productive aquifer that runs roughly north/south along this corridor. Careful attention should be given to even the smallest streams during the permitting process for new developments within this corridor. A minimum of 15 m buffers should be protected along all streams and LID technology should be used to ensure adequate groundwater recharge to maintain stream flow during dry periods.

Banded sunfish, redbfin pickerel, and American eel were “species of concern” recorded in the Middle Lamprey subwatershed. Even juvenile river herring, offspring of adults stocked by the NHFG Marine division in Pawtuckaway Lake each spring, are known to migrate through part of this subwatershed as they migrate out to sea. Fifteen American eels were counted below the Bunker Pond Dam, which was subsequently removed, making the Lamprey River free flowing throughout this subwatershed. A population of bridle shiners previously inhabited the impoundment upstream of the dam. This population will be monitored to assess the ability of bridle shiners to survive under new habitat conditions as the river channel changes in response to the dam removal.

The Middle Lamprey subwatershed should be the primary focus of restoration efforts in the Lamprey River watershed. It shows the most recent signs of impacts from development, yet its fish communities remain largely intact.

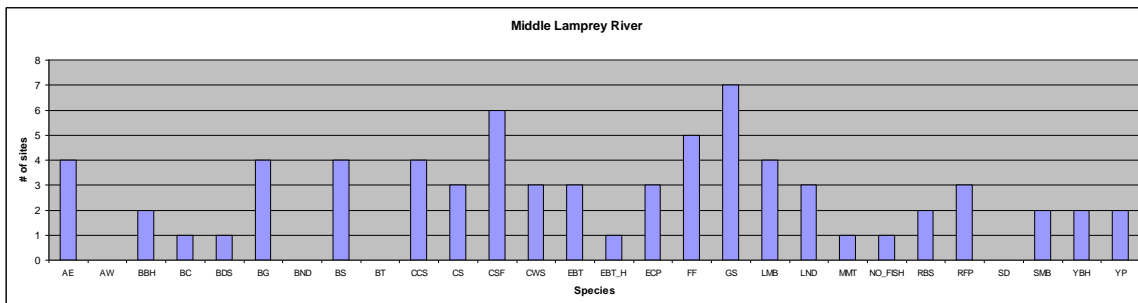


Figure A.14 - Number of species recorded at 14 sites surveyed in the Middle Lamprey River subwatershed.

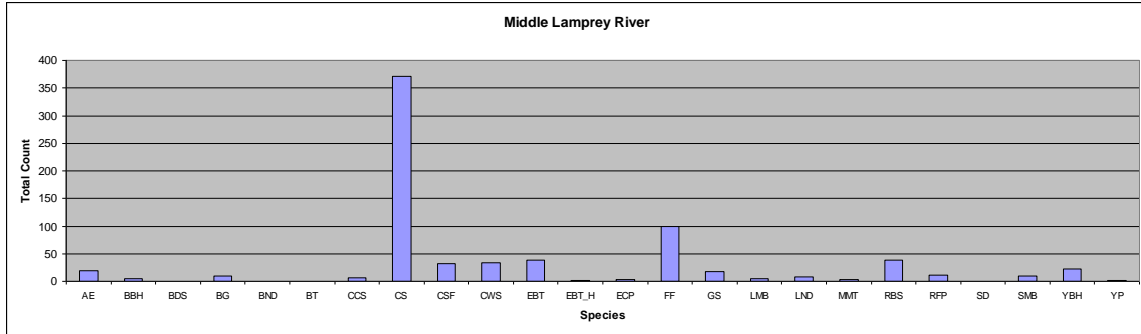


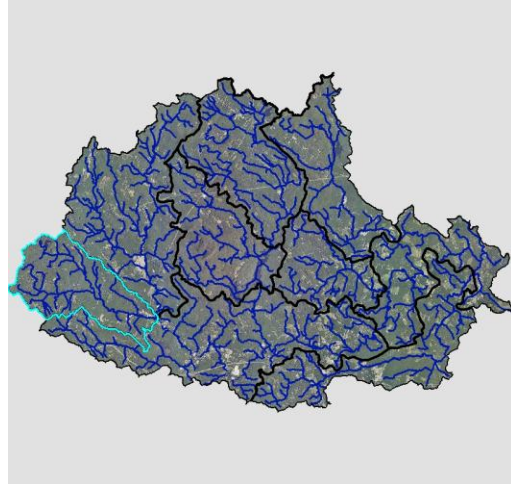
Figure A.15 - Total counts of each species captured at 14 sites in the Middle Lamprey River subwatershed.



