Maine River Herring Sustainable Fishery Management Plan

2024 Maine SFMP Update Approved by the ASMFC American Shad and River Herring

Management Board - October 2024

Update Submitted by the Maine Department of Marine Resources to the Atlantic States Marine Fisheries Commission September 1, 2024

Maine ASMFC River Herring Sustainable Fishing Plan Update 2024

1. Introduction

The purpose of the Maine Sustainable Fisheries Management Plan (SFMP) is to establish river herring management goals, objectives, and develop management actions that continue to support and expand existing river herring resources that provide forage for Maine's fish and wildlife and offer commercial fishing opportunities in Maine's coastal communities. The Maine Sustainable Fisheries Management Plan establishes population metrics to track and assess the health of Maine's commercial and noncommercial river herring populations. Population trend data from fishery dependent and fishery independent surveys provide information to develop a framework for the management actions used to make sound management decisions and ensure that Maine meets the goal and objectives of Amendment 2 to the Shad and River Herring Management Pan.

The State of Maine Department of Marine Resources (DMR) and municipalities that harvest alewife and blueback herring (Alosa aestivalis, Alosa pseudoharengus**)** collectively known as river herring, operate under state and federal site-specific management plans that guide the conservation and harvest of river herring resources. These plans promote and manage commercial and recreational river herring resources where they occur within the state. Maine formalized river herring management plan formats in 1950, though management plans and harvest agreements existed prior to this date.

Maine has 39 municipalities that are granted the exclusive right to commercially harvest river herring. In 2024, twenty-three municipalities actively harvest river herring (Table 1). Joint municipal fisheries, where one or more municipalities harvest the same resource, operate through cooperative agreements between municipalities bordering a shared waterbody. One example is Winnegance Lake in mid-coast Maine. Three municipalities, Bath, West Bath, and Phippsburg, which border the spawning habitat along Winnegance Lake share and coordinate harvest, reporting, and collect biological data from the single commercial harvest location.

The State of Maine, in accordance with state and ASMFC river herring management plans, conducts a review of all municipal river herring harvest requests on an annual basis. An annual review of municipal harvest requests includes analysis of existing commercial harvest practices, escapement, species composition, age structure, repeat spawning, and mortality estimates. Analysis of biological and run count data determines the level of commercial harvest or need for management action for populations that do not achieve SFMP metrics. The most common management actions are additional closed days for the fishery, additional pre-escapement before harvest can occur, gear modifications, or closing the fishery.

Directed commercial harvest of alewife or blueback herring does not occur in the mainstem of nine of Maine's largest rivers (Penobscot, Kennebec, Androscoggin, Saco, St. Croix, Presumpscot, Machias, Salmon Falls, and East Machias). Commercial fisheries do exist on the tributaries of larger rivers, for example, harvest is permitted on the Sebasticook River six miles above its confluence with the

Kennebec. These traditional conservation strategies provide alewife and blueback herring unrestricted access through large migratory corridors and allows access to spawning habitats upstream. To further conserve existing river herring populations in coastal waters this plan prohibits the use of all gear types for directed commercial fisheries for blueback herring or alewife in Maine's territorial waters (inside three miles) except for the permitted municipal fisheries **(Appendix B)**.

There are ongoing efforts to improve commercial and noncommercial runs that occur throughout historic spawning habitats within the state. Dam construction during the last two centuries isolated river herring from many of the inland waters DMR is trying to restore through alewife and blueback herring reintroductions. Due to dams without fish passage, the historical significance of anadromous fish to inland waters was eventually lost and freshwater fish communities, especially recreational game fish, began dominating these habitats.

In the 1980s, DMR began actively restoring access to historic spawning habitats for anadromous fish. To initiate restoration activities DMR must receive a permit from the Maine Department of Inland Fisheries and Wildlife (IFW) before stocking any state water with river herring. The reintroduction of river herring is not permitted into some historic spawning habitats based on perceived conflicts with rainbow smelt and recreational sport fish species including landlocked salmon. Establishing a baseline for reintroduction was important to inland fisheries managers that manage fishing opportunities for salmon, trout, and bass.

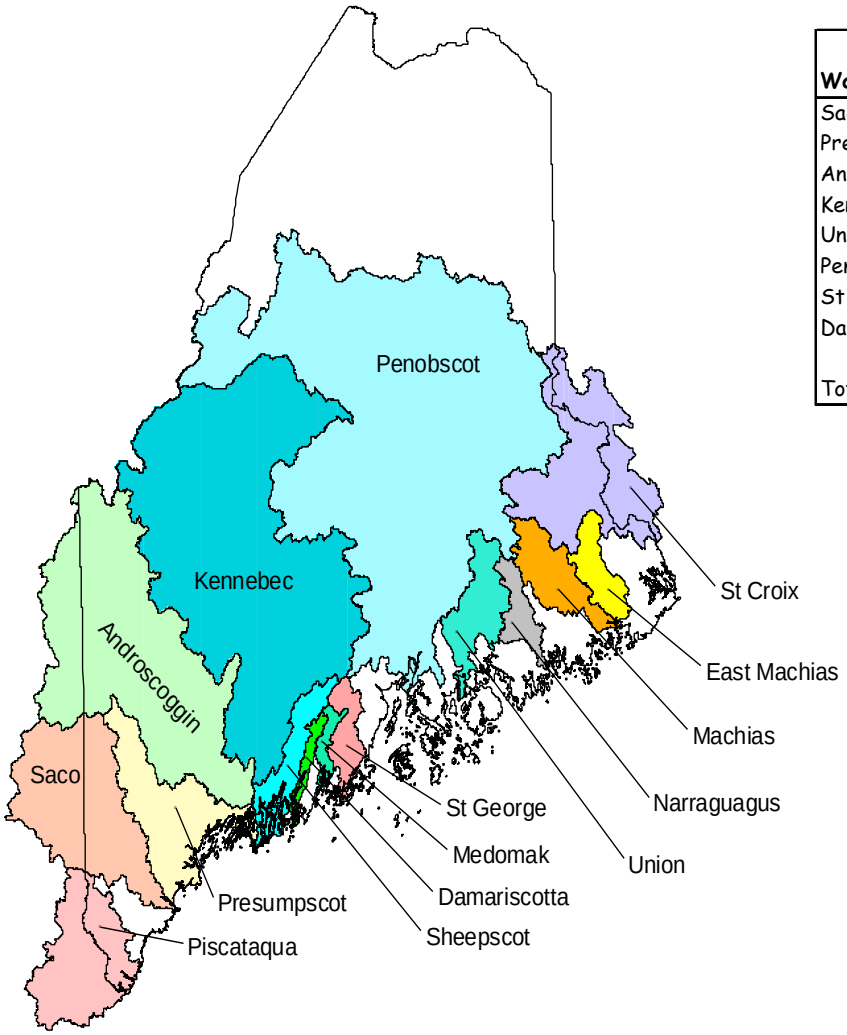
The State of Maine developed an interim restoration stocking target of six fish per surface acre for alewife stocked by truck into Maine's inland lake and pond habitats. State resources agencies established this stocking rate based on the results of a 10-year study (Lake George Report) conducted by DMR, Maine Department of Environmental Protection (DEP), and Maine Inland Fisheries and Wildlife (IFW) (Kircheis 2002). The goal of the study was to quantify the effects of a spawning population of alewife on the resident fish species and zooplankton communities within inland waters.

A stocking rate of six fish per surface acre of lake or pond habitat exhibited no negative effects on growth rates of resident freshwater fish species. Based on this study, and through an agreement reached between IFW and DMR, a stocking rate of six fish per acre is used for all truck-stocked restoration sites. River herring returns at the conclusion of restoration efforts are passed at a rate higher than six fish per acre. Returns post-restoration are passed at the rate that river herring return to the fishway and may be as high as several hundred fish per acre.

It is important to note that the experimental stocking rate for this study was arbitrary and the initial stocking density could be higher and still not demonstrate significant impacts to resident fish species, in fact it may show significant benefits. The potential alewife population based on historically available habitat and estimates of current production would exceed 54.5 million fish (Figure 1).

State legislation prohibits stocking river herring or providing passage into several waters within the state. Most often this is to address concerns regarding spread of non-native fish species, though in some cases it is targeted at preventing the expansion of river herring populations. Most commercial runs could expand if they were not constrained by permitting or fish passage restrictions unrelated to the commercial harvest. One example is the Androscoggin River, Maine's third largest River where only 1/3 of the historic spawning area is open to river herring restoration. A similar issue occurred on the St. Croix River when the Maine Legislature ordered modifications to the existing fishways to prevent river herring from ascending the river. In the 1980s', soon after the state closed these fishways, the St. Croix River river herring run declined from a population of 2.8 million returns to approximately 5,000. In 2013, the Maine Legislature reversed its decision and river herring were allowed to pass into a larger portion of the watershed beginning in 2014. The DMR continues to work with state, federal, and tribal resource agencies and NGOs to increase access to historic spawning habitats on the St. Croix River and other rivers statewide.

Figure 1. Estimates of potential alewife returns from historic alewife habitat by watershed (@235/fish/acre).



Watershed	Alewife Potential
Saco River	720,630
Presumpscot River	147,700
Androscoggin River	2,300,000
Kennebec River	11,143,086
Union River	2,000,000
Penobscot River	14,561,305
St Croix River	22,660,000
Damariscotta	1,034,000
Total	54,566,721

Commercial harvesters and supporters of river herring restoration efforts continue to advocate for increased passage for river herring. All municipalities that exercise commercial river herring fishing rights maintain and monitor up and downstream passage during the spring and fall. In 2008, commercial harvesters began collecting scale samples and biological data from their respective commercial catches to meet the data collection objectives and anticipated management actions resulting from Amendment 2. In municipalities which do not exercise their right to fish, river herring returns typically remain below expectations. In most cases, there is no local interest in providing/improving passage or monitoring these runs at the municipal level. However, this has changed in recent years with increased funding for fish passage and renewed local interest in restoring many locations with native sea-run fish species.

Table 1. Maine municipalities with directed commercial river herring fishing rights

Municipality	Fishery	Municipality	Fishery
Alna*	Long Pond	Meddybemphs	Meddybemphs Lake
Arrowsic*	Sewall Pond	Mount Desert	Somes Pond
Bath*		Newcastle*	Damariscotta Lake
Phippsburg*	Winnegance Pond	Nobleboro*	
West Bath*		Orland*	Orland River
Benton*	Sebasticook River	Pembroke	Pennamaquan Lake
Boothbay Harbor	West Harbor Pond	Perry*	Boyden Lake
Breman	Webber Pond	Penobscot	Peirce Pond
Bristol	Pemaquid Pond	Penobscot*	Wights Pond
Cherryfield*	Narraguagus River	Phippsburg	Center Pond
Columbia Falls	Pleasant River	South Berwick	Salmon Falls River
Dresden*	Mill Pond	Steuben*	Tunk Lake
East Machias*	Gardiner Lake	Sullivan*	Flanders Pond
Ellsworth*	Union River	Surry	Patten Pond
Franklin*	Great Pond	Tremont	Sea Cove Pond
Gouldsboro*	West Bay Pond	Vassalboro*	Webber Pond
Hampden	Souadabscook Pond	Waldoboro	Medomak River
Jefferson*	Dyer-Long Pond	Warren*	St. George River
Kennebunk	Alewife Pond	West Bath	New Meadows Pond
Lincolnville		Woolwich*	Nequasset Lake
Northport	Pitcher Pond		

* Towns that currently harvest river herring

2. Current regulations

Commercial Fisheries

In Maine, the directed commercial fisheries for river herring occur through the state's municipal governments. State law permits the Commissioner of the Department of Marine Resources to grant exclusive river herring harvest rights to a municipality entitled to those rights prior to 1974. The State of

Maine requires municipalities with exclusive river herring harvest rights to file an annual notification that they wish to maintain exclusive fishing rights. Notification usually occurs through an annual town meeting or through a town ordnance giving town officials the authority to renew harvest rights on the behalf of the town. An annual harvest plan, provided by the municipality, is submitted to the Department of Marine Resources for review and approval for each municipal fishery prior to the fishing season. Most commercial harvest plans follow the model harvest plan provided below, while some plans have additional management requirements specific to an individual run. Each municipality restricts the number of harvesters to one individual who is responsible for harvesting fish under the municipality's harvest plan. All commercial fisheries have a 72-hour closed period or conservation equivalency to insure proper escapement into spawning habitat. Municipal fisheries that operate under conservation equivalencies are required to pass the minimum number of spawning river herring upstream based on habitat availability at the rate of 35 fish per surface acre of spawning and nursery habitat and/or provide additional escapement periods during the season.

Coastal intercept fisheries that historically harvested alewife and blueback herring using stop seines, gill nets and purse seines closed when the river herring moratorium began in January 2012. These fisheries harvested large numbers of spent and sub-adult alewife and blueback herring along the coast during the summer and fall seasons. Large quantities of fish, especially blueback herring, were harvested in numbers that indicate that these fish were likely not produced in Maine rivers.

