Five-Year Report

Massachusetts
Department of
Fish and Game
In-Lieu Fee Program

December 2020

Table of Contents

Executive Summary

The purpose of this report is to present information on the development and performance of the Massachusetts In-Lieu Fee Program (ILFP) during its first 5 years of operation. This report covers the period from establishment of the program in May 2014 through December 31, 2019 and includes data on wetlands and stream credits sold, mitigation projects underway, and program revenues and expenditures. This report also discusses progress in achieving the program goals described in the ILFP Instrument (executed May 23, 2014) as well as challenges and opportunities, and lessons learned during the first five years of implementation.

The U.S. Army Corps of Engineers, New England District (Corps), approved the Massachusetts Department of Fish and Game (DFG) as the Program Sponsor for a state-wide ILFP in May 2014. The MA ILFP sells wetlands and stream credits to permittees that are required to purchase compensatory mitigation credits as a condition of their Corps permits. Upon sale of a mitigation credit, DFG assumes responsibility for the required mitigation. MA DFG established an Expendable Mitigation Trust account dedicated to ILFP funds. The ILF payments received by DFG are associated with Corps' Section 404 permits under the Clean Water Act. Table 1 below summarizes credits sold and ILF payments received by Service Area, and includes a break-out of freshwater and tidal credits sold.

As described in the program Instrument, dated May 23, 2014[1] the state is divided into four main ILF Program Service Areas based on watershed and eco-region boundaries. The largest of these is the Coastal Service Area, which is divided into 3 sub-areas. The map below in Figure 1 outlines the four service areas: Berkshire/Taconic; Connecticut River; Quabbin/Worcester; and Coastal. Figure 2 shows the location and type of resource impacts for which an ILF payment was made, and the location of approved mitigation projects (as of December 31, 2019). As evident in Figure 2. MA ILFP Map of Permitted Impacts and Mitigation Projects, most of the credit sales to date have been in the Coastal Service Area, with limited activity further inland.

The MA ILFP received over $5 million in compensatory mitigation payments during the first 5 years of operation from the sale of 8 wetlands credits and 715 stream credits. The credit sales were approximately evenly split between freshwater and tidal, with slightly more payments received for tidal resource credits. The MA ILFP credit rates vary by service area: Coastal Service Area wetland credit costs are slightly higher than the inland service area rates, and coastal stream credit rates are twice the cost of inland stream credit rates. Additional information on credit pricing and the basis of the fees are provided in Attachment 1. Fact Sheet on MA ILF Program Fees (May 2014).

[1] The MA ILF Program Instrument, Service Area Map and other information is available online at https://www.mass.gov/in-lieu-fee-program

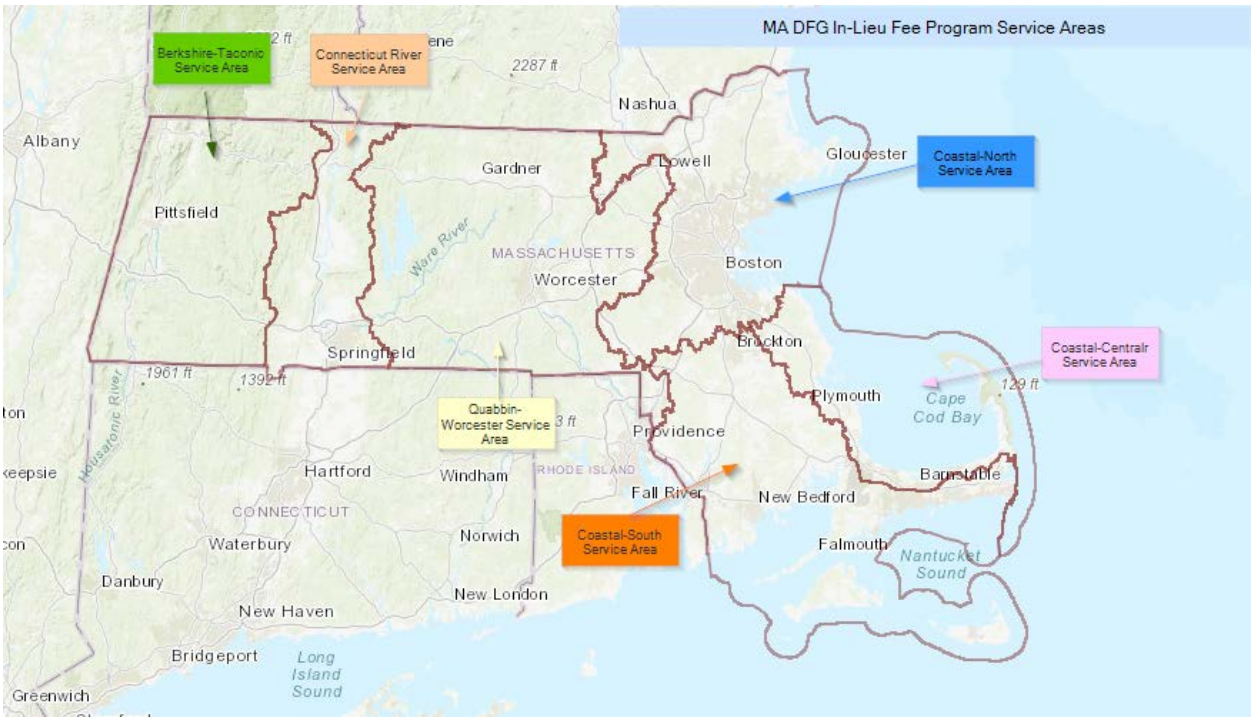


Figure 1. MA ILF Program Service Areas

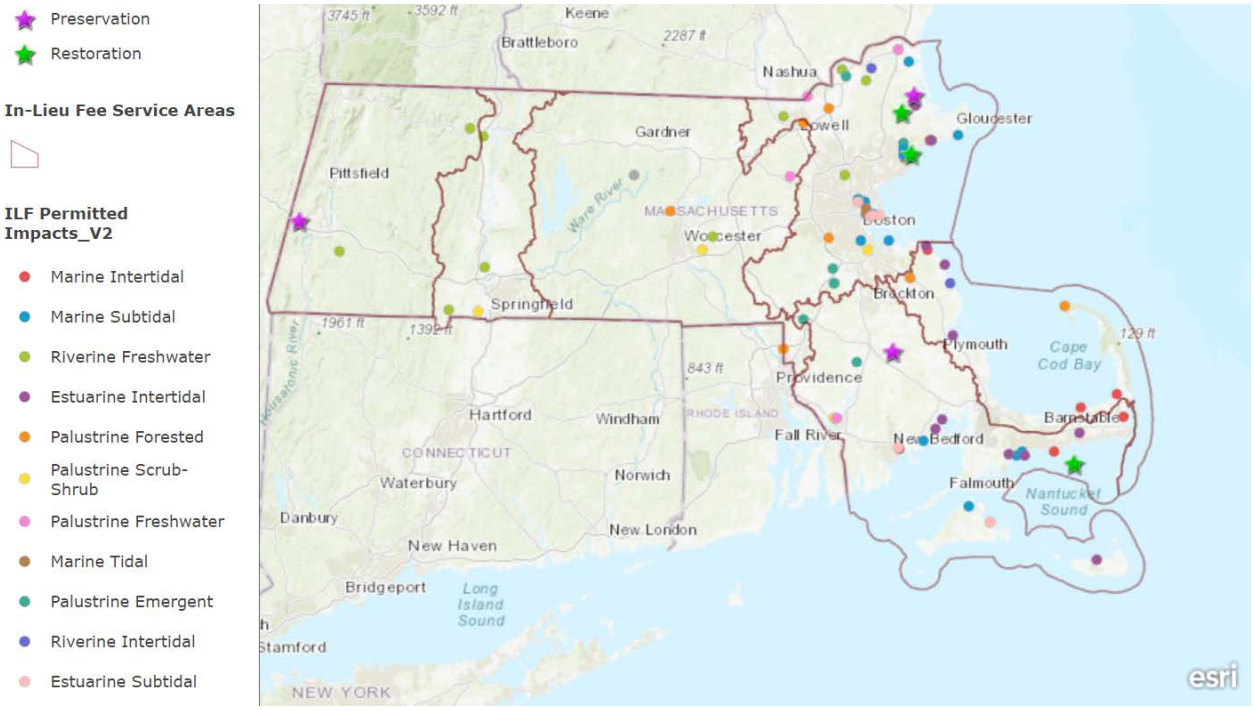


Figure 2. MA ILFP – Map of Permitted Impacts and Mitigation Projects

Table 1. Summary of Freshwater and Tidal Mitigation Credits Sold and ILF Payments Received Since Program Establishment

Service Area Resource Type	Credits Sold		Total ILF Payments Received (5/23/14 – 12/31/19)
	Wetlands Credits	Stream Credits	
Berkshire/Taconic Freshwater	0.00	54.33	$16,300
Connecticut River Freshwater	0.00	146.76	$26,030
Quabbin/Worcester Freshwater	0.29	202.00	$232,059
Coastal-North Freshwater Tidal	0.75 3.86	244.36 3.3	$613,385 $2,403,475
Coastal-Central Freshwater Tidal	0.71 0.24	64.00 0.0	$482,104 $148,238
Coastal-South Freshwater Tidal	1.84 0.41	0.0 0.0	$1,142,358 $260,653
State-wide Freshwater Tidal	**8.1** 3.59 4.5	**714.75** 711.45 3.30	**$5,324,602** $2,512,236 $2,812,329

Program Development and Accomplishments

The first few years of program operation emphasized a) management and tracking of credit sales, b) developing a prioritization tool to support preservation project assessment, c) identification of potential tidal mitigation projects and d) addressing future staffing needs. This stage of program development was led by staff at the DFG Commissioner's Office. By year 3, in 2017, there were sufficient funds available to support the first ILF project (eelgrass restoration) and to hire a Program Administrator. ILFP activities in years 4 and 5 expanded project solicitation within DFG's divisions and state-wide through a public Request for Proposals (RFP). The 2018 solicitation within DFG resulted in the selection of five additional mitigation projects, which were approved by the Corps in the Spring of 2019. The six ILF projects approved as of December 2019 are listed in Table 2 below and described in more detail in Section 2 of this report. In December 2019, the ILFP hired a full-time Aquatic Mitigation Specialist to further support program management, in particular, the development and implementation of restoration projects.

Table 2. MA ILF Approved Mitigation Projects 2017-2019

ILF Mitigation Project	Year	ILF Award	Aquatic Resource Benefits
Eelgrass Restoration, Middle Ground, Salem	2017	$262,092	Estuarine (0.5 acres)
Marine Habitat Enhancement, Yarmouth Artificial Reef	2019	$275,027	Marine (2 acres habitat, 0.7-acre structure)
Willowdale Dam Fishway	2019	$122,611	Freshwater stream, restore 14 miles of diadromous fish passage
Nemasket River Preservation	2019	$405,000	Freshwater stream and wetlands (95 acres)
Town Farm Road Preservation	2019	$40,000	Estuarine (29 acres)
Williams River Preservation	2019	$13,447	Freshwater stream and wetlands (49 acres)
Total ILF awards (through 12/31/19)		**$1,118,177**	

Based on the responses to the MA ILFP 2019 RFP, which included applications from municipalities and conservation-based non-government organizations, an additional four projects were selected to advance to Public Notice. These projects were undergoing mitigation plan review during the Winter of 2019 and therefore are not included in this report. A summary of the 2020 site selection process and newly approved 2019 mitigation projects will be provided in the MA ILFP Annual Report for 2020. The annual report will also include an updated credit ledger. Given the early stage of project implementation, no mitigation credits had yet been released by the end of 2019.

Table 3. MA ILFP Revenue by Calendar Year

YEAR	ILF Payments Received
2014	$43,265
2015	$255,406
2016	$793,691
2017	$1,549.468
2018	$1,543,278
2019	$1,139,494
Total	**$5,324,602**

Program Challenges and Opportunities

As can be seen from Table 3 above, it took a few years before the program built up sufficient revenues to implement mitigation projects and hire full-time dedicated staff. For a newly developing program, this presented challenges to early implementation of mitigation projects to meet the Federal Mitigation Rule

timeline requirements (*i.e.* 3 years after receipt of first ILF payment in a Service Area). Complicating factors included Service Areas that received minimal revenue in 2014-2015 and no further credit sales. These issues are discussed further in Section 3 of this report, which outlines potential approaches and Instrument amendments that may allow for more flexibility in transferring revenue and credits across Service Areas to expedite successful mitigation outcomes.

Other key challenges in the first five years included:

1. Providing in-kind mitigation for subtidal impacts and long-term protection mechanism in tidal areas;
2. Finding suitable cost-effective restoration projects with an implementation timeline that aligns with ILFP; and
3. Limitation for ILF contribution of mitigation funds to support restoration projects receiving certain "proactive, voluntary" grant funding and/or projects on federal land.

Section 3 of this report "Program Improvements" discusses the issues above including approaches that the MA ILFP is taking to address these challenges and measures to improve program administration overall. Such measures include expanded outreach and project solicitation, developing partnerships and opportunities for estuarine and freshwater restoration, potential amendments to the Instrument, and continued collaboration with the Corps on site selection and the Corps/IRT review process.

Lessons Learned

The key lessons learned during the first five years of MA ILFP operation are summarized below. Additional detail is provided in Sections 3 and 4 of this report.

Preservation versus Restoration

Opportunities to mitigate resource impacts through preservation have been more readily available and viable than opportunities for restoration. This is in part because MA DFG has a robust land protection program and there is a strong, active land trust community in the Commonwealth. On the other hand, although restoration opportunities are many, it has not been as easy for the ILFP to find ways to collaborate on restoration projects, with the exception of projects sponsored by DFG's Division of Marine Fisheries. This is in part because of conflicts between state and federal programs that prioritize funds for proactive, voluntary restoration and discourage or prohibit the use of ILF mitigation funds on their projects. At the state level, the MA DFG Division of Ecological Restoration (DER), expected to be a pipeline for restoration projects, has not participated at the level expected because its "Priority Project" designation does not allow the use of ILF mitigation funds to support restoration projects. Another complicating factor is the length of time and upfront site assessment, design, and permitting costs required before a restoration project can be assured of a high probability of success, which makes it difficult to achieve the ideal "less than 3-year" timeline for mitigation. The next stage of MA ILFP development will be emphasizing restoration projects through expanded outreach in coastal areas, creating partnerships, and identifying feasible projects that do not rely on federal grant programs with ILF funding restrictions.