Figure A.16 - West Epping Dam before its removal in August of 2011. A population of state threatened bridle shiners was identified upstream.

North Branch River

Fifteen surveys were conducted in the North Branch River subwatershed. These surveys were conducted in 2007 during an earlier pilot study to develop survey protocols for the Eastern Brook Trout Joint Venture.



The headwaters of the North Branch River provide some of the best examples of old mill structures at the transition between low gradient wetland streams or beaver ponds and steeper rocky streams below the ruins of an old dam or road (Fig. A.19). This pattern is reflected in the fish survey data, with a number of species, such as brown bullhead, common sunfish, and chain pickerel that were captured in higher gradient, rocky stream sections below old mill dams. These species are usually associated with wetland streams or pond habitat.

Fish diversity and abundance increased significantly moving downstream into the mainstem of the North Branch River, where over 13 species were captured at one site. Here the channel becomes wider, with gravel and cobble riffles interspersed with beaver impounded, slower flowing reaches. Species such as longnose dace, common shiner, and margined madtom inhabit faster flowing reaches, while largemouth bass and common sunfish inhabit the slower moving water. The farthest upstream record of smallmouth bass in this survey was found in the North Branch River.

Seventeen temperature sensors were deployed throughout the North Branch River subwatershed in 2007. The average water temperature in July and August was above the threshold (19°C) for supporting wild brook trout at all sites except for one cold water stream known locally as Aunt Mary Brook. The stream, which flows north into the North Branch River near its confluence with the Lamprey River in east Candia, likely receives groundwater from the valley fill aquifers deposited in this region (Moore 1990). The lower section of Aunt Mary Brook was filled with sediment and had run dry due to the impacts of a driveway culvert and the excavation of the streambed near a residence (Fig. A.20). Thirty wild brook trout were captured above the culvert. Replacing the culvert with a properly sized crossing and restoring the stream channel downstream would greatly increase the amount of habitat available to brook trout as well as restore the connection between Aunt Mary Brook and the North Branch River.

The large wetlands and connecting streams of the North Branch River subwatershed are relatively unfragmented and offer important habitat for many species of concern, including Blanding's and spotted turtles. Banded sunfish were found at one survey site and are likely more common in the thickly

vegetated beaver impoundments, which are difficult to sample with electrofishing gear. The North Branch River has relatively few dams and American eel were found at three sites. Their distribution is expected to increase with improvements to fish passage in the lower Lamprey River.

Very little of the North Branch River subwatershed has been protected, despite the quality of its habitat. Impervious surface coverage has increased considerably from 6.3% in 1990 to 11.6% in 2010. Although a number of examples of undersized stream crossings are impacting stream habitat, the overall number of crossings, estimated at 35, is relatively low compared to other subwatersheds in the Lamprey River drainage. In addition to slowing the spread of impervious surfaces, land conservation along the North Branch River would increase the size of the large area protected by Bear Brook State Park to the west. Efforts to protect riparian buffers along headwater streams were initiated in the towns of Candia and Deerfield through a partnership between the Southern New Hampshire Planning Commission and the Piscataqua Region Estuaries Partnership (SNHPC 2006). These efforts should continue and be used as a model for other town planners in the Lamprey River watershed.