Commercial Season

The annual river herring harvest begins when fish arrive at the harvest site, typically the last week of April, though many runs do not commence until the first week of May. The run timing of commercial catches is progressively later as you move eastward along the coast. The river herring season ends June 5th unless the municipality submits a request for a 10-day extension until June 15th. The DMR will award an extension if environmental conditions delay run timing during the season and river herring are not available to the commercial harvester during the regular fishing season. Weekly closed periods still apply, which effectively reduces the extension period to no more than seven and as few as five additional fishing days for the season. Most years the June 5th end date coincides with the start of the blueback herring run in Maine rivers, though in recent years blueback herring have arrived earlier in the season. At some locations commercial harvesters do capture blueback herring toward the end of the alewife season (Orland, Benton, Warren). Most commercial alewife harvest locations do not support blueback herring populations. In general, Maine rivers with blueback herring runs see spawning into the first week of July. Most commercial quantities of blueback herring are found in the mainstems of our large rivers and larger tributaries and are protected by time/area closures and gear restrictions.

Model Harvest Ordinance for the Harvest of River Herring

Towns are provided with a model harvest plan that may be used as a template for developing a harvest plan that is specific to their run and harvest location. Most municipalities conduct commercial harvest with a variation of a weir and trap which allows the harvester the ability to capture the entire run during a harvest day. The largest threat to harvest gear is high river/stream flows that can make it difficult to

maintain a weir site under high flows and debris loads. During periods of high flow fishing gear may be removed from the stream or modified to prevent damage. River herring benefit under these conditions and may pass the harvest location without being captured. The model ordinance provided to the town contains the following requirements:

1) A minimum unobstructed opening of two feet (2') shall be maintained at all times between the riverbank and the downstream end of the weir.

2) The maximum mesh size of wire, twine, or other material used in the weir shall not exceed one inch by one inch (1" x 1").

3) There shall be a 72-hour weekly closed season on alewives from 6:00 a.m. Thursday morning until 6:00 a.m. the following Sunday morning. During the closed period, a minimum size unobstructed opening of three feet by three feet (3' x 3') shall be maintained in the upstream and downstream end of the trap to allow escapement of spawning river herring and other migratory fish.

4) Migratory fish such as salmon, shad, or other species except river herring that enter the trap shall be removed and allowed to pass upstream.

5) Fishing operations shall cease and all fishing gear obstructing the passage of fish shall be removed from the fishing waters not later than June 5. If late-run river herring enter the river, the town must seek written approval from the Department of Marine Resources to extend the season up to, but no later than, June 15.

6) The total landings in pounds or bushels and value of the catch shall be made available to the Maine Department of Marine Resources and/or National Marine Fisheries Service. Annual harvest reports are required by the State and must be submitted by August 1.

Additional Regulations for Streams with Atlantic Salmon Runs

1) The entrance to the dipping pen or trap shall be covered by bars, slats, or spacers with a maximum width of two inches (2") between said bars, slats or spacers.

2) Dipping of river herring shall be confined to the dipping pen or trap.

The U.S Fish and Wildlife Service lists Atlantic salmon as endangered in all Maine watersheds. There are no known conflicts with commercial river herring fisheries in the rivers where these fisheries currently exist. Siting locations of commercial river herring fisheries takes the presence of Atlantic salmon into consideration, with a goal of keeping migratory routes open for Atlantic salmon migration upstream. River herring may provide benefits to the Atlantic salmon smolts during emigration by increasing the numbers of forage fish within the system during smolt migration. The U.S. Fish and

Wildlife Service is currently testing the hypothesis that river herring provide a cover for migrating Atlantic salmon smolts, lessening predation on smolts during downstream migration to the sea.

Newly Enacted Legislation

The 124th Maine Legislature passed a law that creates a "Commercial Pelagic and Anadromous Fishing License and Establishes the Pelagic Fisheries Fund." The law requires mandatory reporting of all catch data within 60 days, tracks bycatch for river herring, and provides funding to conduct limited research **(Appendix B)**. This legislation tracks river herring bycatch statewide and helps identify fishing locations and gear types that have high incidence of river herring bycatch in coastal waters.

The 126th Maine Legislature passed a law opening up the St. Croix River to the passage of river herring. "*By May 1, 2013, the commissioner and the Commissioner of Inland Fisheries and Wildlife shall ensure that the fishways on the Woodland Dam and the Grand Falls Dam located on the St. Croix River are configured or operated in a manner that allows the unconstrained passage of river herring.*"

Recreational Fisheries

In Maine, limited opportunities exist for recreational river herring harvest in tidal and inland waters. Exclusive harvest rights to the most productive river herring waters are granted to the municipalities. Municipalities may choose to allow a recreational harvest, though most do not permit this activity. Current state law allows recreational anglers to take 25 fish per day for personal use during the open fishing days. A 72-hour weekly closed period prohibits recreational river herring harvest from 6:00 a.m. Thursday morning until 6:00 a.m. Sunday. The closed period allows a weekly migration window for river herring to access spawning habitat. Recreational anglers are restricted to using hook-and-line and dip nets to harvest river herring. Few locations in Maine permit recreational anglers to regularly catch 25 fish per day. Recreational harvest activities and gear types are permitted only in areas outside of a watershed and downstream of the municipal harvest location where exclusive rights are granted by the State. These restrictions are in place to prevent any harvest of fish allowed to escape the commercial fishery.

3. Brief Description - Current Status of the Stocks

The State of Maine manages individual river herring runs as separate stocks. These stocks have separate, well-defined spawning habitats, migration routes, and run timing that make them unique compared to similar runs throughout the state. Information on individual river herring runs is maintained by the State and collected through fishery independent and fishery dependent data collection. All commercial river herring fisheries are monitored through trends in commercial harvest, run counts, biological sampling, and analysis of scale data collected from the commercial catch. Noncommercial sites are monitored using run count data, biological sampling, and scale data where these data are collected.

River herring restoration activities continue to produce increasing numbers of adult returns to many Maine rivers. Restoration activities since 1999 have opened historic river herring habitats that were inaccessible for the last 150 years on two of the state's largest rivers. Multiple fishway construction and

fishway replacement projects continue to support access to spawning habitat throughout the state. River herring returns to the Union, Penobscot, Damariscotta, Dennys, East Machias, Sebasticook, and Orland rivers and Pushaw and China lakes have all surpassed 1 million adult returns at least once since 2022, with three of these waters each returning 3-7 million adults.

The most recent peer reviewed coastwide analysis of river herring populations in the Northern New England (NNE) stock-region are provided in the approved 2024 ASMFC River Herring Benchmark Stock Assessment (ASMFC 2024). Analysis of these data were presented in the to the American Shad and River Herring Management Board on August 7, 2024, which accepted and endorsed the assessment. A summary of the results for the NNE stock-region is provided below:

For many of Maine's river herring populations stocks were categorized as stable or increasing. The ASMFC River Herring Stock Assessment Subcommittee (SASC) reviewed eight species-level time series in the NNE stock-region. ARIMA results indicated five of the six run counts had a greater than 50% chance of being higher than they were in 2009, indicating an improvement in these run counts compared to run counts prior to Amendment 2. These findings are supported by run count data collected at fishways in Maine where passage count data are recorded annually. In most cases, significant increases in returns have occurred over the past 15 years. (Appendix C). For the remaining species-specific run counts that the SASC investigated trends were classified as non-significant.

There were 11 rivers in the NNE region where run counts did not separate river herring species. Four of these run counts have continued through 2021 or 2022 while others terminated in early years. Of those with data through 2021 or 2022 (Androscoggin River, Kennebec River, Saco River, and St. Croix River), river herring abundance has increased over the last two decades with high probabilities in the terminal year of being greater than the 2009 reference point. (ASMFC 2024).

Analysis of Maine and New Hampshire fishery independent survey data from the Maine-New Hampshire Trawl Survey, Merrymeeting JAI Survey and New Hampshire Juvenile Finfish Seine Survey are trending upward. NNE alewife abundance indices included two juvenile abundance indices. The assessment indicated that the two NNE fishery independent JAI surveys are significantly positively correlated with a Rho > 0.5. Trends in ARIMA fits generally indicated increases in abundance for both adults and juveniles with a high probability of being greater than the Q25 and 2009 index based reference points. (ASMFC 2024).

For blueback herring, in the CAN-NNE stock-region, there was one species-level time series, a young-of-year index. ARIMA results indicated it had a very high probability of being above the 2009 index value and showed an increasing trend in both recent years and over the full time series.

While the NNE and CAN-NNE stock-regions showed the highest proportion of rivers with positive abundance trends, there were rivers in these stock-regions with high Z rates and/or no sign of increases since 2009. Mortality estimates for mature fish were only available from scale data for the NNE region.

There was a decreasing trend from the early 1990s until the mid-2000s, then there was an increase until around 2015 followed by a decrease in the final years of the time series. For the entire time series, average Z was 1.1/yr and ranged from 0.56/yr to 1.7/yr. For the 33 rivers that had Z estimates since the last assessment, 19 (or 57.6%) of them had a greater than 50% probability of exceeding the Z40%SPR reference point (ASMFC 2024).

Maine runs can reflect wide annual variation of Z estimates based on several factors related to the year-class strength, upstream and downstream passage, annual harvest, escapement, and bycatch in other fisheries. When assessing Maine's commercial fisheries, mortality estimates are considered in conjunction with annual and 3-year average run counts, age structure, species composition, repeat spawning ratios, and environmental conditions to achieve harvest rates that support Maine SFMP metrics and create a basis for implementing sound management actions.

Most noncommercial runs are stable at low levels, except where active restoration efforts are improving run size. Many noncommercial runs are small by nature and experience passage issues that limit reproduction and run size. Despite commercial closure, many of these runs maintain comparatively small populations to some larger runs in Maine. Improving upstream and downstream passage and stocking efforts to rebuild these runs could enable these habitats to produce excess fish for commercial harvest in the future. At locations where significant restoration projects have occurred during the past 10 years river herring numbers have increased significantly, resulting in river herring runs of more than 1-million fish in several rivers.

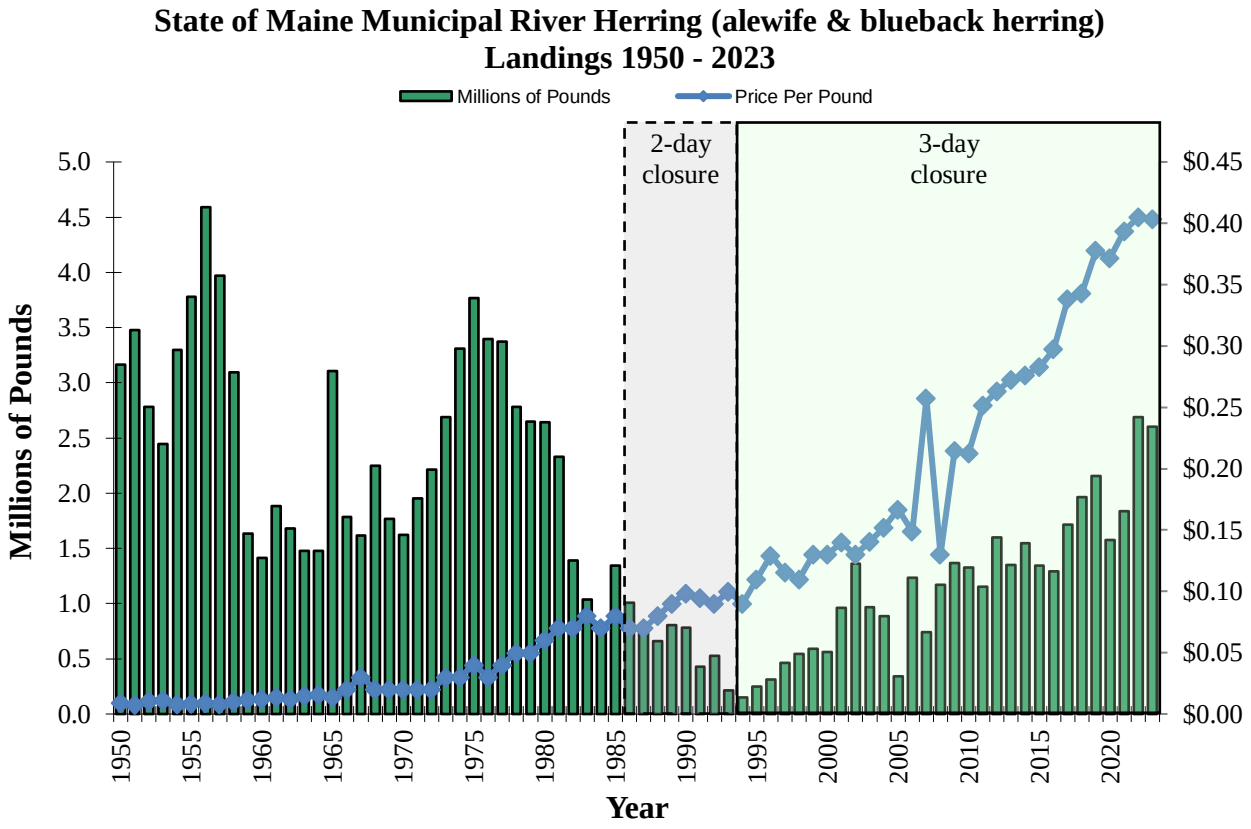
a. Landings

The State of Maine requires mandatory reporting of municipal landings by August 1st of each year. Trend analysis indicates an increasing trend in state landings for the period 1981 to 2023 (Figure 2). The Department of Marine Resources also tracks annual landings through time to observe trends by stock. Total and stock specific annual landings data is becoming less dependable as a metric to assess the health of commercial runs due to changes in harvest activity. An increasing number of municipal harvesters are choosing to harvest for personal use or limited retail sale and not fully exploiting the available population as has occurred historically. Exact escapement numbers are unknown in most Maine river herring fisheries and are estimated using a ratio of closed days and reported commercial landings. Population level estimates of escapement and total run size using commercial landings are the best estimators of population size for most of Maine's commercial runs. However, reduced commercial harvest may result in a substantially lower estimate of escapement and total run size when runs are not actively harvested. To address this issue the Maine DMR is conducting total escapement counts on some runs where limited harvest is known to exist.