Project Solicitation and RFP Process

The lessons learned from the solicitation and response experiences of 2018 (within DFG) and the public RFP in 2019 pointed to some inefficiencies in the process, lack of clarity on the level of detail needed for final project approvals, and challenges in aligning funding decisions with the timeline of a proposed project. For example, a preservation site may need to be acquired quickly to avoid development; a restoration project needs to be at a further state in feasibility and design before final funding decisions or mitigation plans can be completed. In a few cases, these types of challenges resulted in the ILFP investing a lot of effort upfront on projects before realizing they might not be feasible or optimal for the ILFP. The MA ILFP is building off the lessons learned to improve its funding application, review, and decision-making process as further described in Sections 3 and 4 of this report.

Stream Credits

Over the first 5 years of program operation, it became apparent that stream mitigation credit generation would more likely be achieved through preservation, in part due to the small amount of revenue available from stream credit sales and in part because the cost of stream restoration is quite variable and can be extremely high in relation to the credits generated. Unless there is an increase in future stream credit sales (based on Corps permit requirements for mitigation credits), the MA ILFP expects that compensatory mitigation will be primarily be required for wetlands impacts, and will be achieved through wetlands restoration and aquatic resource preservation projects. The MA ILFP intends to re-evaluate stream credit fees; however, the cost of credits is not the only factor. There have not been many Corps permits for which ILF stream mitigation credits were required and this trend may continue. ILFP contribution to stream restoration projects may be subsidized in the future by additional funds remaining after credit obligations are met through preservation.

Sub-tidal mitigation and credit generation

The MA ILFP has learned that identifying in-kind sub-tidal enhancement and restoration projects is quite difficult, and that this is a challenge for ILF programs across the country. Fortunately, MA DFG has an active eelgrass restoration and artificial reef program within its Division of Marine Fisheries (DMF), with expertise to support development and implementation of estuarine and marine ILF projects. The MA ILFP is also exploring possibilities for salt marsh restoration projects.

Long-term Management and Permanent Protection Mechanisms

The challenges and lessons learned here relate to both terrestrial and marine environments. In the case of land preservation, the ILFP realized that finalizing Long-Term Management (LTM) Plans at an earlier stage would have been more effective, thereby avoiding delays in deliverables and a lack of consistency between draft LTM plans, Conservation Restriction (CR) language, and the original project proposals. In addition to Memorandums of Agreement (MOAs), the program will be requiring signed contracts with Project Sponsors and advanced-stage LTM and site protection instruments prior to release of funds for acquisition.

The LTM and permanent protection issues and lessons learned for estuarine and marine projects are somewhat different, in that the typical land-based CR is not the standard protection mechanism in estuarine and marine environments and because Commonwealth-owned tidelands and ocean areas cannot have such restrictions placed on them. The MA ILFP together with DMF and the Corps will coordinate on appropriate measures and permit conditions to address the needs for long term protection and to avoid and minimize potential encroachment on tidal mitigation project sites.

1.0 Program History

The Massachusetts Department of Fish and Game (DFG) became the Sponsor of Massachusetts' In-Lieu Fee Program (ILFP) when the program Instrument was approved by the Army Corps of Engineers (Corps) in May of 2014. DFG was established as an agency of the Commonwealth of Massachusetts pursuant to M.G.L. c. 21A, §8. The department is tasked with protecting and managing wildlife and wildlife habitats, including fisheries, within the Commonwealth. This mission is accomplished by DFG's three divisions: Division of Fisheries and Wildlife (MassWildlife), the Division of Marine Fisheries (DMF), and the Division of Ecological Restoration (DER). To support DFG's focus on inland fisheries and terrestrial wildlife, MassWildlife manages lands owned by DFG. DMF manages the Commonwealth's fisheries in tidal waters, including diadromous fish runs in coastal rivers, and essential fish habitat. DER, DFG's newest division, operates several grant programs that allow the division to provide technical and financial assistance to municipalities and private landowners who are willing to undertake restoration projects in inland and coastal environments, such as removing dams or tidal restrictions, replacing undersized culverts, or retiring cranberry farms and restoring their natural hydrology. The responsibilities of DFG's three divisions are described in greater detail in the MA ILFP Instrument. The MA ILFP operates out of the office of the Commissioner of Fish and Game rather than any one of the department's divisions. All three divisions are represented on the MA ILFP's departmental review team, which reviews project pre-proposals and proposal solicitation and evaluation materials and provides feedback to the MA ILFP staff based on their project management experience within their respective areas of expertise.

Following the guidance established by the 2008 federal Mitigation Rule, mitigation projects proposed by the MA ILFP are reviewed by an interagency review team (IRT), which recommends that the Corps either accept or reject proposed projects as suitable for mitigation purposes. The U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service, National Marine Fisheries Service, Massachusetts Department of Environmental Protection, and Massachusetts Office of Coastal Zone Management are represented on the IRT. Through close coordination between the MA ILFP staff, the Corps and the IRT, the MA ILFP has thus far only put forth for consideration projects that the IRT deemed appropriate for mitigation.

The MA ILFP Instrument established four geographic areas that would be served by the program. From west to east, they are Berkshire/Taconic, Connecticut River, Quabbin/Worcester Plateau, and Coastal (Figure 1.). As described in the Instrument, the service boundaries follow the 8-digit hydrologic unit code (HUC) boundaries, which approximately correspond with the divisions between ecological regions delineated by EPA and the BioMap2 project led by DFG and The Nature Conservancy. However, because the Coastal Service Area is much larger and more active than the other three service areas, it is divided into three sub-areas: North, Central, and South.

1.1 Credits Sold

The Massachusetts ILFP receives a payment when the Corps requires that an applicant for a permit under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act purchase credits from the ILFP in order to provide mitigation for impacts to wetlands or streams that have been minimized to the maximum extent practicable in the design of the proposed activity, but cannot be avoided. Impacts to Coastal Service Area wetlands are assessed at $14.26 per square foot (sq.ft.), which amounts to $621,165.60 per acre (one wetland credit). Wetland credit rates are slightly less in non-coastal service areas (see Attachment 1. Fact Sheet on MA ILF Program Fees (May 2014)). Impacts to streams are charged at $100 per linear foot of bank or channel in the inland service areas and $200 per linear foot of bank or channel in the Coastal Service Area. Between 2014 and 2019, the MA ILFP received 100 payments totaling $5,324,602. The MA ILFP sold 8.1 wetland credits, of which 4.5, or slightly more than half, were tidal, and about 715 stream credits, 3.3 of which were tidal. Although more projects in the residential sector have made payments to the MA ILFP than any other sector, all of these payments have been small, representing 1% of the program's revenue (Figure 3). The transportation and utility sectors represent 33% of payments made to the MA ILFP, but 68% of the program's revenue (Figure 4).

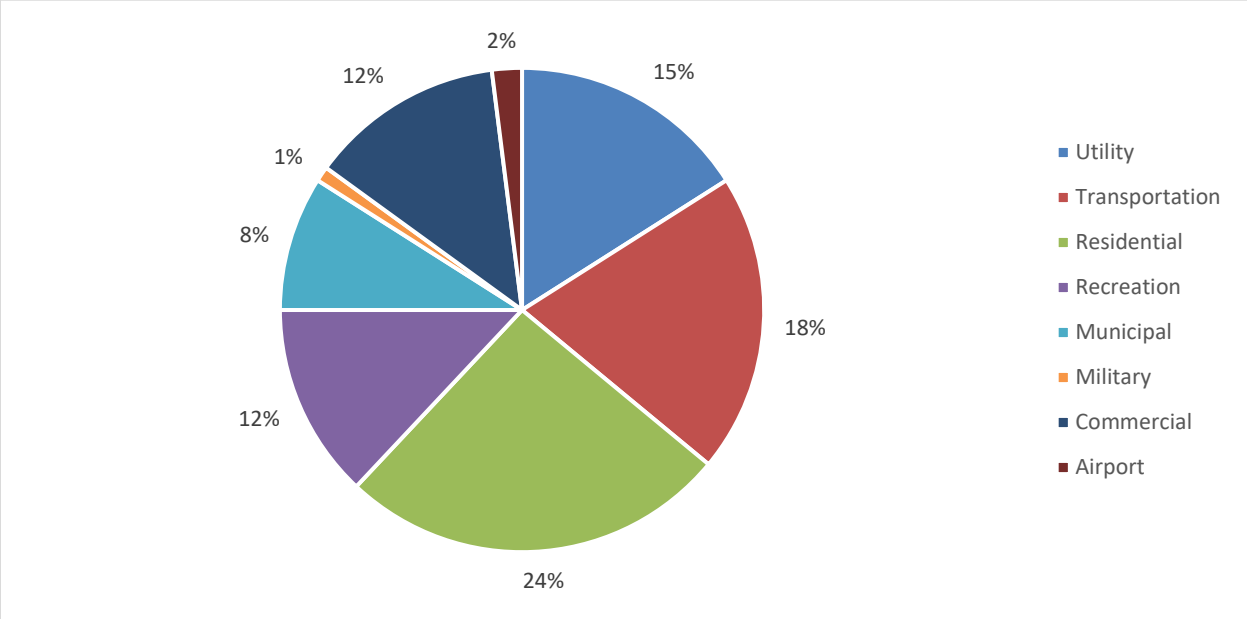


Figure 3. Contribution of payments to MA ILFP by sector, 2014-2019 (based on number of individual transactions)

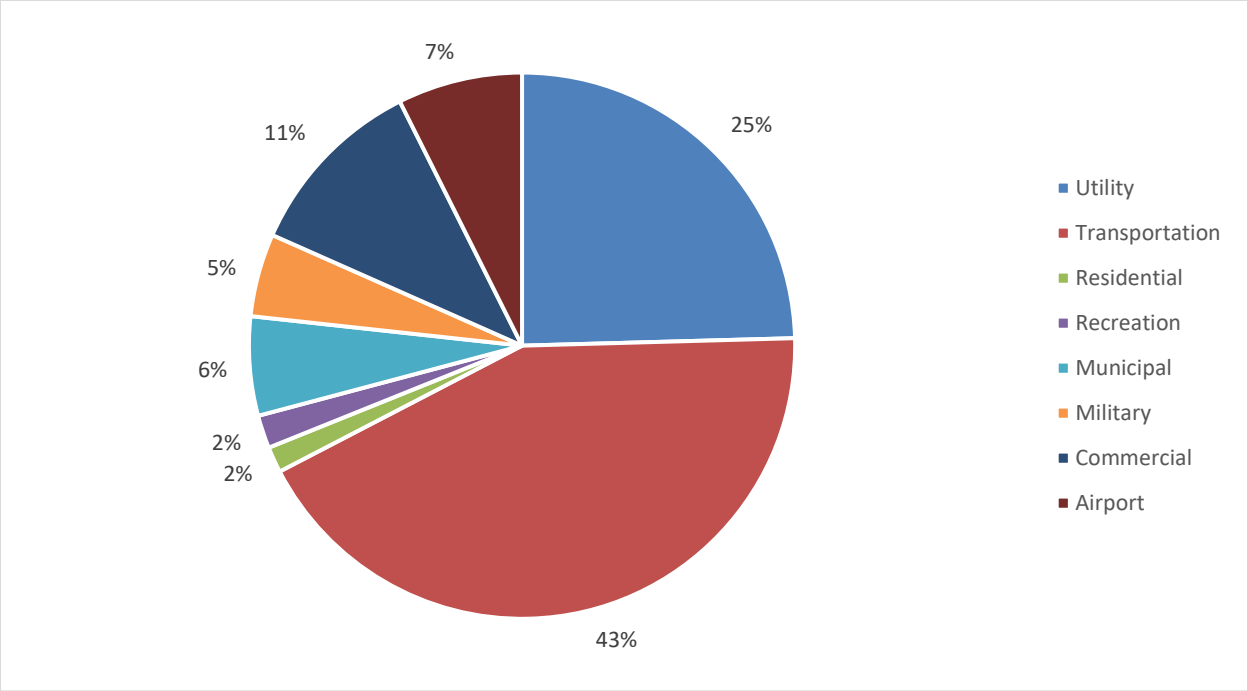


Figure 4. Contribution of revenue to MA ILFP by sector, 2014-2019 (based on the amount of ILF payment).

1.2 Coastal Service Area

The Coastal Service Area is the MA ILFP's largest, most developed, most densely populated, and most active service area and is subdivided into Coastal-North, Coastal-Central, and Coastal-South sub-service areas. Massachusetts' topography is generally flat, which directs streamflow and runoff from areas that are significantly inland east toward the coast. The majority of Massachusetts' coastline drains into the Gulf of Maine, and most of this drainage is served by the Coastal-North Sub-Area. Local features of this watershed include Plum Island Sound, Cape Ann, Salem Sound, Boston Harbor, and a dozen major coastal rivers. The Coastal-North Sub-Area includes the City of Boston and most of its urban sprawl. The South Coast's major watershed and Cape Cod Bay are served by the Central Sub-Area, the smallest and least developed of the three sub-areas. The remainder of Massachusetts' coastline south of Cape Cod to the Rhode Island boundary drains into the New York Bight rather than the Gulf of Maine. This drainage is served by the Coastal-South Sub-Area and includes Mount Hope Bay, Buzzards Bay, Nantucket Sound, and the Taunton River watershed. The Coastal-South Sub-Area is unique in that it includes large, populated islands (Martha's Vineyard, Nantucket). Suburbs of both Boston and Providence trail across this sub-area.