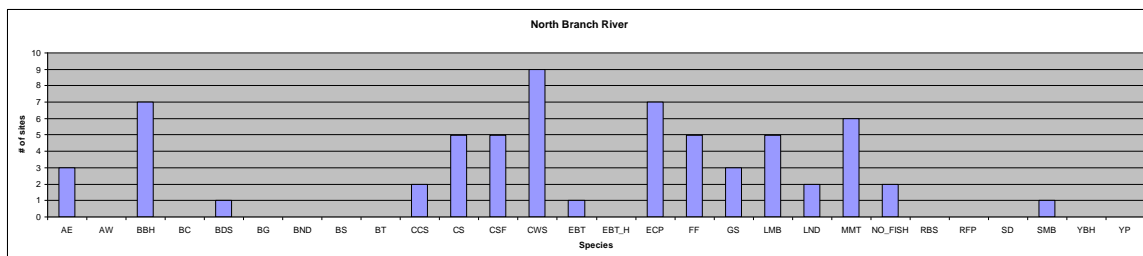


Figure A.17 - Number of species recorded at 15 sites surveyed in the North Branch River subwatershed.

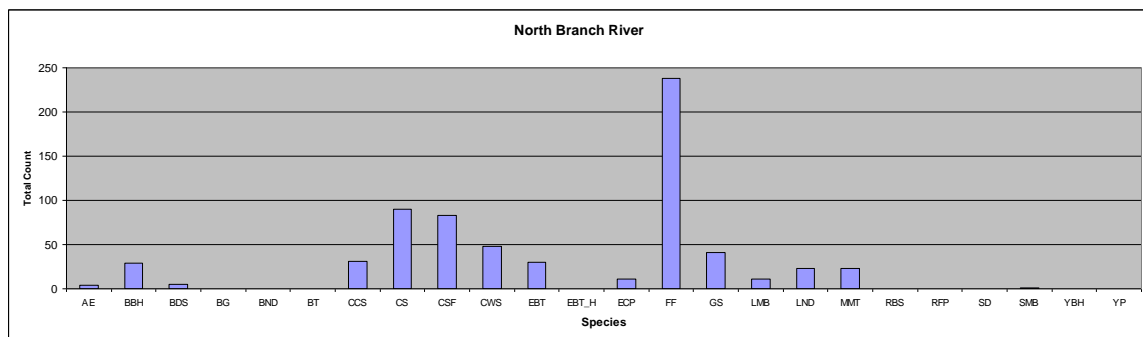


Figure A.18 - Total counts of each species captured at 15 sites in the North Branch River subwatershed.



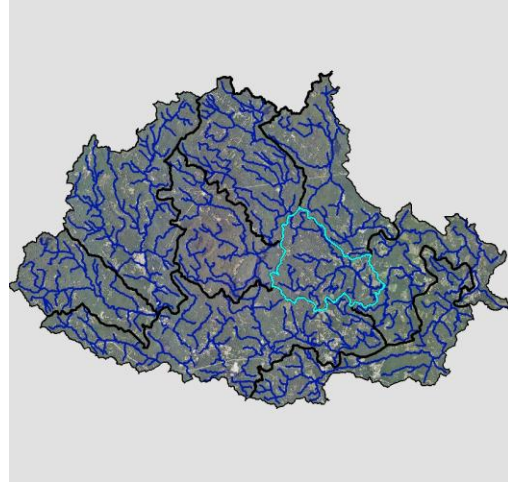
Figure A.19 - Rocky stream channel downstream from the ruins of an old mill.



Figure A.20 - This driveway culvert marks the downstream limit of brook trout in Aunt Mary Brook.

North River

Nine surveys were conducted in the North River subwatershed. With 19 different fish species recorded, it was among the most diverse subwatersheds in the Lamprey River drainage area.



The mainstem of the North River contains a wide variety of habitats, from low gradient reaches dominated by submerged and emergent vegetation to rocky riffle reaches occasionally used by whitewater paddlers.

Aquatic habitat in the North River subwatershed remains largely intact, although very little of it is protected.

Wild brook trout were found in one small tributary of the North River downstream of Birch Hill Road in Lee. Most of the trout were found in a small pool below a perched culvert, but two juvenile brook trout were found upstream of Birch Hill Road (Fig. A.24). Additional surveys should be conducted to determine the viability of this brook trout population. If suitable habitat exists for a significant length of the stream, then the perched stream crossing might be a candidate for replacement.