Estimates of annual commercial escapement calculated using fishery independent data as a proxy for commercial runs can range from 15 – 80 percent. To ground truth estimates of escapement to actual escapement, runs where daily counts were conducted were used as a proxy for commercial fisheries. The ratio of the number fish passed on closed days, when commercial fisheries were not allowed, was

compared to open days when commercial fisheries were allowed. These data indicate that consecutive closed days during the week can achieve a mean escapement rate approximating 42.8 percent of the annual run. The daily counts at the Sebasticook River fishway indicate escapement similar to those observed at Brunswick. The escapement rate at the Sebasticook River fishway was 45 percent based on the numbers of fish passed upstream on fishing days vs non-fishing days. Counts were also collected at the Weber Pond fishway where an active harvest exists and the numbers of fish that pass into the pond are counted daily. These data indicate that escapement may exceed the target escapement of 42.8 percent of the run. Fisheries staff bases these estimates on upstream passage at fishery independent and fishery dependent locations where actual counts provide total escapement numbers by day.

Figure 2. State of Maine river landings 1950 – 2023.



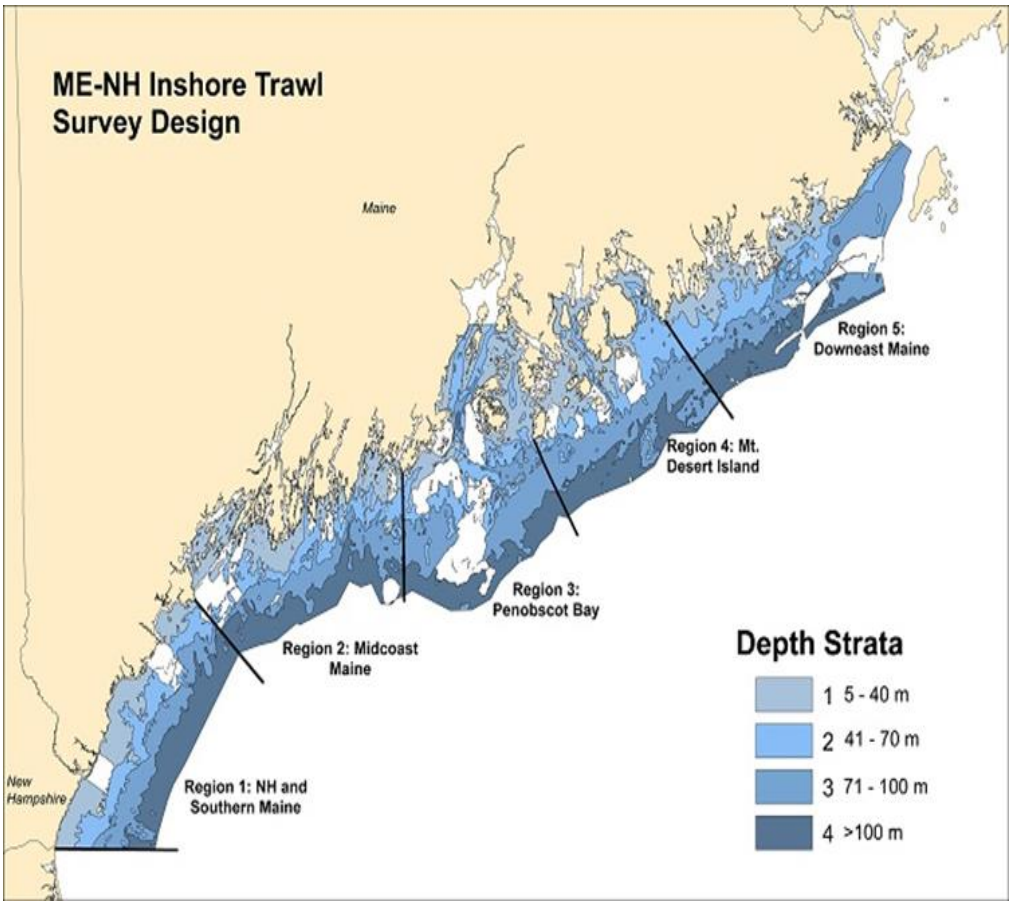
b. Fishery Independent and Fishery Dependent Indices

Both fishery independent and fishery dependent data are available to provide relative measures of river herring run health and condition. Most fishery independent data come from the Maine-New Hampshire Trawl Survey, River Herring JAI Beach Seine Survey, fishway counts, or volunteer fish counts on rivers without commercial fisheries. Fishery dependent data originate from the commercial catches and run counts on commercial rivers. Analysis of harvest data alone may not be the best way

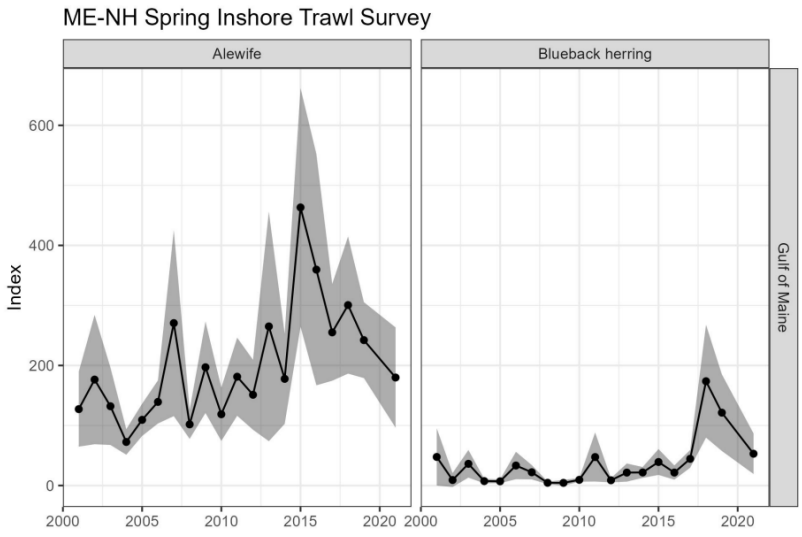
to determine the health of all stock specific runs throughout the state due to recent changes in how some commercial harvesters conduct individual fisheries. Fewer harvesters are electing to fully exploit existing harvest days and gear types to maximize harvest for commercial sale. Increasing numbers of harvesters are harvesting for personal use to meet their existing need for bait in the lobster fishery. This allows an individual harvester a guaranteed source of bait without the need to be present at the harvest site through the duration of the harvest season. Harvesters simply elect to open the trap or remove the gear and allow fish to pass upstream even though they are legally permitted to harvest fish.

Maine-NH Trawl Survey:

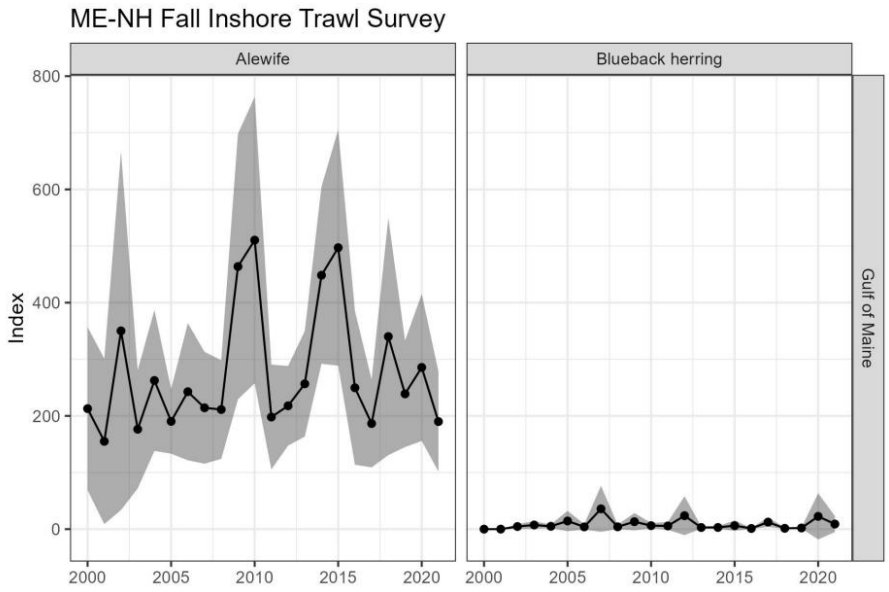
The Maine-New Hampshire inshore trawl survey takes place during spring and fall in five regions and four depth strata along the coast of Maine and New Hampshire. The survey was initiated in the fall of 2000, with the fourth depth strata added in 2003. Regions are based on geologic, oceanographic, geographic and biologic factors and divided into four depth strata: 5–20, 21–35, 36–55, and 55+ fathoms. Stations are selected randomly to reflect representative conditions within each of the strata, with a target level of 120 stations per season. Sample gear consists of a modified shrimp net with 2-inch mesh in the wings and a 1-inch mesh liner in the cod end. Foot rope and head ropes are 57' and 70' respectively, with 6-inch rubber cookies. Indices were developed separately for each season for each species.



Indices of abundance from the ME-NH Inshore Trawl Survey for the spring.



Indices of abundance from the ME-NH Inshore Trawl Survey for the fall.



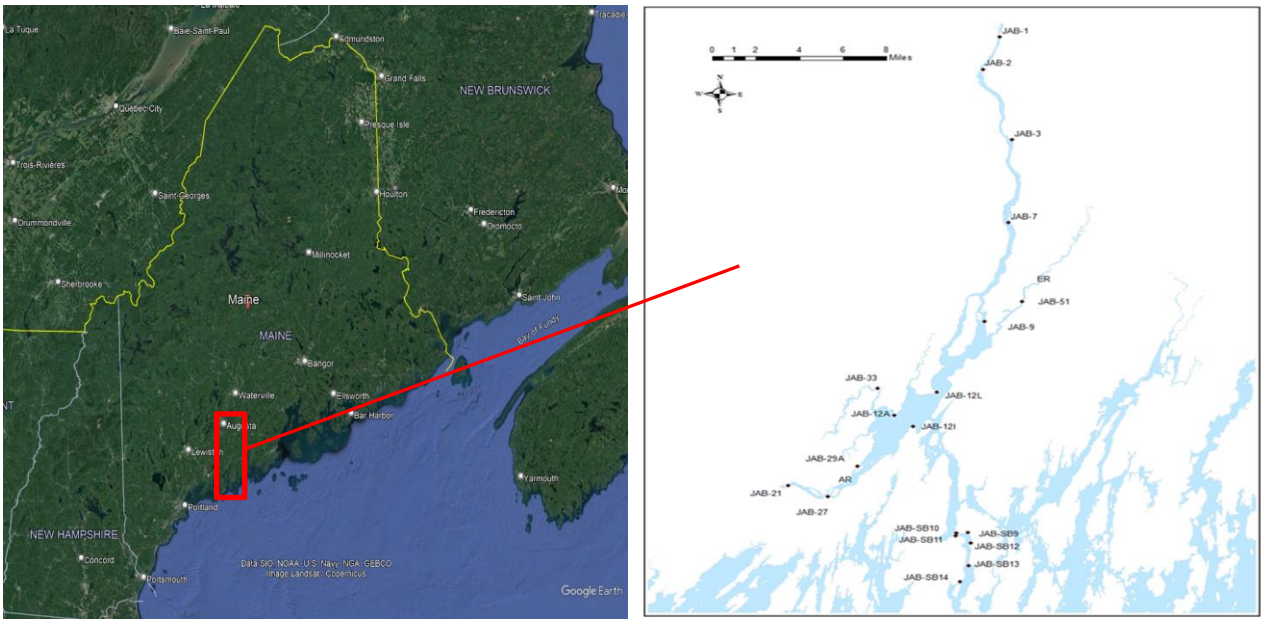
Results from the analysis of the Maine-New Hampshire Trawl Survey data were included in the 2024 ASMFC River Assessment along with additional regional indices of juvenile abundance. The assessment report presented to the Management Board indicated the following results: For alewife, in the NNE stock-region, both young-of-year indices had a greater than 50% chance of being higher than they were in 2009. For blueback herring, in the CAN-NNE stock-region, there was one species-level time series, a young-of-year index. ARIMA results indicated it had a very high probability of being

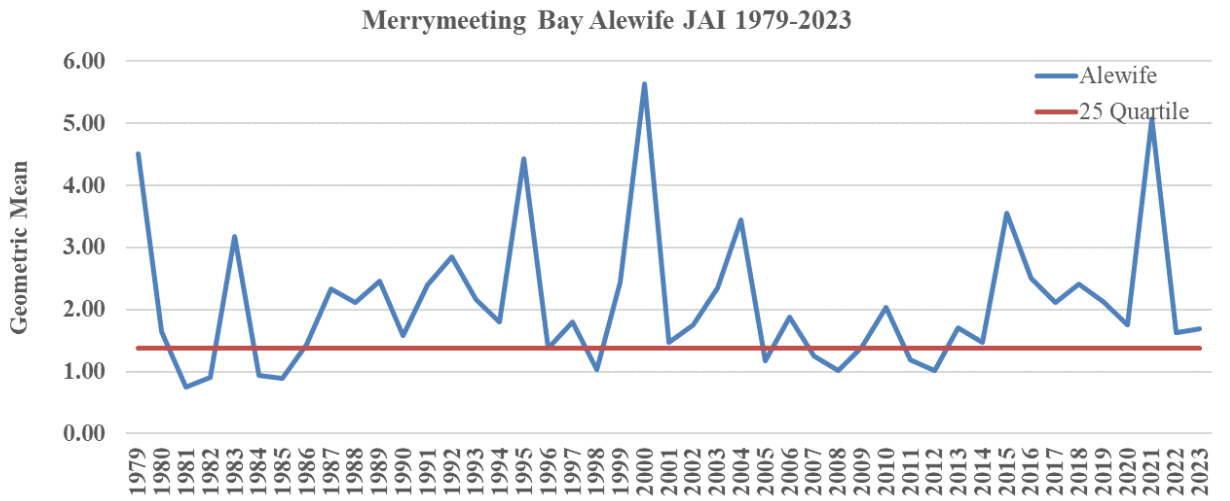
above the 2009 index value and showed an increasing trend in both recent years and over the full time series.