1.2.1 Coastal North Sub-Area

The Coastal North Sub-Area is the largest and most active of the sub-areas within the Coastal Service Area, generating $3,016,860 in credit sales between 2014 and 2019. The MA ILFP has collected 55 payments for mitigation in this sub-area, with some permittees making multiple payments for a single project, either because the project impacts multiple types of aquatic resources or the project design was modified after the Corps issued the construction permit, and some permittees making multiple payments because they

requested permits for multiple projects in this area. The transportation sector is the greatest contributor to the MA ILFP in the North Coastal Sub-Area with payments totaling $1,222,197.00. Utilities account for just over a third of credit sales at $1,047,402.80. A total of 4.61 wetland credits and 247.96 stream credits have been sold in this sub-area.

1.2.1.1 Wetland Credit Sales

Of the 55 fee payments that have been made in this sub-area, 40 (73%) were used to purchase tidal wetland credits. Because the City of Boston falls within the Coastal North Sub-Area, a greater number of entities representing the transportation sector work in this sub-area. The Massachusetts Bay Transit Authority (MBTA) and MassPort have purchased 1.8236 tidal wetland credits at a cost of $1,133,087.00. Two utilities, Algonquin Gas Transmission and Harbor Electric Energy Company, have purchased 1.254 tidal wetland credits for $777,704.00. The Coastal North Sub-Area is the MA ILFP's only service area that continually sees impacts of commercial development. Seven commercial developers paid $350,358.20 to purchase 0.5605 tidal wetland credits. Five boat clubs and marinas on the northernmost section of coastline from Beverly to Newburyport purchased 0.124 credits. Although fourteen residential homeowners or their representatives have purchased tidal wetland credits in this sub-area, their total contribution to the MA ILFP is only $60,385.18, or 0.0975 credits. Only one municipality, the City of Salem, has paid a fee in lieu of mitigation for impacts to tidal wetland, purchasing 0.005 credits. The 3.86 tidal wetland credits sold to date represent 84% of wetland credit sales in this sub-area.

Pool on salt marsh in Ipswich, MA

Eleven in-lieu fee payments totaling $466,765.30 have purchased a total of 0.750 freshwater wetland credits in this sub-area. The utility sector (Eversource Energy and National Grid) purchased the most freshwater wetland credits in this sub-area at a total of 0.4327 credits for a cost of $269,698.80 (58%). The transportation sector ranks second: the Norwood Airport Commission purchased 0.197 credits, and

MassDOT purchased 0.1114 credits. A municipality (City of Beverly) purchased 0.004 freshwater wetland credits, and the Massachusetts Department of Conservation and Recreation purchased 0.005 freshwater wetland credits.

1.2.1.2 Stream Credit Sales

Stream credit sales occurred less frequently in this sub-area than wetland credit sales. The MBTA purchased 3.3 tidal stream credits to mitigate impacts of a bridge stabilization project and is the only permittee that has purchased tidal stream credits from the MA ILFP. Another 244.66 freshwater stream credits have been sold to municipalities (Chelmsford and Winchester), the Massachusetts Department of Transportation (MassDOT), and a private developer. The majority (86%) of freshwater stream credits were sold to municipalities.

1.2.1.3 Future Credit Sales

It is likely that the Coastal Service Area will continue to be the MA ILFP's busiest service area for the next five years, with the Coastal North Sub-Area contributing the most activity. Residential and commercial activity could be relatively stable over the next five years, as only five of the twenty communities that MassAudubon's 2020 Losing Ground Report identifies as experiencing the highest rates of development between 2012 and 2017 are located wholly or partially within the Coastal North Sub-Area. However, Massachusetts' 2020-2024 Transportation Improvement Plan (TIP) suggests that the transportation sector will see increased activity in the Coastal North Sub-Area in the next five years.

The Commonwealth's largest investment in transportation infrastructure in the next five years is planned for the Coastal North Service Area, with $422 million budgeted for more than 30 projects that directly involve crossing waterways.

Large projects include:

- Replacement of a road crossing over the upper Charles River in 2020
- Replacement of a road crossing over the Essex River in 2021
- Replacement of the North Washington Street crossing over Boston Inner Harbor in 2021
- Replacement of the Route 107 bridge over the Saugus River in 2022
- Replacement of the I-495 bridge over the Merrimack River in 2024
- Replacement of a road crossing over the Ipswich River in 2024
- Work planned for the Sumner Tunnel.

Planned infrastructure improvements will not necessarily correlate with ILF payments. For one, the TIP focuses on upgrading existing infrastructure as opposed to planning new development, so some improvements may be possible without incurring new impacts to aquatic resources. Smaller road crossings may not require Corps review at all. However, we expect that some of the larger transportation improvement projects will not be able to avoid temporary impacts to aquatic resources, which will result in ILF payments or permittee-responsible mitigation.

1.2.2 Coastal Central Sub-Area

Seven permitted projects in the Coastal Central Sub-Area have made payments to the MA ILFP totaling $630,341.46. MassDOT purchased 64 stream credits to mitigate fill that was needed for a transportation improvement project. The 0.714 freshwater wetland credits that were sold in this service area were purchased by MassDOT and Provincetown Airport Commission, to mitigate impacts of fill. Five projects required purchase of tidal wetland credits totaling 0.240. Tidal wetland credits were sold to MassDOT, two municipalities, a yacht club, and a residential homeowner. Both the Town of Dennis and the Town of Scituate purchased tidal credits to mitigate impacts of dredging.

The Coastal Central Sub-Area has seen consistent low credit sales from year to year; this is likely to continue in the next five years. This sub-area is much smaller than the other coastal sub-areas and does not include any of the Commonwealth's major transit corridors or other infrastructure facilities. Only one road crossing project is proposed for the Coastal Central Sub-Area in Massachusetts' current TIP: the replacement of a crossing on the Herring River in 2021. Three of the 20 communities that MassAudubon's 2020 Losing Ground Report identified as experiencing the highest rates of development between 2012 and 2017 are located in this sub-area, but to date no in-lieu fee payments have been required for activities in those communities.

1.2.3 Coastal South Sub-Area

Twenty permittees have made payments totaling $1,403,041 in the MA ILFP's Coastal South Sub-Area. No permittees were required to purchase stream credits. Four permittees purchased freshwater wetland credits, totaling 1.8393. Entities operating in the transportation and utility sectors, MassDOT and National Grid, the Corps, and a municipality (Town of Plainville) purchased freshwater wetland credits. Nineteen tidal wetland credit sales have occurred in this sub-area, totaling 0.4139. The U.S. Coast Guard; municipalities, including Marion, Plymouth, and Tisbury; and nine private property owners have purchased tidal wetland credits in this sub-area. Private property owners account for $184,483.45, or 13%, in credit sales in this sub-area. The Coastal North and Coastal South Sub-Areas are the MA ILFP's only service areas that see frequent activity in the residential sector. Payment from National Grid to mitigate impacts from a single project accounts for approximately 15% of credit sales in this sub-area. Similarly, a single payment from

Riparian wetlands on the Nemasket River in Middleborough, MA

the Army Corps accounts for almost 19% of credit sales in this sub-area. Half of the credits sold in this sub-area to date were purchased by the transportation sector.

Credit sales in the Coastal South Sub-Area could fluctuate over the next five years. Three of the five watersheds that MassAudubon's 2020 Losing Ground Report identifies as experiencing the highest rates of development in the Commonwealth are in this sub-area: the Taunton River watershed, Buzzards Bay, and the South Coastal watershed. Five of the twenty communities that MassAudubon's 2020 Losing Ground Report identifies as experiencing the highest rates of development between 2012 and 2017 are in this sub-area. Although private property owners consistently purchase tidal wetland credits from year to year, these sales are typically very small and insufficient to support a mitigation project on their own. Because larger credit sales in the transportation and utility sectors occur less frequently, it is difficult to say whether or not these industries will require in-lieu fee mitigation in any given year; however, Massachusetts' current TIP lists five road crossing replacements in the Coastal South Service Area that are slated for funding in 2021 and 2024 with a budget of $7.2 million.

1.3 Quabbin/Worcester Service Area

The MA ILFP's Quabbin/Worcester Service Area encompasses approximately 2,480 square miles of land in the center of the Commonwealth. It is bordered by New Hampshire to the north and Connecticut and Rhode Island to the south. Development is centered around the City of Worcester and several major transit corridors that traverse the city in order to provide access between the eastern and western parts of the Commonwealth and across New England. This region's hydrology is driven by the 25,000-acre man-made Quabbin Reservoir and low-gradient rivers that support forested wetlands on the Worcester Plateau.

Seven permitted projects have made in-lieu fee payments to the MA ILFP's Quabbin/Worcester Service Area totaling $232,058.82. One permittee, MassDOT, purchased 202 stream credits to mitigate fill that was needed for a transportation improvement project. The remaining permittees purchased 0.286 wetland credits. Half of these projects were in the transportation and utility sectors, and the other half were commercial or residential developments.

Credit sales in the Quabbin/Worcester Service Area have been steady and may increase in the next five years. With respect to residential and commercial development, half of the 20 communities that are identified in MassAudubon's 2020 Losing Ground Report as experiencing the highest rates of development between 2012 and 2017 fall wholly or partially within this service area. The Quabbin/Worcester Service Area is also defined to contain the Blackstone River watershed, which ranked fourth in the Commonwealth for land acreage that was developed between 2012 and 2017 and ranked third when developed acreage was normalized for watershed size (MassAudubon 2020). MassAudubon's 2020 Losing Ground Report also projects that impervious cover in the area represented by the MA ILFP's Quabbin/Worcester Service Area will exceed 12%, whereas other parts of the Commonwealth may be able to avoid significant changes if they employ strategic land use planning, smart growth, and low-impact development.

Massachusetts' 2020-2024 TIP suggests that the transportation sector will continue to be active in this service area in the next five years. Although fewer transportation infrastructure improvement projects

that directly involve crossing waterways are planned in the Quabbin/Worcester Service Area, the planned projects for this area are larger than the projects that are planned in the Berkshire/Taconic Service Area, and the 20 or so proposed projects have a greater cost, at $94.7 million. Projects are proposed throughout the service area, with work on road crossings of the Assabet, Blackstone, Nashua, Quinebaug, Seven Mile, Sudbury, Swift, and Ware Rivers.

1.4 Connecticut River Service Area

The Connecticut River Service Area is the MA ILFP's smallest service area at only 830 square miles. As its name suggests, the defining feature of this region is the Connecticut River Valley. Sixty-five of the river's 410 miles fall within the Commonwealth's borders. By the time it reaches Massachusetts, the riverbed is wide and low-gradient, and its broad floodplains include both wetlands and uplands. This service area is bordered by Vermont to the north and Connecticut to the south. In the mid-twentieth century, Interstate 91 assumed the transit corridor role that the Connecticut River previously provided.

Three in-lieu fee payments have been made in the MA ILFP's Connecticut River Service Area totaling $26,030.00. Payments were required for the purchase of 146.76 stream credits to mitigate unavoidable impacts from transportation and utility projects proposed by MassDOT, the Tennessee Gas Pipeline Company, and Exxonmobil Corporation. Additional sales of wetland credits in 2020 have made it possible to solicit a mitigation project in this service area.

It is anticipated that the Connecticut River Service Area will continue to see low levels of activity in the next five years. MassAudubon's 2020 Losing Ground Report notes that communities around the City of Springfield and the Interstate 91 and MA Route 2 corridors have grown since the previous report, but not as much as other parts of the Commonwealth. Massachusetts' 2020-2024 TIP shows that the transportation sector will continue to be active in the Connecticut River Service Area: it budgets $39.6 million for ten stream crossing replacement projects here. Replacement of the Route 202 crossing of the Little River slated for 2020 and replacement of a road crossing on the Deerfield River slated for 2023 may have relevance to the ILFP. Eight other small stream crossing replacements are also proposed to be funded in this area.

1.5 Berkshire/Taconic Service Area

The MA ILFP's Berkshire/Taconic Service Area encompasses approximately 1,600 square miles on the Commonwealth's western boundary with New York State. It is the least developed of the MA ILFP's service areas; its built environment is clustered north and south of Interstate 90. Defining features of this region include the Berkshire Plateau and Hills and the Taconic Mountains. Its major watersheds are the Housatonic, Farmington and Hoosic Rivers. High gradient, coldwater streams and floodplain forests are abundant in the Housatonic watershed in particular.

The Corps has required two permittees to pay in-lieu fees for projects in the MA ILFP's Berkshire/Taconic Service Area totaling $16,300.00. Payments were required to purchase 54.33 stream credits to mitigate unavoidable impacts of transportation and utility projects proposed by MassDOT and the Tennessee Gas Pipeline Company, respectively. No in-lieu fee payments have been required in this service area since 2016. Although activity in this service area may remain low in the near-term, Massachusetts' 2020-2024

TIP demonstrates potential for more activity in the Berkshire/Taconic Service Area in the next five years. The TIP proposes about 30 projects that require crossing waterways in the Berkshire/Taconic Service Area with an estimated value of $71.9 million. The primary projects that could have relevance to the MA ILFP are the replacement of the Route 2 crossing of the Hoosic River slated for 2023 and the Cottage Street crossing of the Housatonic River slated for 2024.

West Stockbridge, MA

2.0 Status of Program Goals

2.1 Mitigation Project Selection

A reflection of both the newness of the program and consistency with the program Instrument, all of the mitigation projects that were funded by the MA ILFP between 2014 and 2019 were sponsored by DFG, meaning that the ILF Program Sponsor is also the long-term steward for all of the mitigation project site. Also consistent with the Instrument, the MA ILFP has provided mitigation for impacts to non-tidal resources exclusively through land preservation. At the time that the Instrument was created, preservation was the preferred form of mitigation because of the difficulty of identifying suitable sites for creating, restoring, or enhancing self-sustaining aquatic resources and low level of functional success, both of which make alternative forms of mitigation more costly than preservation. In order for land preservation to be considered a suitable means of providing mitigation, the quality or integrity of the land must be threatened in some way. It is rare that this is not the case in Massachusetts.