Four of the nine survey sites contained banded sunfish and three sites contained redbfin pickerel. The diversity of fish habitat in the North River subwatershed provides excellent refuge for native cool-to-warm water fish communities. Efforts to increase the protection of riparian zones and reduce the spread of impervious surfaces should be a priority in this subwatershed. Unfortunately, estimates of impervious surfaces have nearly doubled from 5.4% in 1990 to 11.3% in 2010.

The North River is relatively unfragmented, with only 37 road stream crossings and no mainstem dams. Eel numbers are likely to increase with fish passage construction at the Wiswall Dam. The North River also contains suitable spawning habitat for river herring, although upstream passage might currently be limited by the ruins of the Wadleigh Falls Dam in Lee (Kevin Sullivan, NHFG fisheries biologist, personal communication).

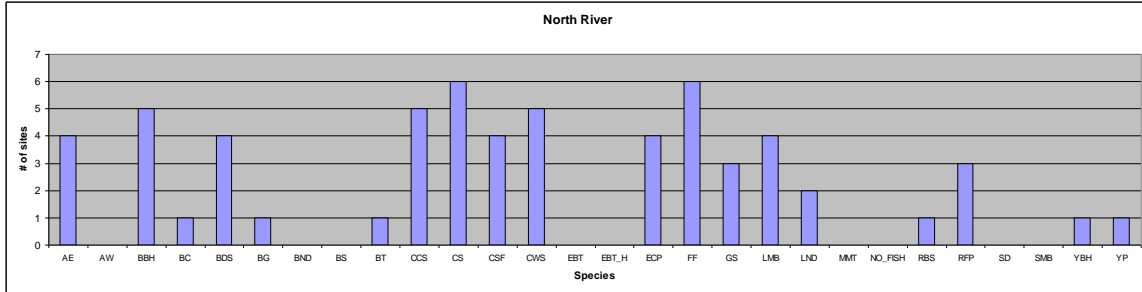


Figure A.21 - Number of species recorded at 9 sites surveyed in the North River subwatershed.

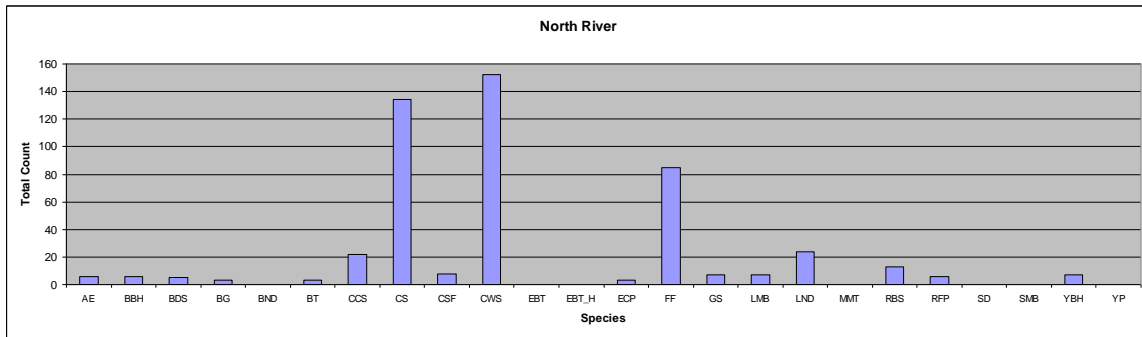


Figure A.22 Total counts of each species captured at 9 sites in the North River subwatershed.



Figure A.23 Twelve fish species were recorded in this rocky section of the North River downstream of Mcrillis Road in Nottingham.