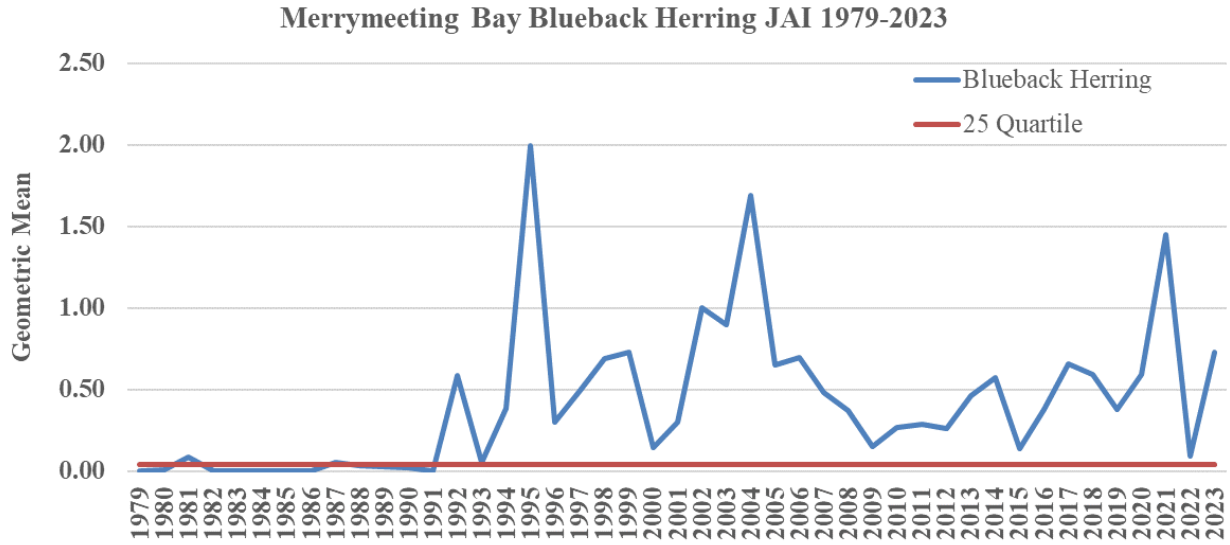
Juvenile Abundance Index:

The JAI survey monitors the abundance of juvenile river herring and American shad in the Merrymeeting Bay river complex in mid-coast Maine. The survey began in 1979, covering 17 fixed stations as well as data from a separate juvenile striped bass survey designed to assess the numbers of juvenile striped bass in the lower Kennebec River. The juvenile abundance survey for the Kennebec/Androscoggin estuary monitors the abundance of juvenile alosines at 14 permanent sampling sites. Four sites are on the upper Kennebec River, three on the Androscoggin River, four on Merrymeeting Bay, one each on the Cathance, Abadagasset, and Eastern Rivers. These sites are in the tidal freshwater portion of the estuary. Since 1994, DMR added six additional sites in the lower salinity-stratified portion of the Kennebec River. A total of 120 samples are collected during the sample season. The sample data is used to calculate the geometric and arithmetic means, SE and confidence intervals for alewife, blueback herring, and American shad.

The sampling protocol for all stations is similar to that used in the juvenile shad-sampling program on the Connecticut River. Field staff sample each site once every other week from July to the end of September. The goal is to sample each site six times during the season. Field staff collects samples with a beach seine within three hours of high slack water. The seine is made of 6.35 mm stretch mesh nylon, measures 17 m long and 1.8 m deep with a 1.8 m x 1.8 m bag at its center. One person holds an end of the seine stationary at the land/water interface, and the boat operator tows the opposite end perpendicular to shore. After the net fully extends, the boat operator tows the seine in an upriver arc and pulls the net ashore. The net samples an area of approximately 220 m^2.







The 2024 River Herring Assessment used the Merrymeeting Bay beach seine survey data as an index of juvenile abundance for alewife and blueback herring in NNE Stock-Region. The draft assessment included the following results.

A young-of-year index from the Maine Merrymeeting Bay Juvenile Alosine survey was available for 1982-2021. Although the index was variable from year to year, there was an increasing trend in the alewife YOY index over the time series and over the 2009-2021 time period, according to the Mann-Kendall test. The alewife YOY index in 2021 had a 97% probability of being above the 25th percentile of the time series, and an 83% probability of being above the 2009 value.

An ARIMA model was fit to only one juvenile blueback herring survey in the CAN-NNE region (ME Merrymeeting Bay Juvenile Alosine Survey). This survey showed a general increasing trend in

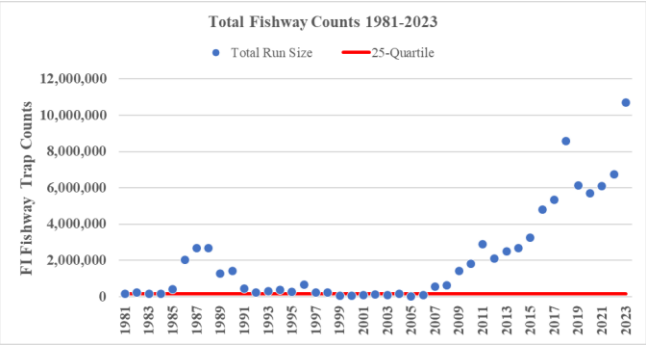
abundance from the 1980s through mid-2000s, followed by a decrease to 2010, but another increase back to levels observed in the mid-2000s (ASMFC 2024).

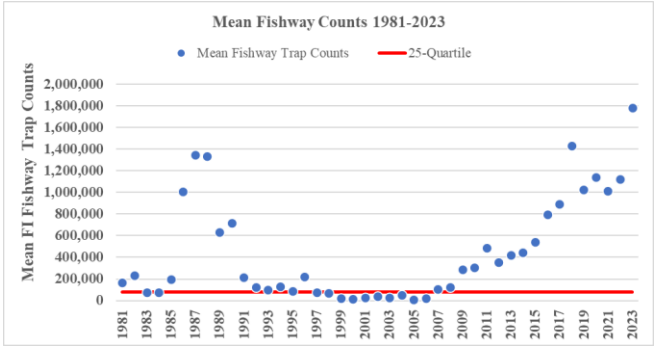
Fishway/Run Counts:

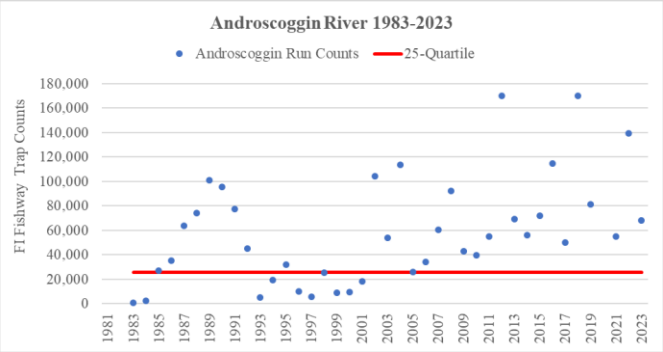
At locations with fishways, annual run data are collected to monitor upstream passage and determine spawning escapement at locations that provide passage into spawning habitats. The Saco, Androscoggin, Damariscotta, Union, Penobscot, Sebasticook and St. Croix rivers provide the most consistent sources of count data, though many other locations conduct passage counts at various levels depending on location, staffing, and environmental conditions. The time series length and counting methods vary by site. The counts of river herring runs in Maine fall under two categories: total counts and subsampled counts. Total counts occur at locations where the state maintains electronic tube counters or trapping facilities that make electronic or hand counting the total population possible. Most volunteer or community counts use the VisuCount software and count protocol to determine total run counts and associated confidence intervals. The VisuCount system works well for volunteer groups and is adaptable to staffing and funding constraints. Some locations use standardized 10-minute counts at the beginning of each hour from 7:00 a.m. to 7:00 p.m. throughout the duration of the river herring run. The methods used to collect volunteer run count data have not changed since 2010. However, there is an effort to standardize all volunteer counting methods using the VisuCount program identified by ASMFC as the best existing counting platform for organized volunteer groups that count river herring.

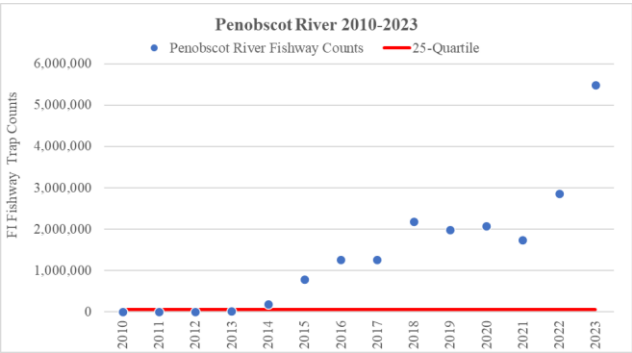
Fishery Independent Management Triggers for Recreational River Herring Harvest

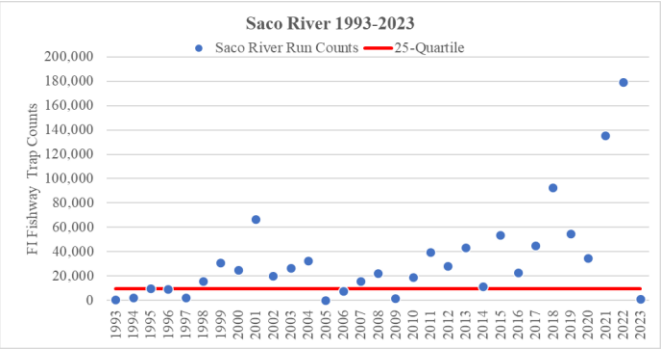
Fishway	25-Percentile
Saco River	9,491
Androscoggin River	25,682
Kennebec River	68,744
Penobscot River	56,390
St. Croix River	20,900
Fishway Totals	169,620
Fishway Mean	76,636