The MA ILFP issued its first public request for proposals for mitigation projects in July of 2019, which has diversified the pool of mitigation project Sponsors. Through targeted outreach and future public RFPs, the MA ILFP staff intend to diversify the types of mitigation projects that the program funds with a particular emphasis on developing the restoration component of the program. The RFP process, outreach efforts, and Instrument revisions are discussed further in Section 3 Program Improvements.

2.2 Coastal Service Area

Reflecting its high level of credit sales, the Coastal Service Area had five active mitigation projects by the end of 2019, the greatest number of mitigation projects of the MA ILFP's four service areas. Three of the projects will restore degraded aquatic resources, and two of the projects will preserve existing high-quality aquatic resources.

The five coastal ILF projects, which were funded betwwen 2017-2019 are:

- Eelgrass Restoration, Middle Ground, Salem
- Marine Habitat Enhancement, Yarmouth Artificial Reef, Nantucket Sound
- Willowdale Dam Fishway, Ipswich
- Town Farm Road (aka Greens Point) Preservation, Ipswich
- Nemasket River Preservation, Middleborough

The five approved projects in the Coastal Service Area, described in more detail below, contribute to the following goals identified for the Coastal Service Area in the MA ILFP Program Instrument:

- ✓ Identify and pursue opportunities to restore priority coastal resources and habitats
- ✓ Support efforts that increase fish passage in rivers that drain directly to the ocean and in high-quality coldwater streams
- ✓ Support coastal habitat connectivity
- ✓ Support protection, restoration or enhancement opportunities near high- quality habitats that improve coastal aquatic resource functions and values.

Eelgrass Restoration, Middle Ground

Eelgrass beds are designated as Essential Fish Habitat (EFH) due to the habitat value that they provide for protected resident and diadromous fish and shellfish species for critical life functions such as feeding and spawning. Along Massachusetts' coastline, eelgrass beds struggle in the face of coastal development, boating impacts, and poor water quality. This project revegetated 0.5 acre of subtidal habitat in Salem Sound in 2017 using eelgrass shoots harvested from donor beds in Lynn (Broad Sound), Nahant (Nahant Cove), Salem (Aquavitae), Beverly (West Beach) and Gloucester (Niles Beach). In the spring of 2018, an additional 0.25-acre bed was planted south of the original planting because the western side of the original bed was lost during coastal storms. Performance metrics recorded in annual monitoring reports indicate that the restoration has otherwise been successful. Project monitoring will continue through 2022.

Rock crab on eelgrass monitoring transect

Marine Habitat Enhancement, Yarmouth Artificial Reef

This project enhanced 2.1 acres of subtidal habitat by adding more than 2,200 cubic yards of repurposed granite block and concrete structures to an existing permitted artificial reef site in Nantucket Sound in January of 2020. Structures were distributed in patches on the ocean bottom at a 1:2 ratio of new structures to undisturbed natural bottom (33% material coverage to 67% undisturbed area). The project location is EFH for one or more life history stages of fifteen managed marine species, including Atlantic cod, winter flounder, long-fin squid, scup, black sea bass, and surf clam. DMF divers conducted the first round of post-construction monitoring in 2020 using divers and remote sensing equipment to assess

performance metrics for successional colonization and community composition and will continue monitoring the site annually for the next four years.

Deployment of artificial reef material in Nantucket Sound, January 2020

Willowdale Dam Fishway

This project will replace the function of an existing weir-pool fishway that was intended to provide passage for diadromous fish across the Ipswich River's Willowdale Dam using a new Alaska steeppass-style fishway. The existing passage structure is failing and poorly sited on the river. The project primarily targets river herring, which are federal Species of Concern. For both alewife and blueback herring, the new fishway will restore access to 14.5 miles of mainstem spawning and nursery habitat and additional tributary miles and pond acreage. The project will improve connectivity, food webs, and nutrient transport among marine, estuarine, riverine tidal and riverine freshwater ecosystems. The project is ready for construction pending a safe work plan with respect to the COVID-19 pandemic.

Willowdale Dam on the Ipswich River, Ipswich, MA

Town Farm Road Preservation

This 29-acre property consists of approximately 25 acres of saltmarsh and 5 acres of coastal woodland within the Great Marsh Area of Critical Environmental Concern (ACEC). The MA ILFP provided 86.5% of funds needed for MassWildlife to acquire this property in fee. Located in Ipswich, the project is on the east side of MassWildlife's Great Marsh North Wildlife Management Area. It is identified as BioMap2 Aquatic Core habitat, Priority Natural Communities Core habitat, and Species of Conservation Concern Core habitat. The property is also mapped as BioMap2 Critical Natural Landscape (CNL) Landscape Block and Aquatic Buffer, as well as Tern Foraging Habitat. It provides an important connection between protected areas owned by the Ipswich Conservation Commission and the Essex County Greenbelt Association. In addition, it is expected to be an important resource for coastal adaptation.

Dormant saltmarsh at Town Farm Road, Ipswich, MA

Nemasket River Preservation

Preservation of this his 95-acre property will permanently protect approximately 6,810 linear feet of shoreline on the south bank of the Nemasket River, 12.5 acres of high-quality riparian and palustrine wetlands and 67.7 acres of upland buffer. The MA ILFP provided 86.5% of funds needed for MassWildlife to acquire this property in fee. Located in Middleborough, the preservation site is now incorporated as part of MassWildlife's Taunton River Wildlife Management Area (WMA). The site is identified as BioMap2 Aquatic Core, Wetlands Core, and Species of Conservation Concern Core habitat. Approximately 5 acres of the property are designated as NHESP Priority Habitat, and there are documented reports of Species of Concern on or near the property. The site protects high-quality riverine habitat with direct connectivity

to a tidal river and its estuary: the Taunton and Mount Hope Bay, respectively. The property is identified as a BioMap2 Critical Natural Landscape and as a resilient site per The Nature Conservancy[2].

View of the Nemasket River from trail on the preserved property

2.3 Quabbin/Worcester Service Area

The availability of funds in the Quabbin/Worcester Service Area was announced for the second time in the MA ILFP's 2020 RFP. DFG put forth a property for conservation in this service area in response to the 2019 RFP; however, the land use history of the site diminished its suitability as a mitigation project location. A prior MassWildlife proposal in 2018, which advanced to Public Notice and full proposal stage, unfortunately fell through as the appraised value was much less than the landowner expected. Through outreach to non-profit organizations that would be eligible to sponsor a mitigation project and environmental restoration professionals, the 2020 RFP attracted proposals with potential to meet the following goals that were established for the Quabbin/Worcester Service Area in the program Instrument:

[2] The Nature Conservancy's Resilient Sites for Terrestrial Conservation project identifies the areas estimated to be the most climate resilient for each of 62 characteristic environments in Eastern North America.

- ✓ Protect DFG-identified "focus areas" that are located within this Service Area, which have been selected based on their character as high-quality, riparian, palustrine habitats, as diverse natural communities, and/or as habitats of wildlife species, including state-listed species protected under MESA (which incorporates federally-listed species);
- ✓ Protect high-quality wetlands and the land around those wetlands.

The MA ILFP will continue to seek restoration projects to meet the following program goals depending on available funds and future credit sales in the Service Area.

- ✓ Restore habitat continuity in high-quality stream reaches by removing dams and replacing culverts with those that meet MassDEP stream standards
- ✓ Restore degraded wetlands that are adjacent to high-quality wetlands
- ✓ Support efforts that increase fish passage in rivers that drain directly to high-quality coldwater streams
- ✓ Restore riparian vegetated buffers in active agricultural lands

2.4 Connecticut River Service Area

No ILF mitigation projects have been completed in this service area yet. The MA ILFP had limited funds available in the CT River to support a mitigation project that would meet stream credit obligations and no suitable projects were identified during the 2019 public solicitation or through the 2018 internal DFG request for pre-proposals. However, additional ILF funds are now available due to wetland credit sales in 2020. The ILFP anticipates that a suitable project(s) will be identified during the 2020 RFP process.

The following goals were established for this service area in the program Instrument.

- ✓ Protect DFG-identified "focus areas" that are located within this Service Area, which have been selected based on their character as high-quality, riparian, palustrine habitats, as diverse natural communities, and/or as habitats of wildlife species, including state-listed species protected under MESA (which incorporates federally-listed species)
- ✓ Protect high-quality wetlands and land around those wetlands
- ✓ Restore habitat continuity in high-quality stream reaches by removing dams and replacing culverts with those that meet MassDEP stream standards
- ✓ Restore degraded wetlands that are adjacent to high-quality wetlands
- ✓ Support efforts that increase fish passage in rivers that drain directly to high-quality coldwater streams
- ✓ Restore riparian vegetated buffers in active agricultural lands.

2.5 Berkshire/Taconic Service Area

Because of the low level of credit sales in this service area as described above in Section 1.5 Berkshire/Taconic Service Area, the MA ILFP has only partially funded one mitigation project in this service area to date: the Williams River Preservation Project. The MA ILFP provided 9.16% of funds needed for MassWildlife to acquire this property in fee. Located in West Stockbridge, the project is on the east side

of MassWildlife's Maple Hill WMA. The property consists of 28 acres of palustrine wetlands, 11 acres of upland buffer, and 4,800 linear feet of the western shoreline of the Williams River, which supports a coldwater brook trout fishery. The majority of the property falls within BioMap2 Critical Natural Landscape and Core Habitat (wetland core). The southwest corner of the property is designated as Priority Habitat for an undisclosed species.

Williams River Preservation

The Williams River Preservation Project contributes to the following goals identified for the Berkshire/Taconic Service Area in the MA ILFP Program Instrument:

- ✓ Protect DFG-identified "focus areas" that are located within this Service Area, which have been selected based on their character as high-quality, riparian, palustrine habitats, as diverse natural communities, and/or as habitats of wildlife species, including state-listed species protected under MESA (which incorporates federally-listed species); and
- ✓ Protect high-quality wetlands and land around those wetlands, including, but not limited to, calcareous fens and riverine wetlands, such as oxbows and remnant channels.

Williams River, Maple Hill WMA

The MA ILFP has no remaining outstanding credit obligations in the Berkshire/Taconic Service Area at this time. However, should new credit sales occur in the future, the MA ILFP will seek opportunities to meet the other goals identified for this service area in the MA ILFP Program Instrument:

- ✓ Restore degraded wetlands that are adjacent to high-quality wetlands.
- ✓ Restore habitat continuity in high quality stream reaches by removing dams and replacing culverts with those that meet Massachusetts stream crossing standards and guidelines; and
- ✓ Support efforts that increase fish passage in rivers that drain directly to high-quality coldwater streams.

3.0 Program Improvements

The MA ILFP has made several changes to improve the program's ability to meet its mitigation obligations and programmatic goals and continues to explore potential future improvements. Key program improvements are described below.

3.1 Program Staff

In its earliest years, the MA ILFP was administered by the Director of DFG's Land Conservation Program. However, by 2017, the program had sold enough credits that program administration required full-time staff support. A full-time Program Administrator was hired in October 2017. By 2019, the MA ILFP found that it again experienced significant growth as its first mitigation projects moved into the monitoring phase, new mitigation projects were solicited through the program's first public RFP, and credit sales continued. Given the amount of credit sales for tidal wetlands in particular, and the MA ILFP commitment to developing the coastal restoration component of the program, additional staff capacity was needed. An Aquatic Mitigation Specialist was hired in December 2019 to help solicit and develop projects that could fulfill the program's tidal resource mitigation needs and to assist with other program functions.

3.2 Project Solicitation and the Public RFP Process

Initially, the MA ILFP relied solely on its own three divisions as a source of potential mitigation projects. This approach was envisioned in the Instrument as well as the option of a public Request for Proposals (RFP) process if needed to fulfill DFG's mitigation obligations. As the program evolved and mitigation projects sponsored by the DFG Division of Marine Fisheries and Division of Fisheries and Wildlife were underway, the MA ILFP focused on developing a public RFP process to solicit potential mitigation projects from other eligible Project Sponsors, including non-profit organizations, municipalities, and other state agencies. This allows for a broader range and increased number of potential mitigation projects to fulfill both freshwater and tidal mitigation credit obligations. In addition to the RFP process, the MA ILFP continues targeted outreach efforts to provide information about the program and to identify potential projects and build partnership opportunities.

The MA ILFP issued its first public RFP in July of 2019, which resulted in applications from municipalities, non-governmental conservation organizations, and state agencies. Several proposals from non-DFG project Sponsors were advanced to the final proposal stage for Corps and IRT review and decision-making in 2020. An update on these proposals will be provided in the MA ILFP Annual Program Report for 2020.

The MA ILFP has developed RFP documents outlining eligibility criteria, guidance for applicants, and evaluation criteria. To respond to the RFP, a potential Project Sponsor completes a pre-proposal application form and submits it to the ILF Program Administrator. The pre-proposal approach had previously been used with success by the New Hampshire Aquatic Resource Mitigation Program and a similar preliminary Letter of Interest approach is used by the CT ILFP. The Corps facilitated exchange among the New England ILF Programs, which has been very helpful for the MA ILFP in developing project solicitation and evaluation process and materials.

The pre-proposal phase of the RFP process is intended to be a relatively easy screening process that encourages applications for ILF funding, while allowing the MA ILFP and Project Sponsors to focus

subsequent efforts on advancing the most competitive projects to the next phase of project review. Following the 2019 RFP, the ILF Program Administrator, DFG's ILF project review team, the Corps and the IRT reviewed the pre-proposals and invited a small subset of the applicants from the pre-proposal stage to submit full project proposals.

Based on the program experience to date as well as feedback from both Project Sponsors and the Corps, the MA ILFP is modifying its RFP process for 2020 to be more streamlined, to align better with the Corps' phased review process, and to provide more predictability on proposal requirements and decision timelines. DFG sees this as an iterative process and will continue to develop its process and guidance documents to effectively achieve the ILF program goals. Please see Section 4.0 below for a discussion of lessons learned.