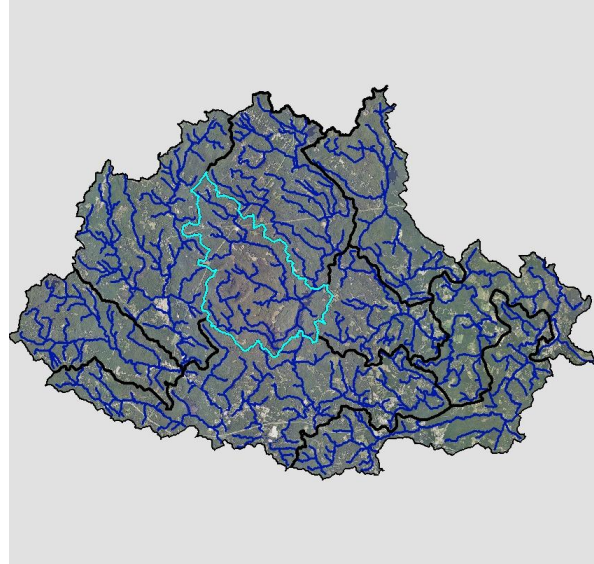
Figure A.24 - Perched culvert above scour pool where brook trout were captured in an unnamed tributary of the lower North River.



Figure A.25 - Brook trout captured below a perched culvert in the North River subwatershed.

Pawtuckaway Pond

There were six fish surveys conducted in the Pawtuckaway Pond subwatershed. Habitat consisted of ponds and large wetland complexes separated by small rocky streams. Fish communities consisted of warm water species with chain pickerel as the most commonly encountered species. Interestingly, this was the only subwatershed where fallfish were not encountered, although this might have been due to the lower survey effort.



Most of the Pawtuckaway Pond subwatershed is protected by Pawtuckaway State Park. It is the only subwatershed in the Lamprey River drainage that did not see a significant increase in impervious surface coverage between 1990 (2.7%) and 2010 (5.2%). The Pawtuckaway Pond subwatershed also contains the lowest estimated number of stream crossings (31). Conservation work in this subwatershed should focus on protecting the patchwork of conservation lands around the Lamontagne Wildlife Management Area to the north and the Back Creek watershed, which would link Pawtuckaway State Park with the Mulligan Forest conservation easement (Fig. A.28). This would expand one of the largest blocks of unfragmented forest in southeastern New Hampshire, benefitting water quality, aquatic species, and terrestrial species that require large territories (such as bobcats and black bears). This is also a critical subwatershed for maintaining summer flows in the lower Lamprey River, which might be supplemented with water from Pawtuckaway Pond during drought conditions (NHDES 2011).

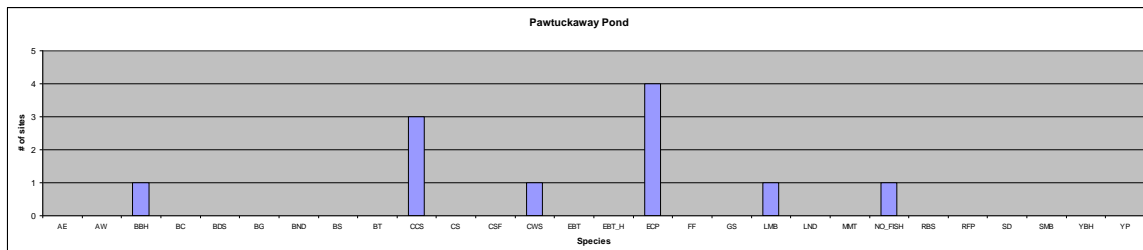


Figure A.26 - Number of species recorded at 6 sites surveyed in the Pawtuckaway Pond subwatershed.

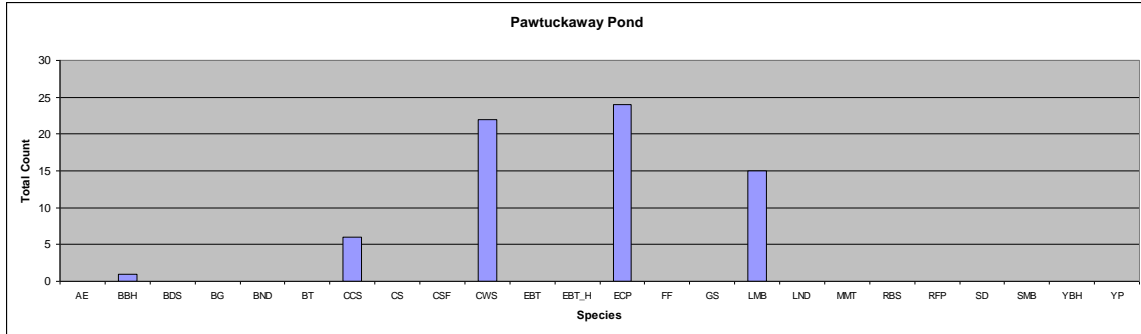


Figure A.27 - Total counts of each species captured at 6 sites in the Pawtuckaway Pond subwatershed.