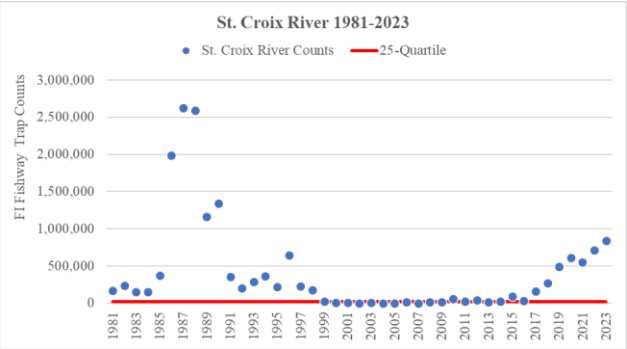


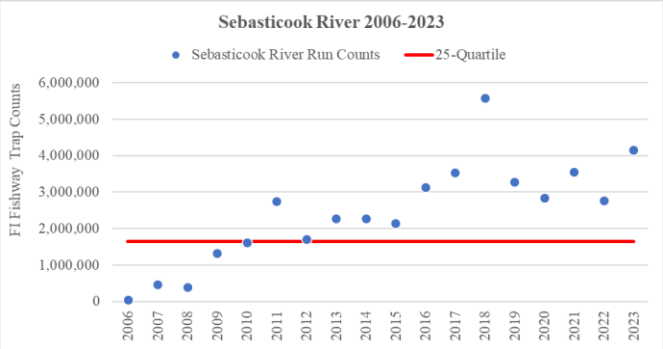






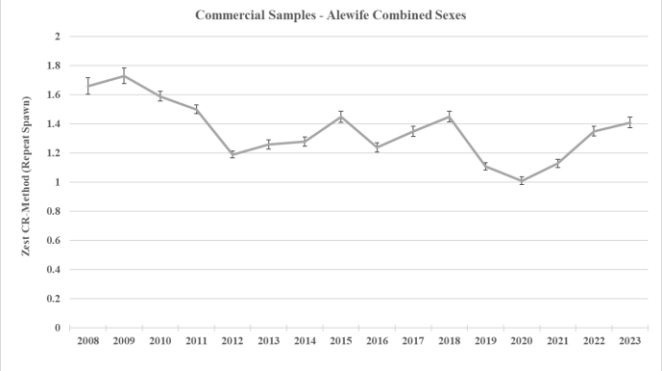


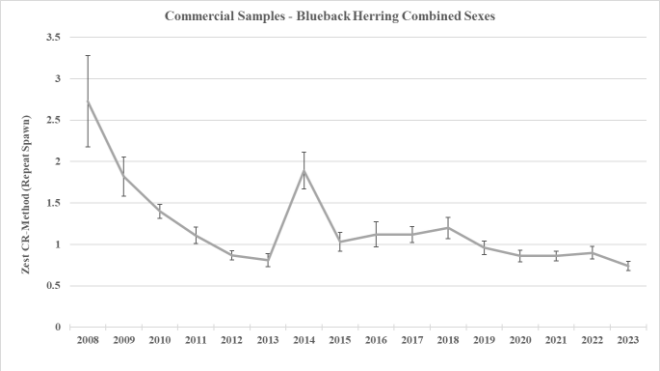


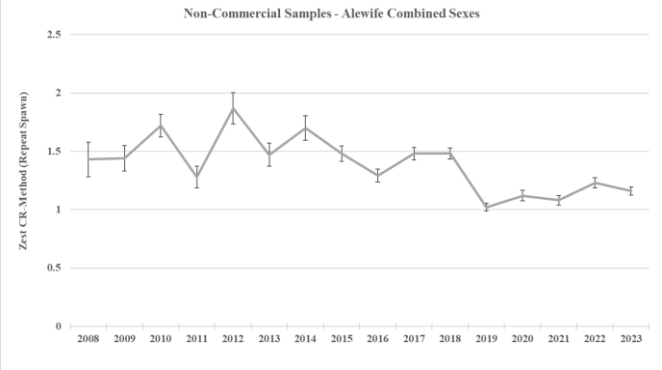


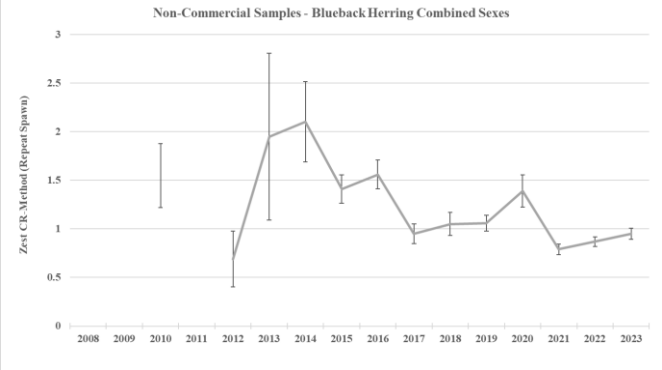
Harvester Data:

Commercial harvesters collect fishery dependent river herring data as part of their permitted harvesting activities. Harvesters collect scale samples weekly from their commercial catches and DMR analyzes the scales to determine species, age, mortality, and repeat spawning history. Scales are used to calculate mortality estimates based on age and repeat spawning marks. Scale samples are also collected from several fishery independent locations during the annual river herring run. The total number of samples collected varies annually, but ranges between 4,200 and 5,500 samples a year. Scale data time series vary, with the most consistent sampling occurring since 2008.









c. Current Habitat Restoration Efforts

Coordinated restoration of historical river herring habitat throughout Maine has been the focus of the Bureau of Sea-Run fisheries since the early 1970s', though this has been an ongoing process since the first dams were built in the mid-18th century. Historical archives demonstrate the importance of diadromous fish and fisheries as a food source and regional/global commodity. Early inhabitants petitioned the governor and state legislature to require mill dam owners to install fish passage for migratory fish. Early attempts to provide passage were met with limited success and were a precursor to a suite of significant environmental and industrial processes that reduced diadromous fish populations along the Maine coast for decades.

The Clean Water Act, passed in 1972, helped address water quality issues in Maine's large industrial rivers. Though still impacted by water quality issues, rivers were becoming less polluted and improvements in fish passage technology helped pass those few fish that were returning to Maine rivers. One of the biggest impacts on recovery of river herring in Maine was the removal of the Edwards Dam on the Kennebec River at the head-of -tide in Augusta. The removal of Edwards Dam is notable on a national level because it was the first time FERC refused to relicense an operating hydro-electric dam. This decision set in place the ultimate removal of the dam and reopened over 100-miles of habitat for diadromous fish.

Similar success was achieved on the Penobscot River with the removal of two mainstem dams and construction of a bypass around the Howland Dam. The benefits of the Penobscot River restoration

projects significantly increased the number of American shad, alewife and blueback herring in the watershed. These projects demonstrated the ability to successfully restore diadromous fish to the landscape when restoration projects are properly planned and supported. The success of the Kennebec and Penobscot river restoration projects have helped to increase the number of restoration sites that were proposed and are now moving forward.

In 2023, Maine submitted $150 million in requests for 80 projects to restore 1,000 miles of sea-run fish habitat. Between 2021 and 2023, the Federal Highway Administration awarded $35M for 27 culvert upgrades to open over 100 miles of stream/river and 7,500 pond/lake acres of sea-run fish habitats. NOAA, USFWS, and NFWF awarded the Maine Department of Marine Resources (DMR) $22 million to build new fishways on the St. Croix River to improve passage to 680 miles of sea-run fish habitat and 68,000 pond/lake acres of sea-run fish habitat. The National Fish and Wildlife Foundation and USFWS awarded DMR $5.3 million to remove dams and build new fishways on the Sabattus River to open 75 miles and 2,400 pond/lake acres of sea-run fish habitat. These projects will have a significant impact on future returns and help support continued recovery of diadromous fish in Maine.

4. Fisheries to Remain Open

Municipality	Fishery	Municipality	Fishery
Alna	Long Pond	Jefferson	Dyer-Long Pond
Bath	Winnegance Lake*	Newcastle	Damariscotta Lake*
Phippsburg		Nobleboro	
West Bath		Orland	Orland River
Benton	Sebasticook River	Perry	Boyden Lake
Cherryfield	Narraguagus River	Sullivan	Flanders Pond
Dresden	Mill Pond	Steuben	Tunk Lake
East Machias	Gardner Lake	Mount Desert	Somes, Long ponds
Ellsworth	Union River	Vassalboro	Webber Pond
Franklin	Great Pond, Card Mill	Warren	St. George River
Gouldsboro	West Bay Pond	Woolwich	Nequasset Lake

* Shared fishery among the municipalities listed

Proposed fisheries for addition in 2024

Proposed Fisheries for Addition in 2024	
Arrowsic	Sewall Pond
Bradley	Chemo Pond
Glenburn	Pushaw Lake
Pembroke	Pennamaquan River
Penobscot	Wights Pond

Commercial Justifications for the Municipal Fisheries Listed Above:

In the commercial landings graphs provided below, years with extremely low landings or zero landings for one or more years indicate that fishing during that year did not occur or occurred at very low levels. Two main reasons for zero landings are 1) the municipality decided to close the fishery for conservation or other purposes or 2) the harvester fished for a limited number of days due to weather, gear, price, or other factors that created unfavorable market conditions. In 2005, extreme high water prevented many commercial fishermen from conducting normal fishing operations during the season. The result was a major decline in reported statewide landings for 2005. Biological data by river for most river systems, other than commercial harvest data, are generally unavailable for years prior to 2008 except for locations where specific short-term scientific studies occurred. The State of Maine and commercial harvesters began collecting run specific data in 2008 to address concerns presented in ASMFC Amendment 2 to the Shad and River Herring Management Plan.

The sustainability threshold established in 1984 for most Maine commercial fisheries is 35 fish per surface acre of spawning habitat. Since 1984, MDMR has used 235 fish/acre to estimate commercial alewife production in Maine's lakes and ponds. The Department established this unit production value from the commercial harvest in six Maine watersheds for the years 1971-1983. Based on these data, commercial yield was assumed to be 100 pounds/surface acre of ponded habitat. This value is slightly less than the average of the lowest yield/acre for all six rivers and within the range of yields experienced in other watersheds. Assuming a weight of 0.5 pounds per adult, the commercial yield equals 200 adults/surface acre. The commercial harvest was assumed to represent an exploitation rate of 85%, because most alewife runs were harvested six days per week. Exploitation rates on the Damariscotta River, for example, ranged from 85-97% for the years 1979-1982. When commercial yield is adjusted for the 15% escapement rate, the total production is 235 adult alewives/acre. This is a conservative estimate of the numbers of returns based on an average individual weight value of .5 pounds per return, including blueback herring.

The Maine Department of Marine Resources estimates escapement for commercial runs where actual counts are not conducted. The estimate is calculated by dividing the number of fishing days allowed by

the potential number of fishing days in a week then multiplying by the reported landings for the year. For most fisheries this will be 0.43 * number of fish reported landed for the season.

Fishery Specific Information

a. Commercial

See Appendix A

b. Recreational

Municipalities which maintain historic harvest rights control access to most of the river herring resources within the state. Municipalities maintain this control through exclusive harvest rights granted by the Commissioner of the Maine Department of Marine Resources. All locations inhabited by river herring and managed by a state/municipal harvest plan, are open to recreational harvest if the municipal harvest plan permits recreational harvest. All recreational harvest must occur below the commercial fishing location and within the municipality that maintains their river herring harvest rights. The number of river herring allowed for personal use is 25 river herring per person per day with associated gear restrictions (hook and line, dip net) down from 120 fish per day allowed prior to 2012.

Most municipalities choose to keep recreational river herring fisheries closed. Municipalities that choose to keep the recreational fishing closed can do so through the municipal harvest plan. Closing the recreational harvest prevents recreational harvest at any location within the municipal boundaries or in the watershed above the municipality that maintains harvest rights.

All locations statewide, outside and below locations controlled by the state's municipal fisheries, will remain open to recreational fishing. A limited recreational catch/possession limit of 25 fish per person per day and gear restrictions will apply along with a statewide closed period to allow escapement of spawning fish. The statewide closed period for recreational fisheries runs from 6:00 a.m. Thursday to 6:00 a.m. Sunday each week.

Recreational catches of river herring are typically used as bait to catch striped bass, halibut or smoked and used as food. The State of Maine relies on the MRIP program to collect catch statistics for the recreational catches of blueback herring and alewife.

5. Fisheries Requested to be Closed (if more specific than statewide)

a. Commercial

The state will close, or keep closed, one or more waters in the towns listed below to the harvest of river herring until these runs can meet minimum state sustainability requirements and are approved by the

ASMFC River Herring Management Board. Prior to Amendment 2 commercial fisheries occurred in all the municipalities listed below. Some of these runs are currently under restoration (*****), while others return viable numbers of fish without supplemental stocking and may support a small harvest in the future. Most of these runs have passage problems that prevent the current population from increasing to commercially viable harvest numbers. Returns to these rivers range from 15,500 to 1,139,000 individuals based on actual counts in Surry and Meddybemphs in 2024. All waters in the state of Maine that are not expressly approved by ASMFC will remain closed to the directed harvest of river herring.

Municipality	**Municipality**	**Municipality**
*Breman	Cape Elizabeth	Boothbay Harbor
Kennebunk	*Phippsburg (Center Pond)	Lincolnville
*Bristol	Northport	South Berwick
*Surry	*Waldoboro	West Bath (New Medows)
Bath (Weskeag)	Hampden	*Penobscot (Pierce Pond)
Meddybemphs	Tremont	

b. Recreational

All locations controlled by municipal fisheries will remain closed to recreational fishing unless expressly opened within the municipal harvest plan. Any recreational harvest must occur below the commercial fishing location if there is an active commercial fishery. This requirement is in effect to protect any river herring escaping the commercial fishery from being harvested upstream. This includes the watershed or sub-watersheds within the drainage above the municipality. A limited recreational catch/possession limit of 25 fish per person per day, gear restrictions, and closed days will apply.

All locations statewide outside and below locations controlled by municipal fisheries will remain open to recreational fishing. A limited recreational catch/possession limit of 25 fish per person per day, gear restrictions, and closed days will apply.

c. Incidental

Incidental catch of river herring may occur in small mesh trawl fisheries, weir, bait gill net, and seine fisheries for other species. There is mandatory catch/bycatch reporting for all of these fisheries. Based on Vessel Trip Reports (VTR) and Dealer Reports (DR), bycatch in state waters appears to be low. An existing law requires all commercial fishermen who fish for pelagic or anadromous species to purchase

the “Pelagic and Anadromous Commercial Fishing License” and requires mandatory reporting of river herring landings. **(Appendix B)**

6. Sustainability Targets/Threshold

Sustainability Definition – The number of alewife broodstock needed per surface area of spawning habitat in Maine to provide alewife populations capable of sustaining annual alewife runs at current levels while providing surplus broodstock for harvest or increasing run size in the future.

The Maine sustainability threshold established an escapement number equal to 35-fish per surface acre of spawning habitat which commercial fisheries must meet to retain commercial fisheries status or close until populations rebuild to meet sustainability metrics. This number is used as the minimum or threshold value that commercial river herring fisheries may not fall below and continue to fish. This metric represents the minimum escapement number used historically to provide commercial quantities of river herring for sustainable harvest and provides a basis from which managers feel the stock can recover if populations decline. However, the State of Maine requires three consecutive closed fishing days, or a conservation equivalent, which was developed to ensure that populations do not approach this minimum threshold value. This plan will achieve escapement numbers through passage counts above commercial fisheries, closed fishing days, season length, gear restrictions or continuous escapement.

An escapement level of six fish per surface acre is used by the Department to provide broodstock for initial introductions of anadromous alewife in Maine lakes and ponds under restoration. This number was developed as the result of a 10-year study researching the effects of alewife introductions into freshwater habitats. Initial introductory, or restoration stocking, can produce runs that may far exceed six fish per acre depending on passage and habitat. The six fish per acre escapement number has demonstrated that it can grow to provide significant run response in a relatively short amount of time given passage and habitat requirements are supportive of alewife and blueback life history. River herring restoration projects started on both the Penobscot and Sebasticook rivers using the six-fish-per-acre each return more than 5-million fish annually as of 2024. Commercial and recreational fisheries are not permitted at locations where the six fish per acre restoration value is actively used to restore river herring populations.