3.3 Program Administration - Standard Operating Procedures

The MA ILFP is developing and documenting Standard Operating Procedures (SOPs) for program administration to address management, financial, and ecological goals and objectives. SOPs will be a core component of an Internal Control Plan (ICP) for the ILFP. The purpose of this ICP is to present a comprehensive assessment of risks that could impede the achievement of the goals and objectives of the MA DFG ILFP, and to lay out a set of internal controls and best practices to avoid and minimize those risks. The format and content of this ICP is based on the June 2015 Internal Control Guide developed by the MA Comptroller's Office in accordance with Chapter 647 of the Acts of 1989. The application of ICPs throughout MA state government is intended to prevent fraud, waste, and abuse of resources.

The draft ICP outlines the main goals and objectives of the MA ILFP and identifies potential risks that might get in the way of success. SOPs will be identified for each objective. These SOPs act as internal controls to prevent risk-related barriers to the achievement of ILFP goals and objectives. As an example, the primary objectives associated with Goal #1 are outlined below. SOPs are in place for most of these items, and the purpose of the ICP is to document procedures in detail, including roles and responsibilities and relevant supplemental information and resources. The ICP will serve as a program manual and administrative guide for current and future staff involved in the MA ILFP.

GOAL #1. Responsible management of ILFP funds in accordance with generally acceptable accounting principles and applicable state and federal regulations.

- Objective 1.1 Establish a separate ILFP account, as required by the Federal Mitigation Rule, that is dedicated for ILF purposes and managed in accordance with applicable state regulations and fiscal policy.
- Objective 1.2 Timely deposit of ILF payments into the mitigation Trust account
- Objective 1.3 Appropriate coding and permittee details to enable tracking and accurate reporting
- Objective 1.4 Timely and accurate receipts for ILF payments (aka Letters of Sale of ILFP Mitigation Credits)

Objective 1.5 Maintain updated tracking system and ledger to support efficient, accurate reporting on revenue, expenditures, credit sales, mitigation obligations, committed funds and available funds.

Objective 1.6 Establish effective mechanisms and protocols for commitment of funds and disbursement to award recipients.

Objective 1.7 Ensure staff have the appropriate training and support needed to perform the accounting and fund management tasks assigned to them.

Objective 1.8 Establish a transparent accounting process for the administrative (17.5%) portion of the ILF revenues and expenditures

Objective 1.9 Timely and complete annual reports to the Corps and quarterly internal QA/QC self-audits

The draft ICP also includes the following major program goals, for which SOPs are also being formalized. The ICP is intended to be a living document, updated and modified as needed for effective program administration.

GOAL #2. ILFP funds are awarded appropriately, consistent with the intent of the MA DFG ILF Program Instrument and the requirements of the 2008 Federal Mitigation Rule.

GOAL #3. Sufficient funds are available to effectively administer the program.

GOAL #4. Mitigation occurs within 3 years following receipt of ILF payments for Corps-permitted impacts.

GOAL #5. ILFP administration is aligned with the review and approval procedures required by the Corps.

GOAL #6. Optimize performance of the program with a view to continuous improvement and flexibility to adapt to changing conditions, such as changes in available funding, mitigation priorities, regulatory environment and best available data to inform decision-making.

3.4 Instrument Re-evaluation and Potential Revisions

During the first 5 years of the MA ILFP, there have been two amendments to the Instrument to incorporate Corps-approved mitigation project sites. Other programmatic amendments are under consideration as described in more detail below. These include potential amendments to address the following topics:

1. Roles and Responsibilities of DFG Divisions in administering the program and implementing ILF projects – conflicts with mixing of mitigation funds with DER priority projects
2. Stream credits - challenges related to low credit sales and high costs of stream restoration
3. Stranded credits and revenue – challenges in Service Areas with low levels of credit sales
4. Coastal Service Area and sub-areas – optimizing use of ILF funds across sub-areas for timely, successful restoration projects

5. Expanding MA ILF Service Areas to encompass portions of Rhode Island – potential receipt of ILF payments required by Corps Section 404 permits in RI, and DFG assumption of mitigation responsibilities

Concurrent with the development of this status and trends report, the MA ILFP is considering several potential revisions to its Instrument:

1. The Instrument lays out the operation of the program within DFG somewhat differently than how the program has evolved. The Instrument defines a leadership role for DFG's Division of Ecological Restoration (DER) within the MA ILFP as a whole and for inland restoration projects in particular. Changes in DER's leadership and policies since the Instrument was developed and its reliance on large federal grant programs to move projects forward have led DER to prohibit any of its projects from receiving mitigation funding. While other in-lieu fee programs have been able to leverage mitigation dollars to implement large, impactful projects, the fact that the MA ILFP has been unable to participate in projects in which DER is involved has significantly hindered the MA ILFP's ability to achieve mitigation requirements through restoration. The MA ILFP has been working with DER on a framework for collaboration whereby DER provides technical and advisory support to ILFP staff, as an alternative approach to the role envisioned for DER involvement in the ILFP. DFG will continue to evaluate the effectiveness of this approach. DFG may propose revisions to the Instrument to reflect the role of DER and to describe the program's revised strategy for aquatic resource restoration to meet the MA ILFP's current and future mitigation needs. DER staff participate in the MA ILFP project review team and provide mentoring and technical assistance to the ILFP's Aquatic Mitigation Specialist. The ILFP and DER may collaborate on other joint efforts. For example, DER has prepared a scope of work and request for quotes to hire a third party to develop a geospatial tool that both DER and the MA ILFP could use to identify and prioritize potential freshwater wetland restoration projects in 2021.

2. DFG's experience operating the MA ILFP under the terms of the Instrument has revealed a few challenges. The MA ILFP has experienced a low volume of stream credit sales across the board, even more so for tidal streams. Such low credit sales make it difficult to generate enough revenue to support a stream-focused restoration project such as a dam removal or culvert upsizing project, which can vary significantly in cost based on the location, condition, and use of the structure. The problem is compounded by the MA ILFP's aforementioned inability to contribute partial funding to a project if it is already being pursued by DER, the primary source of technical and financial support for inland restoration projects in the Commonwealth. Low stream credit sales and the complications of supporting stream restoration projects in Massachusetts together make it likely that the MA ILFP will meet most of its stream credit obligations through land preservation rather than restoration. However, because the cost of stream preservation may be lower per credit generated (compared with restoration), it's possible that the MA ILFP could fund some stream restoration projects in the future. For example, in cases where additional funds remain available in a Service Area and all mitigation obligations are already fulfilled, the MA ILFP may be able to contribute to a stream restoration project even if the cost per credit generated is higher than

stream credit fees. While the preparation of the five-year report is a logical time to re-evaluate credit fees, the MA ILFP is not proposing to change its fees for stream credits at this time because stream credits have played such a small role in the program to date, and the ILFP does not foresee that changing in the near future. Also, in order to propose changes in fees that properly reflect the full cost of restoration, additional cost data on a variety of stream restoration project types is needed. The current stream credit fees are based in part on cost data from a selection of DER river restoration projects during the period 2006-2015. The MA ILFP will continue to gather more recent cost data on a variety of project types and phases to inform any future changes in fee structure and to inform evaluation of potential ILF project feasibility.

3. The Berkshire/Taconic and Connecticut River Service Areas in particular are susceptible to housing stranded credits or revenue. Credits and revenue may become stranded in service areas that experience low credit sales volume, such that the amount of funding that is available in the service area is insufficient to support or attract a suitable mitigation project at any point during the three-year window in which an ILFP is obligated to initiate mitigation for credits that it has sold. The MA ILFP is planning to modify its program Instrument as recommended by the Corps to allow the Program Administrator to transfer stranded credits and revenue between service areas. For example, in the event that only a small number of credits sell in a service area, the MA ILFP may make a request to the IRT to satisfy mitigation obligations in an adjacent service area subject to the approval of the District Engineer. If an insufficient number of credits are sold in a given service area and not enough funds accrue to implement a project, this would not be considered by itself a default of the terms set forth in the Instrument. Credits generated from the use of the transferred funds would be used to offset the debits incurred from the impacts in the original service area. The credit transfer may be subject to a multiplier factor for the transfer of credits.

4. The ILFP Instrument describes 4 main Service Areas for the MA ILFP. It also subdivides the Coastal Service Area into three sub-areas, Coastal-North, Coastal-Central and Coastal-South. The MA ILFP is considering an Amendment request to the Corps that would allow for more flexibility in transferring Credits and/or ILFP funds among the Coastal sub-areas in order to increase opportunities for restoration as a preferred form of mitigation in the Coastal Service Area. This is somewhat similar in concept to the note above about the Berkshire/Taconic and Connecticut River Service Areas, where there are limited funds and/or stranded credits and revenue. The difference in the Coastal area is that substantial funds are available, as this is the most active of the four Service Areas. However, at the sub-area level, the mitigation obligations and available funding do not always align well with the opportunities available for feasible projects. The experience over the past 5 years has shown that opportunities for successful ILF projects may be lost if there is insufficient funds in a particular sub-area, while another sub-area may have available funds but no feasible projects in the near future. Another example relates to the challenge of identifying and implementing appropriate ILF sub-tidal resource mitigation projects. While the MA ILFP prioritizes mitigation in the sub-area where ILF payments (and impacts)

originated, it would be more effective for the program overall to be able to direct tidal ILF payments to another sub-area if there is a better and more timely project opportunity, and to be able to use extra credits generated in one coastal sub-area to meet the credit obligations of another, at least in the near-term. The overall goal here is to fulfill both freshwater and tidal mitigation credits for the Coastal Service Area in a timely manner with the best possible projects. Any additional ILF funds that remain, after all credits are fulfilled, could be directed back to sub-areas where revenue was transferred at a later date if and when a viable project is identified.

5. The New England Corps District has asked the MA ILFP to consider expanding two of its Service Areas into the nearby state of Rhode Island (RI). Currently, the MA ILFP Service Area boundaries stop at the state line. The Corps has suggested expanding the Quabbin-Worcester Service Area and Coastal-South sub-area of the Coastal Service Area to encompass the remainder of those Service Area watersheds that extend across state boundaries. RI does not have an ILF Program and is unlikely to, given its small size and low level of development projects that require Corps permits and associated compensatory mitigation. An amendment to the MA ILF Program Instrument would be required for this Service Area change. If the Connecticut (CT) ILFP also expanded its Service Areas into RI in a similar way, the entire area of RI would be covered in part by MA ILFP and in part by CT ILFP. The MA ILFP will explore this concept further with the Corps and other New England ILFPs. The potential revenue source from RI is expected to be small and if MA ILFP extended its Service Areas into RI, the likely scenario would be that ILF payments from RI would be used to fund mitigation projects within the MA state portion of the Service Area. From an ecological perspective, an expansion of ILFP service areas into RI would allow for compensatory mitigation opportunities that do not currently exist, thereby increasing benefits to aquatic resources on a regional basis.

4.0 Lessons Learned

4.1 Preservation versus Restoration

Opportunities to mitigate resource impacts through preservation have been more readily available than opportunities for restoration. This is in part because MA DFG has a robust land protection program and there is a strong, active land trust community in the Commonwealth. On the other hand, although restoration opportunities are many, it has not been as easy for the ILFP to find ways to collaborate on restoration projects, with the exception of projects sponsored by DFG's Division of Marine Fisheries. This is in part because of conflicts between state and federal programs that prioritize funds for proactive, voluntary restoration and discourage or prohibit the use of ILF mitigation funds on their projects. Another complicating factor is the length of time and upfront site assessment, design and permitting costs required before a restoration project can be assured of a high probability of success. This has made it difficult to commit funds to early conceptual-stage projects and less likely for restoration projects to be implemented within a 3-year window, unless there is a pipeline of shovel-ready, permit-ready projects that could provide the type of ecological lift in the Service Area(s) where ILF revenue is available.

The MA ILFP had anticipated, as provided in its Instrument, that a pipeline of restoration projects would be available and supported by DFG's DER. This has not however been the case, because of the funding source conflict mentioned above. The ILFP continues to work with DER to develop an alternative framework for collaboration. In addition, the MA ILFP continues to expand outreach and partnership development with NGO's, particularly those in coastal areas, and with regional coordinators for the state's various estuary programs. The addition of a full-time Aquatic Mitigation Specialist to the MA ILFP team will be valuable in strengthening the restoration component of the program.

4.2 Stream Credits

Over the first 5 years of program operation, it became apparent that stream mitigation credits would more likely be achieved through preservation, in part due to the small amount of revenue available from stream credit sales and in part because the cost of stream restoration is quite variable and can be extremely high in relation to the credits generated. Unless there is a change in future stream credit sales, the MA ILFP expects that wetland mitigation projects will be more common. The MA ILFP intends to re-evaluate stream credit fees; however, the cost of credits is not the only factor. There have not been many Corps permits for which ILF stream mitigation credits were required and this trend may continue.

4.3 Sub-tidal Mitigation and Credit Generation

Another lesson learned relates to compensatory mitigation for sub-tidal resource impacts. The MA ILFP has learned that identifying in-kind sub-tidal enhancement and restoration projects is quite difficult, and that this is a challenge for ILF programs across the country. Fortunately, MA DFG has an active eelgrass restoration and artificial reef program within its Division of Marine Fisheries, with expertise to support development and implementation of estuarine and marine ILF projects. Given the large amount of estuarine sub-tidal credit sales in the program's Coastal-North sub-area, the MA ILFP is also exploring possibilities for salt marsh restoration, and working with the Corps to evaluate potential inter-tidal restoration opportunities that would also enhance sub-tidal environments and generate tidal mitigation credits.

4.4 Long-term Management and Permanent Protection Mechanisms

The challenges and lessons learned here relate to both terrestrial and marine environments. Long-term management plans and protection mechanisms are required for ILF preservation and restoration projects. In developing project proposals and draft mitigation plans, it became clear that decisions on awards for preservation projects should not be made until after an approvable LTM Plan, and a final draft of a Conservation Restriction (CR), if required, have been submitted to the ILFP and reviewed by the Corps. During 2018 and 2019, the ILFP proceeded with project agreements prior to completion of Baseline Document Reports (BDRs), LTM Plans, and CR documents. However, for a few projects, there has been a delay in receipt of deliverables and inconsistencies in LTM Plan and CR allowed uses when compared with the project as approved. Although these projects are on the path to success, the lessons learned point to the benefits of more work upfront for the Project Sponsors and the ILFP before a funding commitment is made. Although this results in a longer period of uncertainty, it will provide for a stronger, more efficient program with clarity on expectations for both the ILFP and individual Project Sponsors. There is a balance to be found between a) streamlining the process to expedite funding decisions and provide predictability

to applicants who are investing a lot of time in draft mitigation plans, and b) the risk to the ILFP of committing to funding award without 100% assurance that all its requirements will be met.