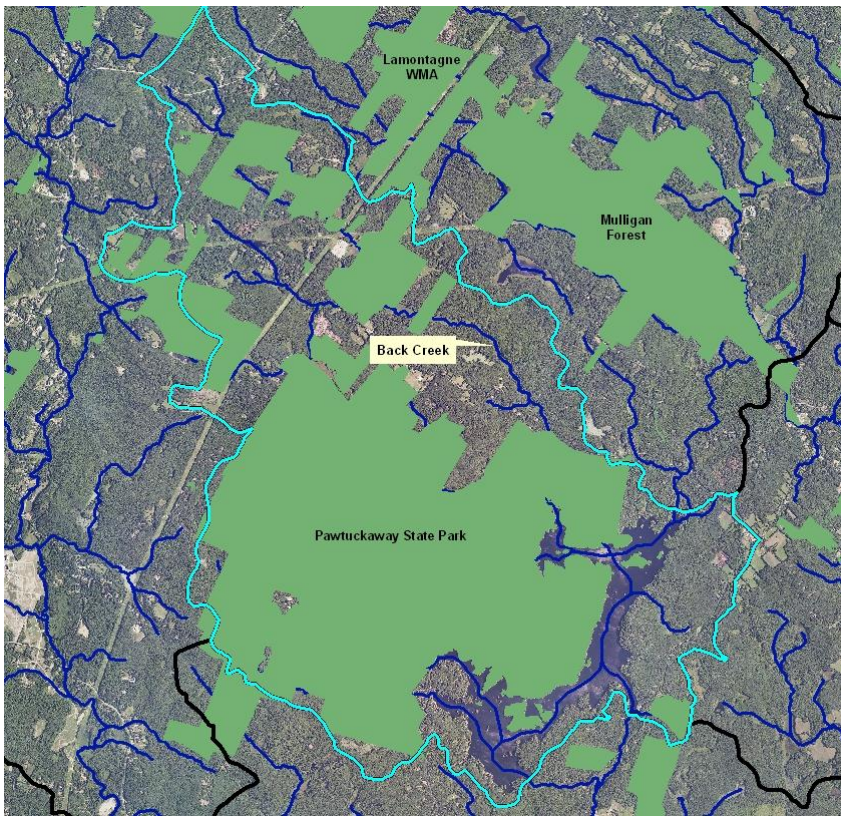
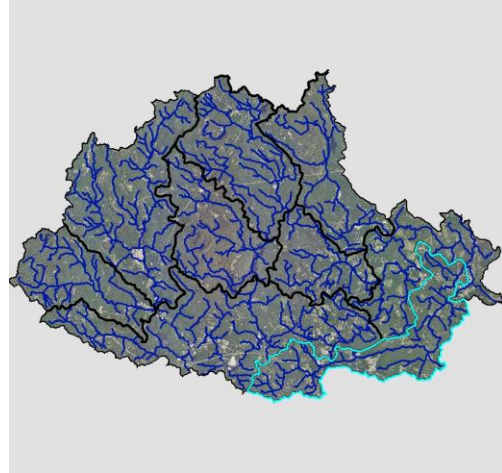


Figure A.28 - Protected land (green) in the Pawtuckaway Pond subwatershed.

Piscassic River

Seven sites were surveyed on the small tributaries of the Piscassic River, which consisted of beaver influenced wetland streams or small meandering gravel streams through woodlands. Redfin pickerel were found at four of the seven sites and banded sunfish were found at three sites. Abundant populations of these species in the mainstem of the Piscassic River are likely.