Method Used to Develop Spawning Threshold

The minimum sustainability threshold of 35-fish per acre of spawning habitat is the result of a combination of studies, observations, and documented commercial catches over several years. Maine uses this minimum sustainability threshold for commercial fisheries that are required to provide escapement of river herring broodstock from river/lake/pond specific populations.

Since 1984, DMR has used 235 fish/acre to estimate commercial alewife production in Maine’s lakes and ponds. The Department established this production value from the commercial harvest in six Maine

watersheds for the years 1971-1983. Based on these data, commercial yield was calculated to be 100 pounds/surface acre of ponded habitat. This value is slightly less than the average of the lowest yield/acre for all six rivers and within the range of yields experienced in other watersheds. Assuming a weight of 0.5 pounds per adult, the commercial yield equals 200 adults/surface acre. The commercial harvest was estimated to represent an exploitation rate of 85%, because most alewife runs were harvested six days per week. Exploitation rates on the Damariscotta River, for example, ranged from 85-97% for the years 1979-1982. When commercial yield is adjusted for the 15% escapement rate, the total production is 235 adult alewives/acre.

Results from studies conducted at Damariscotta Lake located in mid-coast Maine in the 1970s -1980s indicate that increasing the escapement of spawning alewives ranging from 40 to 60 fish per acre caused the parent progeny relationship to trend downward (Walton, C.J. 1987. Parent-Progeny relationship for an Established Population of Anadromous Alewives in a Maine Lake. American Fisheries Society Symposium 1:451 – 454, 1987). The relationship between increased numbers of spawning individuals and returns 4-5 years later does not support increased escapement rates for many Maine runs. Analysis of escapement numbers and commercial catches in fisheries with a sustained level of escapement over several years does indicate a large variation in run size unassociated with the number of spawning fish.

The State of Maine uses an alternative 6-fish per acre target when establishing new river herring runs. The 6-fish per acre target was established through fisheries work designed to examine the effect of anadromous alewives on existing sportfish and zooplankton populations in lakes without anadromous alewives (Lake George Study). The 10-year study conducted by the Maine Department of Inland Fisheries and Wildlife, Department of Environmental Protection, and the Department of Marine Resources, determined that stocking six prespawn fish per surface acre does not negatively affect growth of inland sportfish species including trout, landlocked salmon, or rainbow smelts, but increased numbers of alewives did change the zooplankton structure in the nursery habitat. Based on the study results, the Lake George Study remains the basis for the multispecies fisheries management plans in habitats that receive new introductions of river herring.

7. Monitoring to be Conducted to Support Target(s)

Commercial

Fisheries staff will continue to use annual landings data, escapement counts, escapement estimates, mortality estimates, and scale sample data to track relative health of river specific alewife and blueback herring stocks. Data from the JAI survey will be used to determine changes in juvenile river herring abundance in the tidal portions of the Kennebec River, Merrymeeting Bay and associated tidal rivers. The Maine-New Hampshire Inshore Trawl Survey will provide a broader coastwide perspective on abundance of the mixed stocks of river herring that are found off the Maine coast during the spring and fall seasons. Both fishery independent indices were used in the 2024 ASMFC Benchmark River Herring Assessment. Monitoring efforts will continue for all existing commercial fisheries and will occur for all locations where directed commercial fisheries may open in the future.

Recreational
For locations where commercial fisheries are permitted, monitoring of the commercial catches and existing controls will remain in place to assess and support the development of population metrics for the recreational fishery. For locations where there is no existing commercial fishery, or existing municipal harvest rights, fishway counts will be used to monitor run size where recreational fisheries are permitted **(Appendix C)**.

Fisheries staff will continue to use annual run count data, escapement counts, mortality estimates, and scale data to track relative health of river specific stocks where these data are collected at noncommercial monitoring sites. Additional data from the JAI survey will be used to determine changes in juvenile river herring abundance in the tidal portions of the Kennebec River, Merrymeeting Bay and associated tidal rivers.

8. Proposed Rulemaking to Support Target(s)

Commercial fisheries that cannot support commercial harvest levels above the minimum spawning threshold or maintain other plan metrics will remain closed for conservation. In addition, this plan eliminates the directed harvest, possession, and sale of any river herring within state waters other than the approved directed fisheries contained within this plan. The State has also created a Pelagic Fisheries license which requires annual harvester reports for all river herring harvest activities **(Appendix B)**.

The Department passed a rulemaking proposal prohibiting the opening of new river herring fisheries as required by the Atlantic State Marine Fisheries Commission Management Board.

30.02 Limits on River Herring
Beginning January 1, 2012, it shall be unlawful for any person to take, possess, harvest or sell river herring in the State of Maine or in waters under the jurisdiction of the State of Maine.

> **Exceptions:**
> A. River Herring fishing rights. A municipality or an individual with existing river herring harvest rights granted by the Commissioner in accordance with 12 M.R.S. §6131 are not subject to Chapter 30. The Commissioner may authorize a future river herring fishery, authorized pursuant to 12 M.R.S. §6131, after submission of a sustainable fisheries management plan for that fishery by the Department, which is approved by the Atlantic States Marine Fisheries Commission (ASMFC) Management Board.

Since January of 2012 there has been no additional rule making or statute chances that affect river herring harvest.

9. Adaptive Management

a. Evaluation schedule

The Maine Department of Marine Resources will conduct an annual review of all municipal fisheries harvest plans. Many plans carry over year to year because they demonstrate adequate protection for the river herring resource. Plan reviews incorporate landings data, escapement counts or estimates, broodstock needs, effort controls, and compliance with SFMP metrics. There is no plan to change the review schedule for individual river herring management plans at this time.

b. Consequences or control rules

All Maine directed commercial river herring fisheries operate under a 72-hour closed period or conservation equivalent. The Maine Department of Marine Resources will extend closed periods, modify conservation equivalencies, or close fisheries that cannot sustain existing commercial fisheries and meet SFMP standards. Management actions for fisheries not meeting specific SFMP metrics are provided below.

Commercial

1) Additional management review and/or individual river specific management plan changes will occur based on decreasing trends in running three-year averages of annual landings, increasing time series trends in total mortality (z), trends in repeat spawning rates for fishery dependent and fishery independent sites, and age structure.

A) **Decreasing trends in running three-year averages of annual run counts**

If the run demonstrates a declining trend in the running three-year average of annual run counts the fishery will close for the following year or additional closed days per week will be added to the season.

B) **Increasing time series trends in total instantaneous mortality (Z) for repeat spawning fish**

If the fishery does not achieve a Z-estimate of 1.67 or less for repeat spawners for the 3-year running average the fishery (number of fishing days) will be reduced or fishery closed until the Z-estimate falls below 1.67.

C) **Decreasing time series trends in repeat spawning rates**

If the number of repeat spawning fish for the sample year does not achieve 20 percent, the fishery (number of fishing days) will be reduced until the annual repeat spawning rate exceeds 20 percent.

D) **Decreasing time series trends in age structure**

River herring populations that do not demonstrate the presence of fish ranging in age from 3 to 7 during a three-year period will result in a reduction of fishing days.

2) Fisheries staff will review harvest and age data collected from annual returns to assess the need to increase the number of closed days in the fishery. Due to the variability of river herring runs in Maine under stable escapement rates, run size, and species composition, runs may exhibit wide swings in annual assessment values. However, there may be other unforeseen factors that may require a reduction in allowed fishing days/season (mortality events, disease, extreme environmental conditions).

3) The management objective for all commercial fisheries is to ensure that river herring populations maintain a minimum (35 fish/acre) spawning stock threshold into the future. A commercial fishery that does not meet the minimum spawning stock escapement established for that system will be required to close the following season until fishery achieves the escapement goal for that year.

Recreational

All Maine recreational river herring fisheries operate under a 72-hour closed period (Tuesday 6:00 a.m. to Sunday 6:00 a.m.). The Maine Department of Marine Resources will extend closed periods, modify conservation equivalencies, or close fishing on populations that cannot meet the 25th percentile for fishery independent run counts.

1) Additional management review and/or changes will occur based on decreasing trends in running three-year averages of annual landings, increasing time series trends in total mortality (z), and trends in repeat spawning rates for fishery dependent and fishery independent sites where these data are collected.

2) All recreational river herring fisheries not associated with a commercial run will close if the mean statewide fishway count falls below the 25-percentile for three consecutive years.

3) Recreational fisheries not associated with a commercial fishery will close regionally if one of the fishery independent fishway counts fails to achieve the 25-percentile for three consecutive years. The management objective is to ensure that regional recreational fisheries do not impact spawning stock on rivers without river specific monitoring. The rivers in table Fishery Independent Management Triggers for Recreational River Herring Harvest will represent regions of the state equidistance between fishway locations listed below. The 25-percentile values are fixed but will be updated once every five years when state River Herring SFMP's are reviewed and updated.

Fishery Independent Management Triggers for Recreational River Herring Harvest

Fishway	25-Percentile
Saco River	9,491
Androscoggin River	25,682
Kennebec River	68,744
Penobscot River	56,390
St. Croix River	20,900
Fishway Totals	169,620
Fishway Mean	76,636

References:

ASMFC. 2024. Draft Stock Assessment Report. Atlantic States Marine Fisheries Commission River Herring Benchmark Assessment. Arlington, VA. USA. 475p.

Kircheis, F.W., J.G Trial, D.P Boucher, B. Mower, Tom Squiers, Nate Gray, Matt O'Donnell, and J.S. Stahlnecker. 2002. Analysis of Impacts Related to the introduction of Anadromous Alewife into a Small Freshwater Lake in Central Maine, USA. Maine Inland Fisheries & Wildlife, Maine Department of Marine Resources, Maine Department of Environmental Protection. 53 pp.

Rounsefell,G.A.,L.D, Stringer. 1943. Restoration and Management of the New England Alewife Fisheries with Special Reference to Maine. United States Department of the Interior Fish and Wildlife Service Fishery Leaflet 42.

Walton, C. J. 1987. Parent-progeny relationship for an established population of anadromous alewife in a Maine lake. American Fisheries Society Symposium 1: 451-454.

Appendix A

Alna Commercial Fishery:

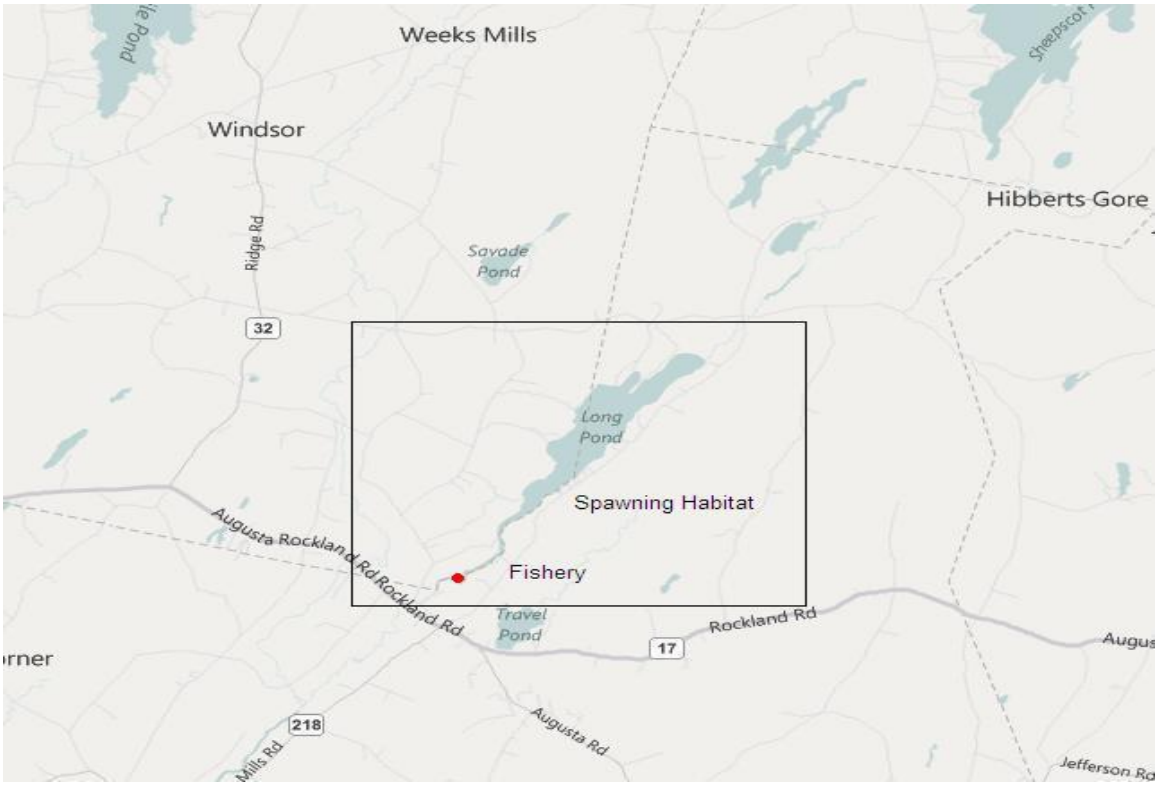
The Maine Department of Marine Resources manages eastern branch of the Sheepscot River drainage for a commercial escapement of 38.2 fish per acre through a conservation equivalent of 20,000 river herring passed upstream by the harvester throughout the season. The management plan has always achieved returns to meet the target escapement developed for this system or passed the entire run upstream. Long Pond was not commercially harvested during the years 2020 – 2023 and only partially harvested in 2019. The harvester holding the harvest contract through the town of Alna elected not to harvest during several years of the contract due to access issues at the approved harvest location. Total run count and biological data are not available for the years 2020 – 2023 but have resumed in 2024. Commercial harvest occurs in the river just downstream of Long Pond, which is the only accessible alewife spawning habitat on the east branch of the Sheepscot River. The Department of Inland Fisheries and Wildlife will not permit alewives access to historical spawning habitat in Sheepscot Pond, or the watershed above, because of concerns with disease that may affect sport fish raised at a state own fish hatchery downstream of Sheepscot Pond.