The LTM and permanent protection issues and lessons learned for estuarine and marine projects are somewhat different, in that the typical land-based CR is not the standard protection mechanism for the marine environment and because Commonwealth-owned tidelands and ocean areas cannot have such restrictions placed on them. In addition, the dynamic nature of the marine environment means that vegetation (e.g. eelgrass) may move and change. Enhanced and restored resources may be subject to disturbance by boats, lobster traps and fishing activities. The MA ILFP tidal mitigation projects currently underway are sponsored by the DMF, and after the 5-year ILF monitoring period will be brought under the umbrella of DMF for long-term monitoring. Site selection measures will include screening for incompatible activities and implementation will include site markers and consultation with harbormasters as LTM measures. The MA ILFP is also discussing with the Corps the possibility of incorporating conditions in Corps permits that will address the needs for long term protection and serve to avoid and minimize potential encroachment on tidal mitigation project sites.

4.5 Project Solicitation and RFP Process

The lessons learned from the solicitation and response experiences of 2018 (within DFG) and the public RFP in 2019 pointed to some inefficiencies in the process, lack of clarity on the level of detail needed for final project approvals, and challenges in aligning funding decisions with the timeline of a proposed project. For example, a preservation site may need to be acquired quickly to avoid development; a restoration project needs to be at a further state in feasibility and design before final funding decisions or mitigation plans can be completed. In a few cases, these types of challenges resulted in the ILFP investing a lot of effort upfront on projects before realizing they might not be feasible or optimal for the ILFP.

Based on the lessons learned, the ILFP is continuing to develop its application materials with guidance and templates for potential Project Sponsors to clarify expectations and requirements for approval. This program improvement will help with quality, consistency, and ensure any red flags or other conflicts are identified early. Another lesson learned relates to timing of the various stages of ILF project solicitation and review by DFG as well as the Corps and IRT. The Corps/IRT process includes established review phases and timelines, and specific requirements for the content of a project Mitigation Plan. DFG has been working with the Corps to coordinate review in a way that avoids redundancy, provides predictability on the timing of Corps decisions, and streamlines the approach such that DFG's RFP and project development process aligns better with the Corps/IRT review and approval process.

For example, having gone through a few earlier versions of proposal guidance and application templates, the MA ILFP application form and guidance for full proposals addresses the twelve key components of a mitigation plan to facilitate review in the context of the 2008 Federal Mitigation Rule. Full proposals are effectively at the Draft Project Mitigation Plan stage. Because a draft project prospectus is now being requested at the pre-proposal stage, a project that is well-suited to the MA ILFP's current mitigation needs could move to public notice while the Project Sponsor prepares a draft mitigation plan and Long-Term Management Plan. This will improve on the 2019 process by starting the public comment process early

for projects under consideration and completing the Long-Term Management Plan agreements prior to release of funding.

The development of project agreements and contracts has also been evolving over the past few years as the program moves from its first DFG-sponsored projects to working with municipalities and NGOs. Project Sponsors within DFG Divisions co-sign Memorandum of Agreements with the MA ILFP that include details on project budgets, performance standards, timeline, deliverables and other conditions of funding. With non-DFG state agency Project Sponsors, the Commonwealth of Massachusetts has an Inter-Agency Service Agreement (ISA) process that the MA ILFP follows to establish contracts for implementation of ILF mitigation projects. The Commonwealth of Massachusetts Standard Contract with project-specific Scope of Services is the mechanism used to establish project agreements with municipalities and NGOs.

Attachment I.

Fact Sheet on Massachusetts In-Lieu Fee Program Fees (May 2014)

Background on DFG's Proposed In-Lieu Fee Program for MA

The U.S. Army Corps of Engineers (the "Corps") has approved the Department of Fish and Game (DFG) to be the sponsor of a state-wide program that would provide in-lieu fee compensatory mitigation associated with Corps permits under §404 of the Clean Water Act and/or §§9 or 10 of the Rivers and Harbors Act of 1899 and related federal rule at 33 C.F.R. Part 332 (the federal Mitigation Rule). On May 23, 2014 the Corps and DFG signed an Instrument developed by DFG that sets forth a comprehensive description of how DFG will administer this in-lieu fee program (ILFP) in Massachusetts, including the fees to be charged thereunder. DFG's ILFP and the related fee schedule are summarized below.

By way of background, the concept of an ILFP is to allow Corps permittees, in compensation for their project impacts to aquatic resources of the U.S. in Massachusetts, to make a monetary payment *in-lieu of* doing the required mitigation on-site. These in-lieu fee payments are made to the ILFP administered by DFG. As the ILFP sponsor, DFG, in turn, assumes legal responsibility for implementing the required mitigation, which it would accomplish by aggregating and expending the in-lieu funds received from Corps permittees for mitigation projects. Maine, New Hampshire, Vermont, Connecticut and New York all have Corps-approved ILFPs.

From June 2008 to June 2013, DFG's Division of Marine Fisheries ("DMF") served as the program sponsor for an ILFP established to provide mitigation for impacts to aquatic resources of marine and diadromous fish species in Massachusetts. That ILFP, however, was limited to providing mitigation associated with in-lieu fee projects that alter less than one acre of aquatic resource and meet the criteria for coverage under the Corps' General Permit ("GP") for Massachusetts. DFG's state-wide ILFP covers impacts to all types of aquatic resources from both small-sized projects covered under the GP and larger projects that require an individual permit from the Corps.

DFG's ILFP is being administered by its three divisions – the Division of Marine Fisheries (DMF), the Division of Fisheries and Wildlife ("DFW") and the Division of Ecological Restoration ("DER") - and will implement mitigation projects that permanently protect aquatic resources and upland buffers and/or restore impacted aquatic resources within four (4) identified bio-regions covering the state (called "service areas"). DFG will select ILFP mitigation projects through its application of detailed prioritization criteria in the ILFP Instrument, which includes consideration of a potential project's ability to achieve multiple mitigation objectives and its support or compatibility with broader conservation or management initiatives. DFG will

coordinate the implementation of its ILFP with a federal and state interagency review team (the "IRT").

Description of the Basis of DFG's Proposed ILFP Fees

Introduction

As summarized above, DFG's ILFP is authorized by and subject to the federal Mitigation Rule. The Corps' New England District Mitigation Guidance, in turn, further specifies how the New England District will apply the federal Mitigation Rule in the context of issuing Corps permits pursuant to §404 of the Clean Water Act and/or §§9 or 10 of the Rivers and Harbors Act of 1899. Thus, the Corps' New England District – not DFG – determines the appropriate amount of compensatory mitigation required in these federal permits.

When a Corps permittee chooses to purchase credit(s) from DFG's ILFP in lieu of being responsible for implementing the required mitigation, the Corps will specify the corresponding number of credit(s) in their permit. The Corps' New England District will generally require a 1:1 mitigation ratio as a condition of its permits. For example, this means that if the Corps permitted activity impacts 1 acre of wetland, a permittee opting to use the ILFP would be required to make an in-lieu payment that equals the cost of purchasing a 1 acre credit from the DFG ILFP.

As discussed in more detail below, the fees established by DFG for its ILFP mitigation credits are based on the full cost of restoring a unit of aquatic resource, which is expressed in terms of a cost per square foot or cost per linear foot, depending on the resource type. This "full cost accounting" approach factors in the following categories of mitigation costs, adjusted by service area:

1. The costs of purchasing suitable land to serve as the mitigation site, including the transaction and other due diligence costs associated with such acquisition;

2. The costs of the engineering, permitting and construction of the project;

3. The costs of monitoring and maintaining the project until its performance standards have been met;

4. The separate cost of long-term monitoring, which will extend beyond the project's achievement of its performance standards, to protect the project from encroachment and conversion;

5. Administrative overhead costs; and

6. A contingency amount, to ensure that there are funds available for any corrective actions that may need to be taken by DFG to ensure that the project meets its performance standards.

In response to the 1:1 mitigation approach to be taken by the Corps' New England District at the permitting stage, DFG priced its credits based on the full cost of implementing the most costly type of mitigation project – i.e., the creation of a new wetland where none existed. This is primarily because the Corps' New England District Mitigation Guidance envisions applying mitigation ratios that are higher than 1:1 to the compensatory mitigation projects implemented by DFG as the ILFP sponsor. The actual mitigation ratios that will be required for the ILFP depend on the type of aquatic resource impacted by the permitted activity and the type of compensatory mitigation implemented by DFG, and will be determined by the New England District and DFG on a project-specific basis, in consultation with the IRT.

The development of fees for DFG ILFP included a review of the fees established by the Division of Marine Fisheries under its earlier coastal/marine ILFP, the cost considerations underlying the ILFP fees established by Maine, New Hampshire and Connecticut, and mitigation project cost information from NOAA, MassDOT, and National Grid.

Engineering, Permitting and Construction Costs

The most expensive cost category underlying the ILFP fees is for the engineering, permitting and construction of a mitigation project. This category also varied the most across the above cost data sources and covered a range of cost assumptions, including the $193,143 cost per acre used by the State of Connecticut for its ILFP; the $268,200 cost per acre reported by National Grid; the $363,000 cost per acre reported by MassDOT (which represents the midpoint of their range of $50 - $75 per square yard); and the $413,671 cost per acre reported by NOAA. DFG ultimately selected MassDOT's $363,000 per acre figure as a reasonable assumption for the engineering, permitting and construction costs.

Land Costs

Another category that varies widely is the cost of land, with per square foot prices ranging from $0.19 in Maine to $2.84 in Connecticut. DFG determined that the most relevant data source for land costs is the appraised value for land actually purchased by DFG from 2008 – 2012. This DFG land cost data was averaged and sorted by the proposed ILFP service areas in Massachusetts. However, DFG also adjusted these average land costs upward by 10% to reflect the depressed state of real estate market values during this time period, and added another 7.5% to account for the transaction/due diligence costs associated with land acquisitions. The average per-acre cost ranged from $2,987 in the Berkshire Service Area to $22,553 in the Coastal Service Area. Despite the wide range in land costs among the different data sources, land cost is still a relatively small component of the total cost of a wetland creation mitigation project, when compared to the project's engineering, permitting and construction costs.

Other Costs

DFG's assumption of sole liability for successful mitigation also required factoring in the cost of long-term maintenance of a mitigation project of this nature ($47,400), the long-term monitoring ($47,767), administrative overhead costs (20%), and a contingency amount (10%) available to fund any necessary corrective measures by DFG.

DFG's ILFP Fee Schedule

Based on its analysis of the full cost accounting factors summarized above, DFG established its fees for purchasing credit(s), or a portion thereof, from DFG's ILFP. DFG's ILFP fee schedule is set forth in the table below. As stated in its ILFP Instrument, DFG intends to periodically review the fees to determine whether any adjustments are appropriate to reflect changes in mitigation cost factors and to account for the full cost of administering the ILFP.

Service Area	**$/sq ft**	**$/linear foot**
Berkshire	$13.68 / s.f. ($596,041 per acre)	$100.00
Connecticut River	$13.70 / s.f. ($596,656 per acre)	$100.00
Worcester	$13.73 / s.f. ($598,071 per acre)	$100.00
Coastal	$14.26 / s.f. ($621,330 per acre)	$200.00
Statewide Average	$13.84 / s.f. ($603,025 per acre)	$125.00

Attachment II.

Massachusetts DFG In-Lieu Fee (ILF) Program

ILF Projects funded to date (July 2019)

Summary Information
Project Fact Sheets

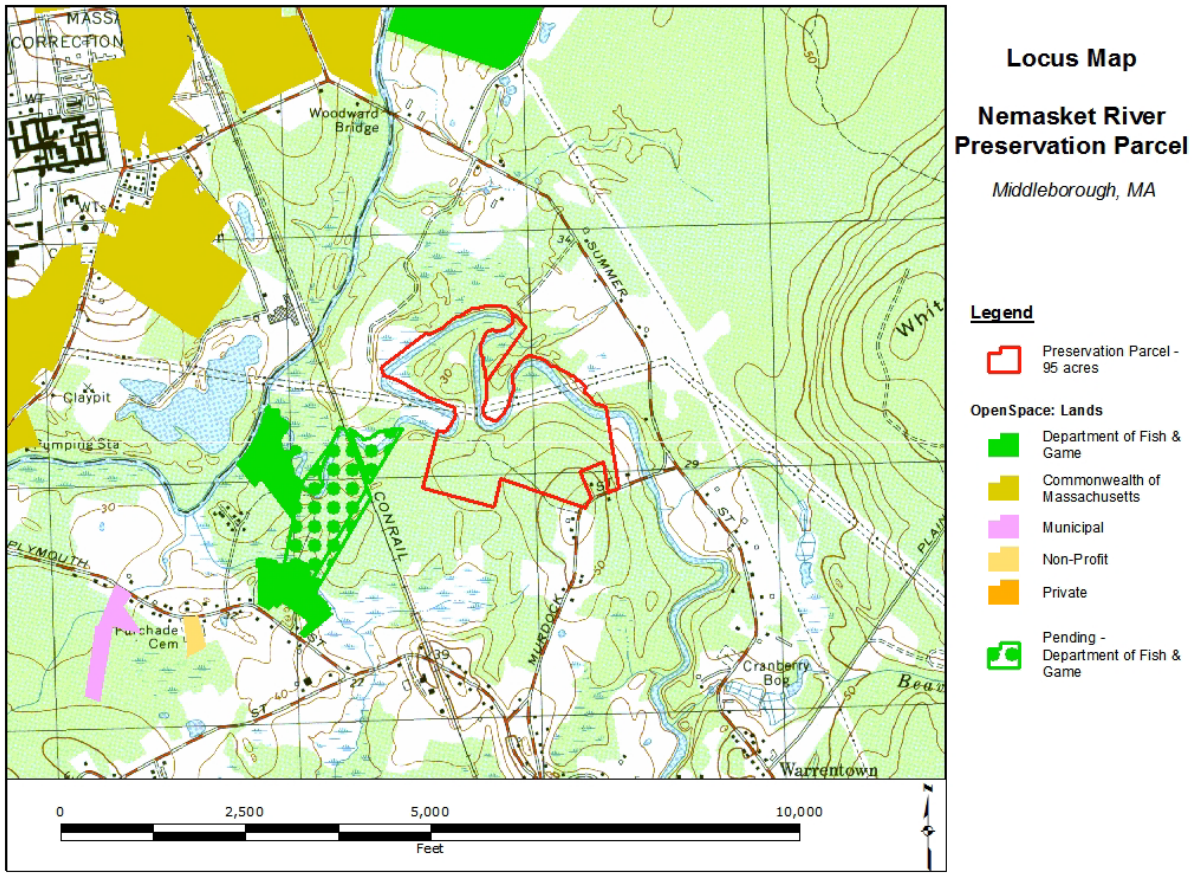
- **Nemasket River Preservation Parcel, Middleborough, MA**
- **Town Farm Road Preservation Parcel - Ipswich MA**
- **Williams River Preservation Parcel - West Stockbridge, MA**
- **Improving Diadromous Fish Passage on the Ipswich River**
- **Marine Habitat Enhancement, Yarmouth MA Artificial Reef**
- **Eelgrass Restoration Project, Salem Sound MA**