The Piscassic River is a low gradient, deep, meandering river that is not suitable for backpack electrofishing surveys. Much of the mainstem of the Piscassic River remains relatively unimpacted and large sections of adjacent land have been protected. Thick stands of submerged aquatic vegetation might make the river a stronghold for certain “species of concern”, including redfin pickerel, banded sunfish, and possibly bridle shiners. The Piscassic River subwatershed might warrant additional surveys with a different method, such as seine or fyke netting.

While the river itself is largely intact, the tributaries show signs of impacts from expanding development. Perched culverts, bank erosion, and stormwater runoff impacts were observed at multiple sites. Impervious surfaces increased from 9.6% in 1990 to 19.7% of the subwatershed area in 2010. Although undersized stream crossings were the most common impact in the Piscassic River subwatershed, at least one site demonstrated the severe damage that certain agricultural practices can cause to stream habitat (Fig. A.31). Improving stormwater management, stream crossing design, and riparian zone protection on the tributaries of the Piscassic River will help protect water quality and aquatic habitat in the mainstem.

There are two dams on the Piscassic River, one near the mouth and one at the crossing of Route 87. Fish passage construction or dam removals at these sites would open up a considerable amount of quality spawning habitat for river herring. Eel passage at the lower dam, near the confluence with the Lamprey River in Newmarket, would likely increase the number of eels in the Piscassic River subwatershed. Eels were observed at only two of seven sites, with a total of three individuals counted. One would expect much greater numbers in a watershed that joins the Lamprey River so close to the head of tide.

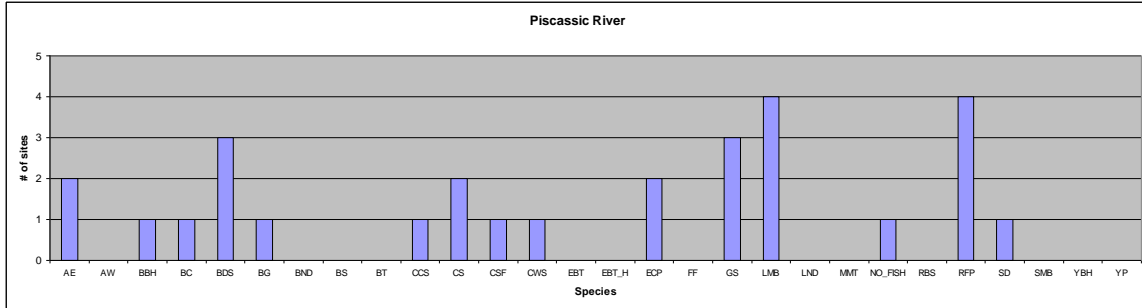


Figure A.29 - Number of species recorded at 7 sites surveyed in the Piscassic River subwatershed.

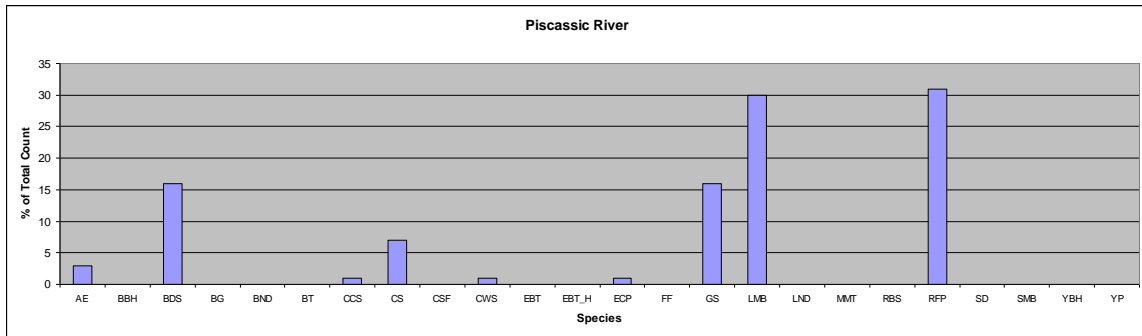


Figure A.30 - Total counts of each species captured at 7 sites in the Piscassic River subwatershed.



Figure A.31 - Livestock grazing in riparian zones can lead to severe stream bank erosion.