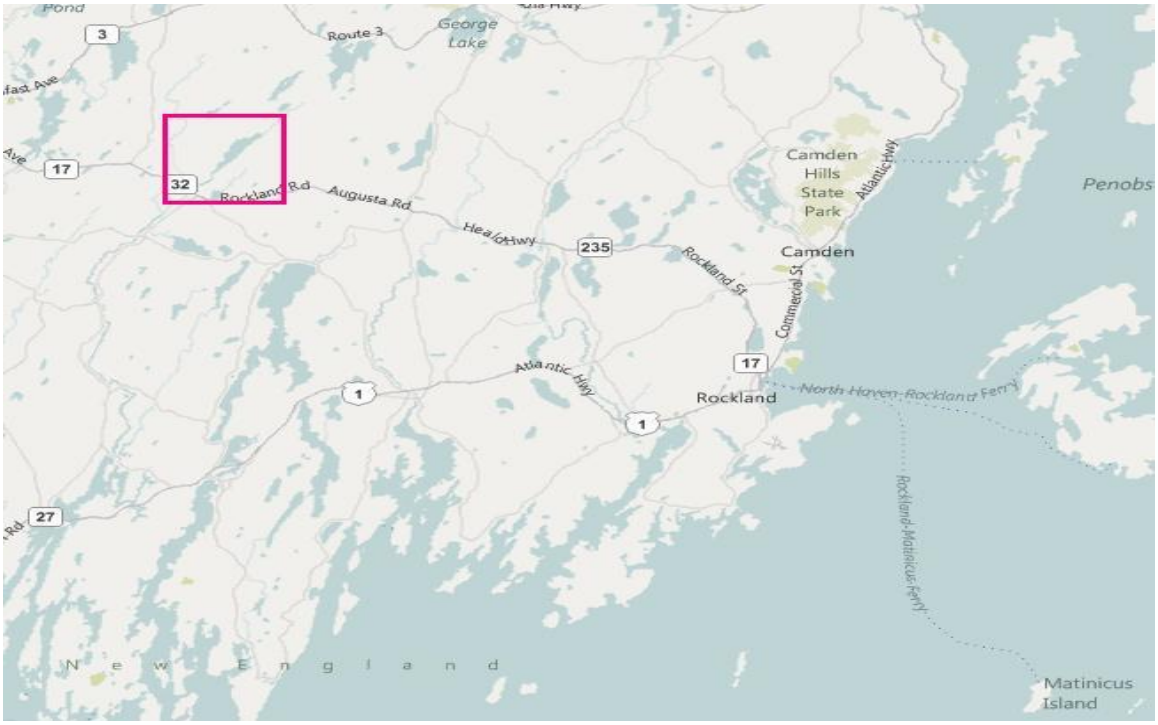
The west branch of the Sheepscot River leading to Branch Pond currently contains very few river herring due to the lack of a fishway prior to 2024. However, in 2023 the construction of a fishway leading to Branch Pond now allows access to spawning habitat. The DMR stocked Branch Pond for a four-year period 2021-2024 to establish a river herring population that is expected to increase as a result of the new fishway. River herring are not harvested commercially on the west branch of the Sheepscot River. The town of Alna does retain the right to harvest these fish if populations reach a level of sustainability in the future and a fishery is approved by ASMFC.

Spawning habitat is available for blueback herring in the river below the newly constructed fishway and on in the east branch of the Sheepscot River. Incidences of blueback herring in the commercial catches or biological samples below the fishway are rare. There is no available spawning habitat for alewives in the Sheepscot River below the commercial fishery and there are no reports of juvenile blueback herring emigrating from this system in appreciable numbers currently.

The Sheepscot River alewife run would be considerably larger if all historic river herring spawning habitats were accessible to river herring. Access restrictions to Sheepscot Pond by the Maine Department of Inland Fisheries and Wildlife prevent river herring from the largest single spawning habitat within the system. Restrictions at Sheepscot Pond are unlikely to change soon due to disease concerns related to the IFW sport fish hatchery. Progress on increasing passage efficiency within the mainstem occurred in 2017 with the removal of the dam at Coopers Mill. The Coopers Mill dam removal facilitates upstream and downstream passage but is unlikely to increase production significantly unless blueback herring populations expand.

Town	River	Lake size (acres)	Threshold (N/acre)
Alna	Sheepscot	532	35


Weeks Mills
Windsor
Hibberts Gore
Ridge Rd
Savade Pond
32
Long Pond
Spawning Habitat
Augusta Rockland Rd
Rockland Rd
Fishery
Travel Pond
17
Rockland Rd
218
Augusta Rd
Mills Rd
Jefferson Rd

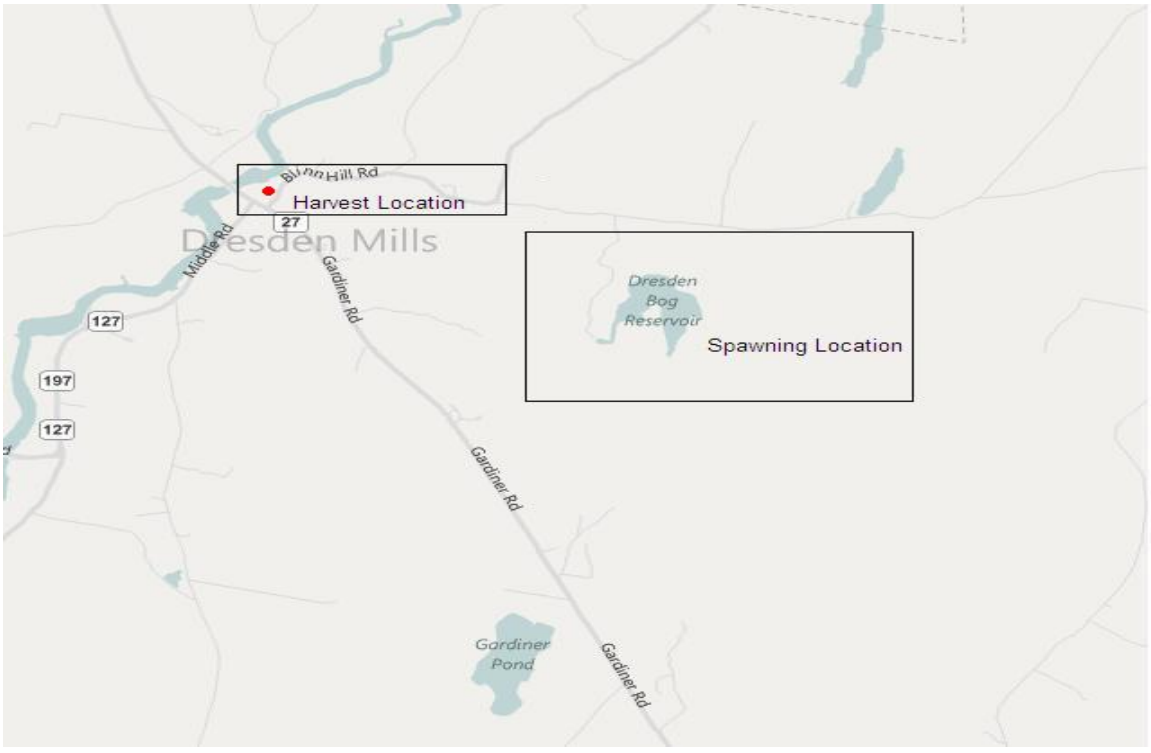

Route 3
George Lake
3
17
32
Rockland Rd
Augusta Rd
Camden Hills State Park
Atlantic Hwy
Camden
235
Rockland St
Commercial St
17
Rockland
North Haven-Rockland Ferry
1
1
27
Rockland-Matinicus Ferry
New England
Matinicus Island

Dresden Commercial Fishery:

The Maine Department of Marine Resources manages Mill Stream and Dresden Bog for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for this system is 5,950 river herring passed upstream through three consecutive closed days per week during the fishery. The management plan has always achieved returns to meet the escapement threshold developed for this system or passed the entire run for the season. The DMR does not permit a river herring fishery in the mainstem of the Eastern River. The Eastern River provides available spawning and rearing habitat for blueback herring, American shad, shortnose sturgeon and striped bass. The commercial fishery for river herring occurs upstream of the confluence of the Eastern River at Mill Stream, which leads to spawning habitat in Mill Stream and Dresden Bog.

The Eastern River is one of several rivers in Maine that protect spawning populations of anadromous fish through gear restrictions, seasons, and time/area closures. The Eastern River is a free-flowing tidal river without any upstream barriers to delay upstream passage. There are no estimates of numbers of blueback herring spawning in the Eastern River, though numbers may be as high as several hundred thousand based on the available habitat. It is unknown, but unlikely that alewives spawn in the mainstem of the Eastern River. Biological sample data indicate that blueback herring and alewife may interbreed in the mainstem of the Eastern River.