For additional information on the ILF Program and Mitigation Projects, contact
Aisling O'Shea, ILF Program Administrator, (617) 626-1605 or email at aisling.oshea@mass.gov

MA In-Lieu Fee Program - Project Fact Sheet

Nemasket River Preservation Parcel, Middleborough, MA

ILF Funding	$405,000
ILF Service Area	Coastal-South Service Area
Project Location	Murdock Street, Middleborough MA (Lat/Long -70.931154, 41.9335165)

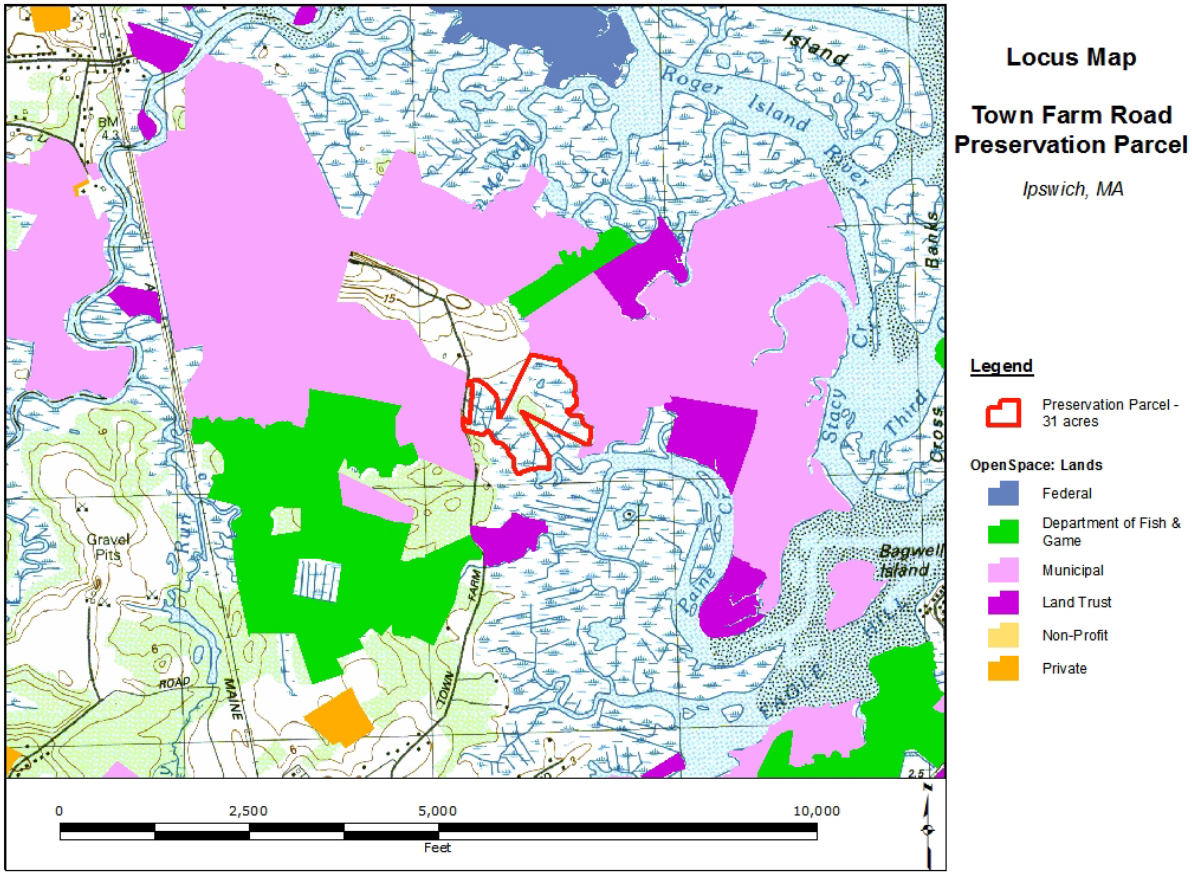


Project Summary The Department of Fish and Game/Division of Fisheries and Wildlife (DFG/DFW) Land Protection Program was awarded $405,000 In Lieu Fee Program funds for the fee interest acquisition of a 95-acre property, comprising two parcels (90 acres and 5 acres), located off Murdock Street in Middleborough, MA. This property, which is under threat of development, includes over a mile of frontage on the Nemasket River in the upper Taunton River watershed and contains BioMap2 Aquatic Core, Wetlands Core, and Species of Conservation Concern Core, as well as substantial upland buffers to these resources. The site is of significance for connectivity, ecological integrity, and climate change resiliency; it is identified as a BioMap2 Critical Natural Landscape (CNL) Landscape Block[1], a DEP Important Habitat[2], and a TNC resilient site[3]. The property had the potential for as many as 13 house lots. Permanent protection of this 95-acre property preserves important high quality palustrine wetland and riverine resources in the Coastal South Service Area. The Long-Term Management Plan for the property addresses vegetation management and other best management practices (BMPs) to ensure protection of endangered species and aquatic resources on site.

MA In-Lieu Fee Program - Project Fact Sheet

Town Farm Road Preservation Parcel - Ipswich MA

ILF Funding	$40,000
ILF Service Area	Coastal-North Service Area
Project Location	171 Town Farm Road, Ipswich, MA (Lat/Long: 42.7120765,-70.840616)

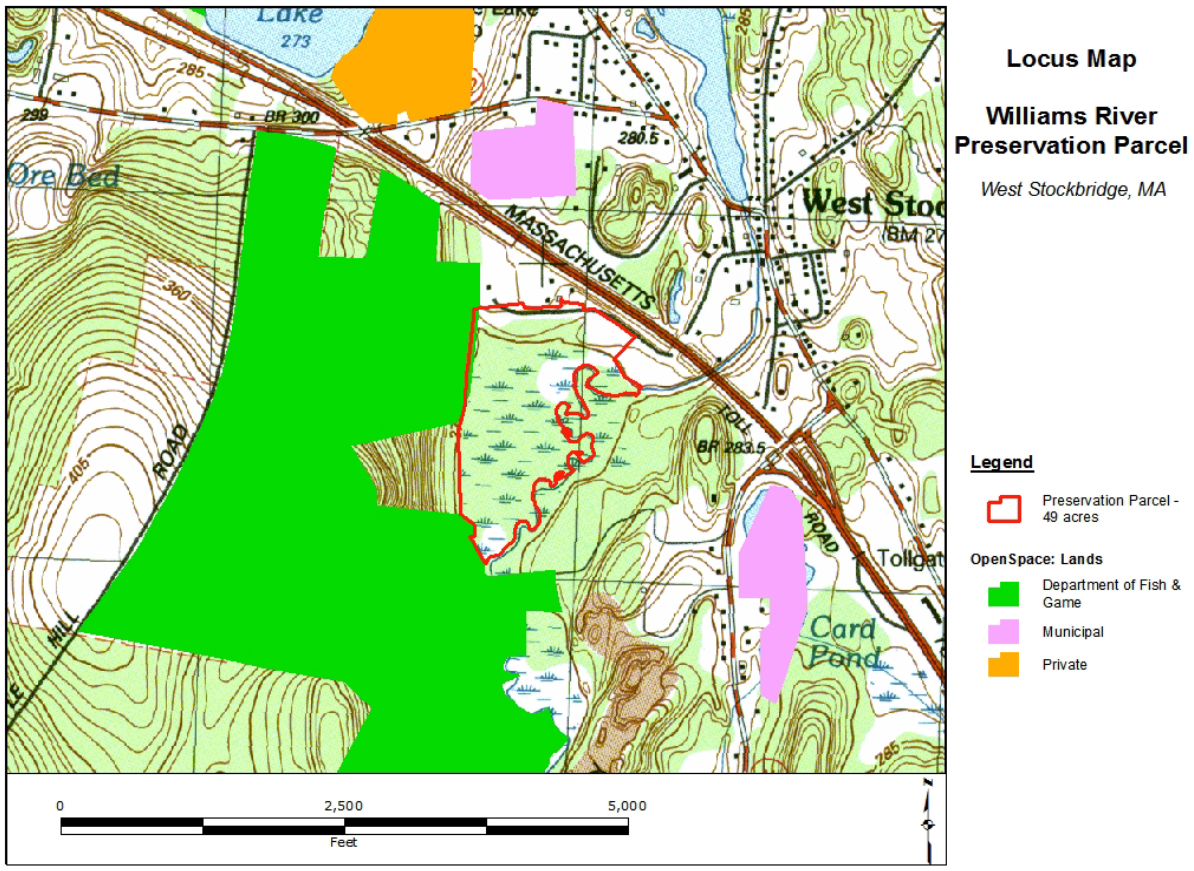


Project Summary The Department of Fish and Game/Division of Fisheries and Wildlife (DFG/DFW) Land Protection Program was awarded $40,000 in In Lieu Fee Program funds for the fee interest acquisition of a 31-acre parcel, located on Town Farm Road in Ipswich, MA. This property provides an important connection between protected areas owned by the Ipswich Conservation Commission and the Essex County Greenbelt Association. It is also in close proximity to conservation lands and salt marsh owned by DFW. This 31-acre parcel contains 2 acres of coastal woodland and approximately 27 acres of estuarine intertidal wetland resources. The parcel also includes frontage on Town Farm Road, with a small gravel parking area. Without permanent protection, this parcel was at risk of degradation by clearing of maritime shrub and coastal forest for a house or cabin on the upland island. The property is located within the Parker River watershed and the Great Marsh Area of Critical Environmental Concern (ACEC). It is identified as BioMap2 Aquatic Core habitat, Priority Natural Communities Core habitat, Species of Conservation Concern Core habitat[1]. The parcel is also mapped as BioMap2 Critical Natural Landscape (CNL) Landscape Block and Aquatic Buffer, as well as Tern Foraging Habitat. In addition, it contains DEP Important Habitat[2] and is identified as an important Coastal Adaptation area.

MA In-Lieu Fee Program - Project Fact Sheet

Williams River Preservation Parcel - West Stockbridge, MA

LF Funding	$13,447
ILF Service Area	Berkshire/Taconic Service Area
Project Location	Moscow Road, West Stockbridge, MA (Lat/Long: -73.374,42.3316)



Project Summary The Department of Fish and Game/Division of Fisheries and Wildlife (DFG/DFW) Land Protection Program was awarded $13,447 in In Lieu Fee Program funds for the fee interest acquisition of a 49-acre property, located off Moscow Road in West Stockbridge, MA. This property is adjacent to the DFW Maple Hill Wildlife Management Area and includes approximately ±5,000 feet of frontage on the Williams River and 38 acres of freshwater wetlands. The property was under threat of development, with 500 feet of frontage on Moscow Road and potential for residential housing lots. The Williams River, which is major tributary of the Housatonic River, is an identified Coldwater Fisheries Resource. Wetlands on-site are identified as BioMap2 Wetlands Core habitat[1]. The Williams River preservation parcel is of significance for connectivity, ecological integrity, and climate change resiliency; it is identified as BioMap2 Critical Natural Landscape Upland Wetland Buffer, a DEP Important Habitat[2], and a TNC resilient site[3]. Acquisition and management of this parcel by DFW ensures the preservation of these aquatic resources and ±10 acres of upland buffer.

[1] BioMap2 is designed to guide strategic biodiversity conservation in Massachusetts by focusing land protection and stewardship on the areas that are most critical for ensuring the long-term persistence of rare and other native species and their habitats, exemplary natural communities, and a diversity of ecosystems. *Core Habitat* identifies key areas to ensure the long-term persistence of species of conservation concern, exemplary natural communities, and intact ecosystems across the Commonwealth. *Critical Natural Landscape* identifies larger landscape areas that are better able to support ecological processes, disturbances, and wide-ranging species.

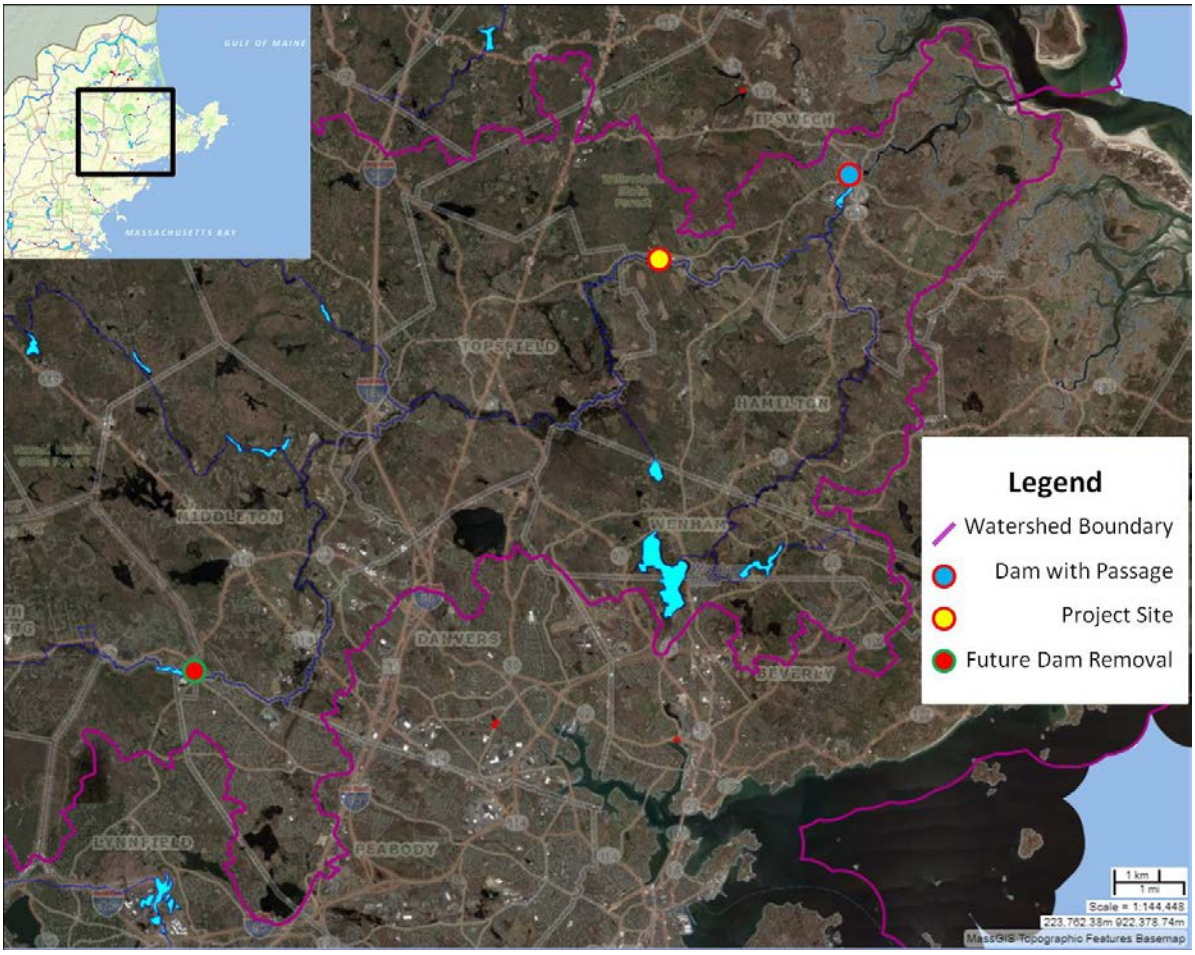
[2] Developed by UMass, the Massachusetts Ecological Integrity Maps (IEI) are based on a computer software program and a method to prioritize land for conservation based on the assessment of ecological integrity for ecological communities (e.g., forest, shrub swamp, headwater stream). Using the IEI values, the MassDEP maps of Habitat of Potential Regional or Statewide Importance (MassDEP Important Habitats) depict areas representing 40% of the landscape with the highest wildlife habitat value.

[3] The Nature Conservancy's Resilient Sites for Terrestrial Conservation project identifies the areas estimated to be the most climate resilient for each of 62 characteristic environments in Eastern North America.

MA In-Lieu Fee Program - Project Fact Sheet

Improving Diadromous Fish Passage on the Ipswich River

ILF Funding	$122,611
Project Location	Willowdale Dam, Ipswich MA Lat/Long 42.659880, -70.894150
ILF Service Area	Coastal (Coastal-North Subarea)

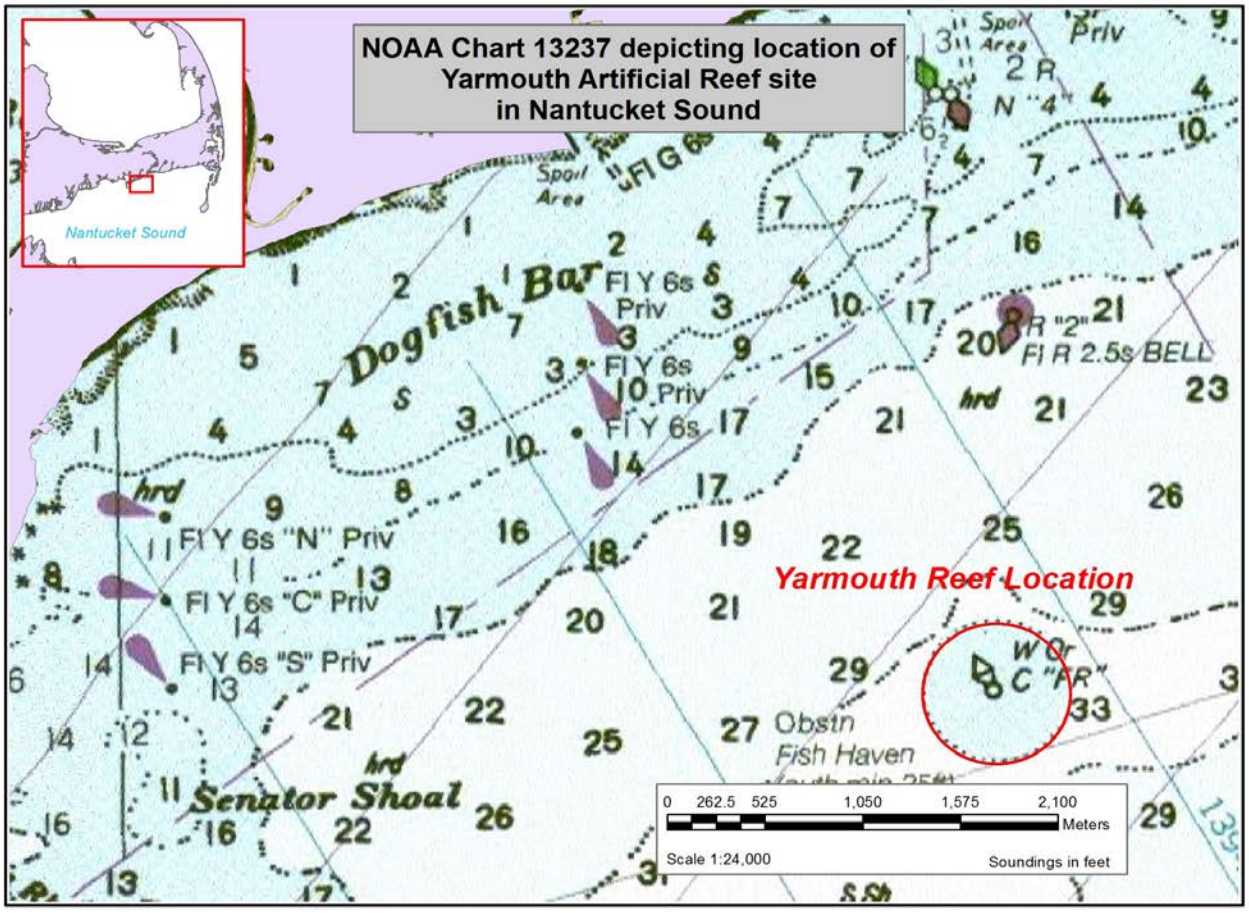


Project Summary MA DFG's Division of Marine Fisheries (DMF) has been awarded $122,611 in ILF funds for installation of a new Alaska steeppass-style fishway, to be sited on river left at the Willowdale Dam in Ipswich, MA. This new fishway will replace a failing and poorly-sited weir-pool fishway that is currently sited on river right. The project is primarily targeting River herring, a Federally-recognized Species of Concern, and will restore passage to 14.5 miles of mainstem spawning and nursery habitat for both alewife and blueback herring, and passage to additional tributary river miles and pond acreage. The aquatic resource benefits of the project include enhancement of freshwater riverine ecosystem and essential fish habitat, improved connectivity, food webs and nutrient transport among marine, estuarine, riverine tidal and riverine freshwater ecosystems.

MA In-Lieu Fee Program - Project Fact Sheet

Marine Habitat Enhancement, Yarmouth MA Artificial Reef

ILF Funding	$225,097
ILF Service Area	Coastal (Coastal-South Subarea)
Project Location	Corner Coordinates of 0.93 acre box within permitted reef site NW: 41.608116 -70.194737 SW: 41.607560 -70.194737 NE: 41.608116 -70.194199 SE: 41.607560 -70.194199

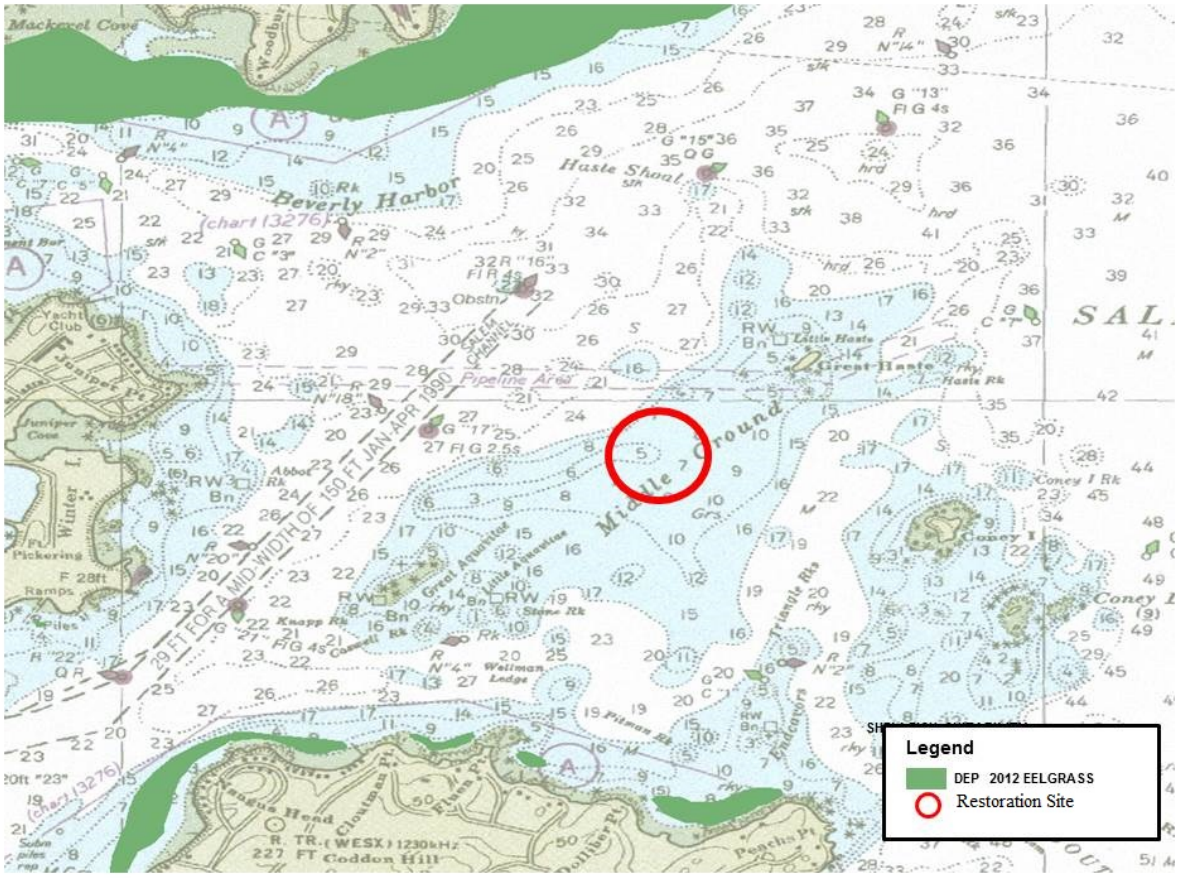


Project Summary MA DFG's Division of Marine Fisheries (DMF) has been awarded $225,097 for a structured habitat enhancement project that will generate 0.93 acres of marine subtidal artificial reef habitat by deploying two thousand (2,000) cubic yards of materials to the site. The selected site for this project is within an undeveloped portion of a 125-acre permitted artificial reef site. Structures will be distributed in patches on the bottom, utilizing a 1:2 ratio of new structures to undisturbed natural bottom (33% material coverage to 67% undisturbed area). The project location is Essential Fish Habitat (EFH) for one or more life history stages of fifteen managed marine species including Atlantic cod, winter flounder, long-fin squid, scup, black sea bass, and surf clam. DMF will conduct a rigorous, multifaceted monitoring program utilizing divers and remote sensing equipment to observe and measure species composition and successional colonization.

MA In-Lieu Fee Program - Project Fact Sheet

Eelgrass Restoration Project, Salem Sound MA

ILF Funding	$262,092
ILF Service Area	Coastal (Coastal-North Subarea)
Project Location	Salem Sound (Middle Ground)



Project Summary MA DFG's Division of Marine Fisheries (DMF) was awarded $262,092 in ILF funds for an eelgrass restoration project, which began in 2017. DMF chose Middle Ground in Salem Sound to plant two ¼ acre (1,011.7 m^2) sites in 2017. The West ¼ acre restoration site (MGW) was planted in April and May 2017, while the East ¼ acre restoration site (MGE) was planted in the end of August and September 2017. An additional ¼ acre site was planted south of MGW in May 2018 as an adaptive management measure to compensate for storm-related losses at MGW. The project has completed its second year of the 5-year monitoring plan, which includes monitoring of mean shoot density and survival, canopy height and percent cover. DMF's eelgrass restoration project also includes monitoring of several reference sites to inform evaluation of restoration success at Middle Ground.