Town	River	Lake size (acres)	Threshold (N/acre)
Dresden	Eastern	170	35

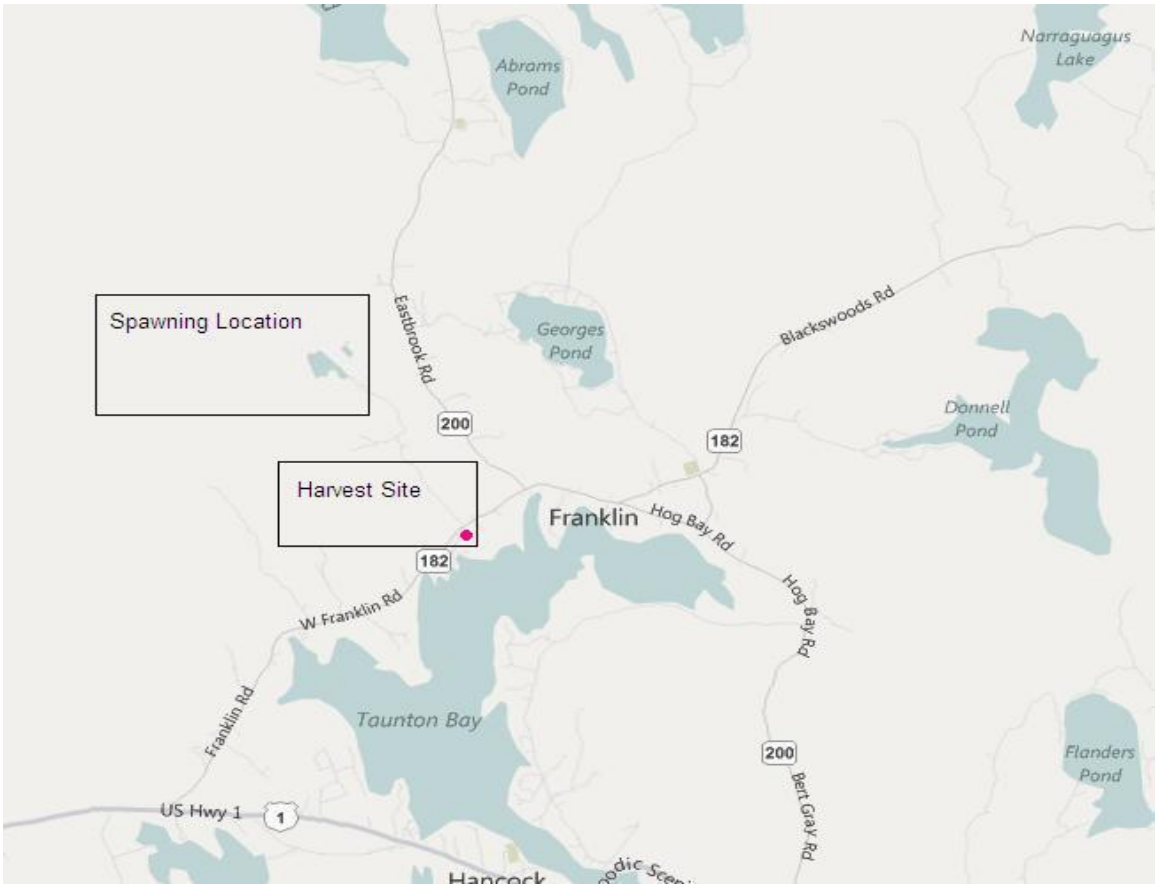


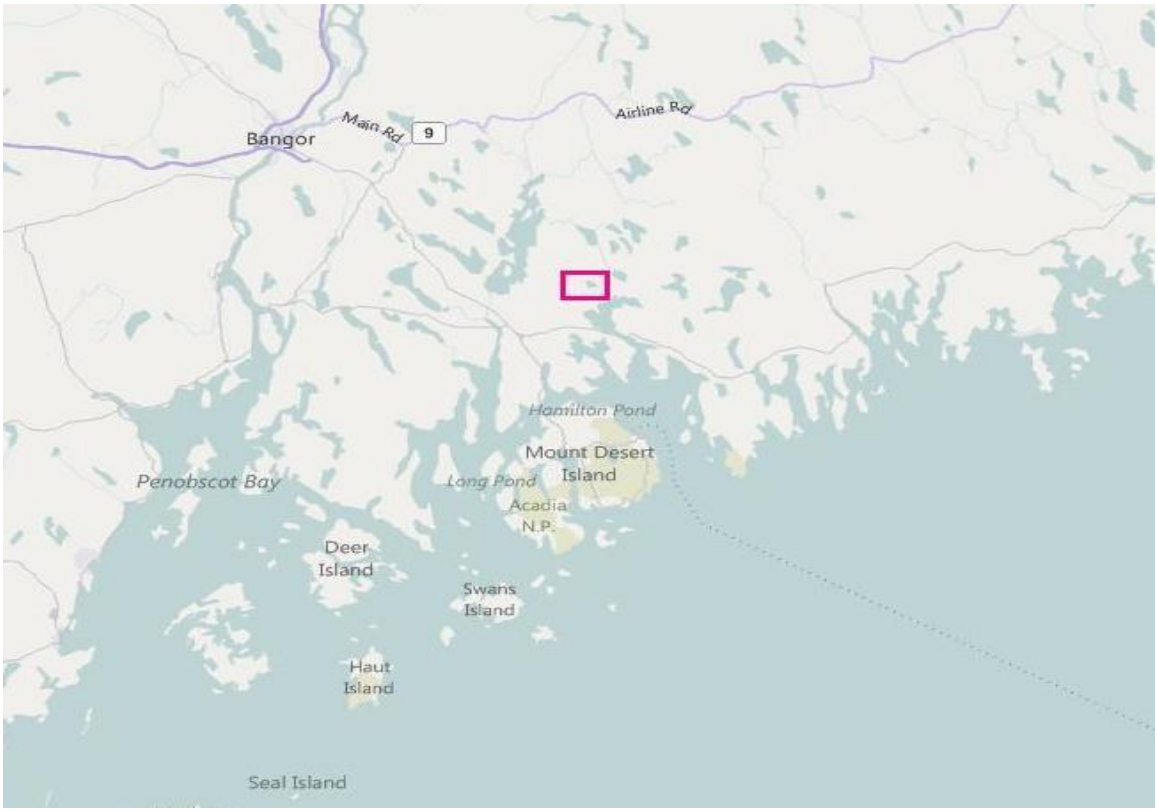
Franklin Commercial Fishery:

The Maine Department of Marine Resources manages Great Pond (Grist Mill Stream) for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for this system is 9,170 river herring passed upstream through three closed days per week during the fishery. The management plan has always achieved returns that meet the target escapement developed for this system or passed the total run upstream. There is no spawning below the pond. Beaver dams are a perennial problem at this location, affecting upstream and downstream migration during periods of low flow. As with many small coastal runs, access to spawning habitat is influenced by spring and fall water levels necessary to permit upstream and downstream migration. Spawning does not occur in the stream below or above the commercial fishery for alewife. Blueback herring are not observed in this system and there are no historical records to indicate that blueback herring inhabited the stream.

The Franklin fishery at one time only harvested post spawn runback river herring. This practice is not permitted currently but likely had a significant effect on spawning stock, exploitation rates, and number of repeat spawning fish within the system historically.

Town	River	Lake size (acres)	Threshold (N/acre)
Franklin	n/a	262	35





Harvest location for Great Pond in Franklin, Maine.

Nobleboro and Newcastle Commercial Fishery:

The Maine Department of Marine Resources manages Damariscotta Lake for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for this system is 153,335 river herring counted upstream by the hydropower company which owns the fishway. The age and design of the previous fishway limited the numbers of river herring entering spawning habitat. In 2007 a one million-dollar fishway renovation significantly improved escapement into spawning habitat in Damariscotta Lake.

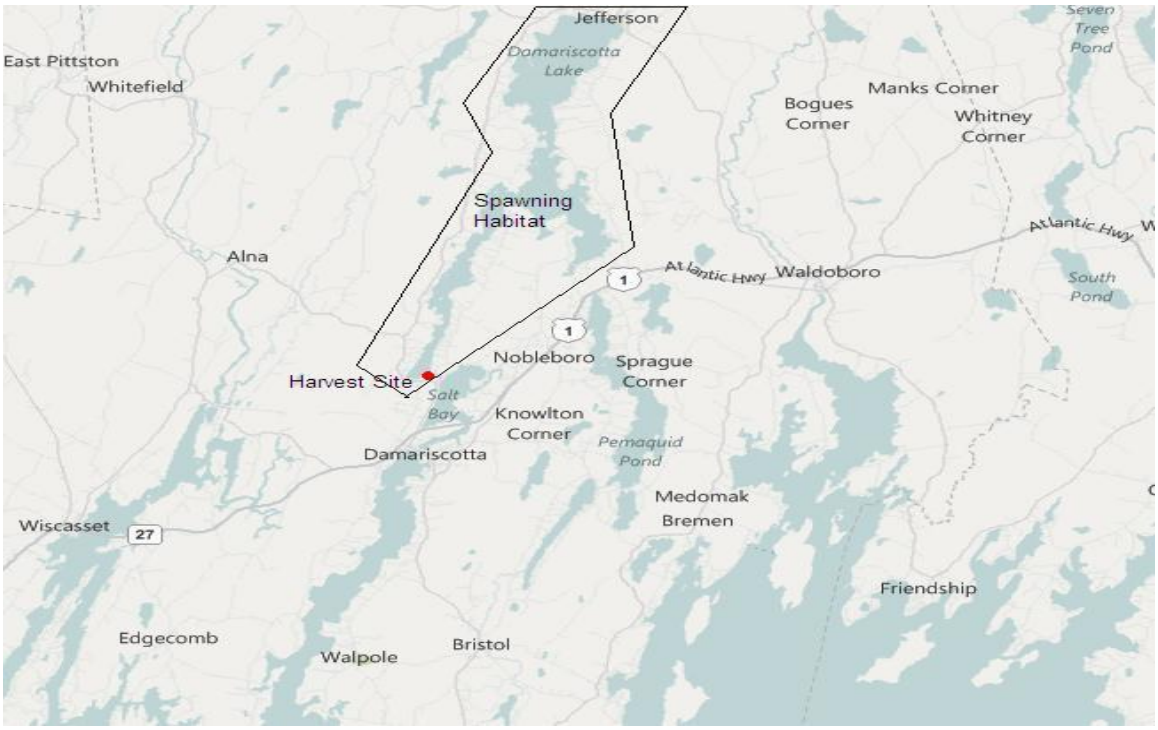
The Nobleboro and Newcastle fishery is a joint fishery conducted by two municipalities at one fishing location. The current municipal management plan for this fishery permits all river herring arriving at the fishway during the first week of the season free passage upstream. This fishery is one of two fisheries in Maine that currently allows continuous escapement of spawning fish throughout the season in addition to closed days, though traditionally they harvested seven days a week. Historically, Damariscotta Lake never had a river herring run. The run began in 1806 with the construction of a 42-foot-high fieldstone fishway and an initial introduction of broodstock from the Sheepscot River. After residents established the run, fishing rights were granted by the State of Massachusetts in 1810 permitting the fishery to occur seven days per week. Continuous escapement up the fishway, and into to the lake, occurred throughout the fishing season. Estimated annual exploitation rates for this run ranged from 85-95 percent from the early 1800s through 1984.

A tidal stream leads from the Damariscotta River to the base of the fishway. Alewives arrive and depart the area downstream of the fishway based on the tidal stage in the river. During high tide river herring enter the tidal stream and attempt to ascend the fishway into Damariscotta Lake. The run is entirely alewife with no blueback herring present in the commercial catches. There is no spawning habitat for either species below the fishway due to high salinities, but American shad, shortnose sturgeon, and sea-run brown trout are observed below the fishway.

A hydropower turbine is located at one of the lakes' two outlets and produces a limited amount of hydropower during early spring and winter. The hydropower station does not operate during the downstream migration period for alewife or American eel (July – November). Operation schedules during the 1960s and 1970s are unknown as are any associated adult or juvenile mortality events.

Damariscotta Lake is an oligotrophic lake that produces small juvenile river herring compared to other lakes in the area. These juveniles start to emigrate from the lake in early July at total lengths as small as 42mm. Work conducted at Damariscotta indicates that increased escapement levels negatively affect the numbers of juveniles produced within the lake. Increased stocking rates appear to lead to diminished yield per adult spawner (Walton 1987). The towns that operate the harvest choose to allow significantly more adult river herring into the system than recommended by Walton's research. Escapement into the lake regularly exceeds 500,000 adults per year and exceeded 900,000 during eight years since 2012 with five years being more than 1-million adult spawners during the same period.

Town	River	Lake size (acres)	Threshold (N/acre)
Nobleboro	n/a	4,381	35



Commercial harvest of river herring at Damariscotta Lake in the 1980s

Entrance to the Damariscotta fishway.

Upper section of the Damariscotta fishway prior to restoration.

Upper section of the fishway after restoration.

Bath-West Bath-Phippsburg Commercial Fishery:
The Maine Department of Marine Resources manages Winnegance Lake for a minimum commercial escapement of 35 fish per acre. The fishery is jointly harvested by three municipalities through coordination of a single harvest location and contracting with a single harvester. The annual spawning escapement need for this system is 4,795 river herring passed upstream through the fishway during the three-day closed period. The management plan has always achieved returns that meet the target escapement developed for this system or passed the total run upstream. The fishway leads from the tidal zone directly into the 137-acre spawning habitat provided by Winnegance Lake. This fishery is typically the earliest of all Maine river herring runs, with river herring arriving as early as March 15. There is no spawning below the tidal fishway.

The commercial harvester catches blueback herring at this location toward the end of the commercial fishing season. It is unknown how successful blueback spawning or survival is in the lake. Blueback herring may drop out of the lake prior to spawning to look for suitable spawning habitat which is not available in the lake. Field staff have not observed any juvenile blueback herring in biological samples collected as juveniles emigrate from the lake in the fall.

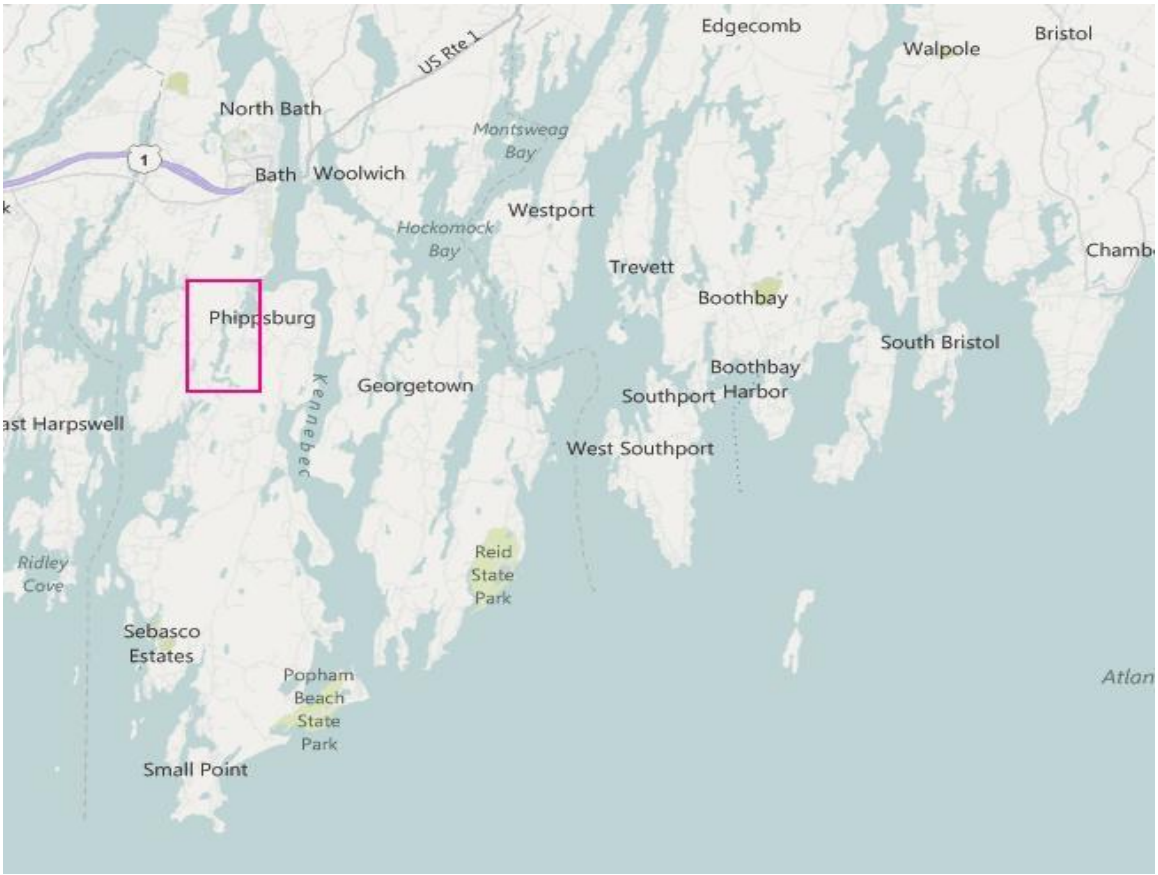
The fishery at Winnegance Lake is currently on the watch list. Though the fishery currently meets the minimum escapement levels in the plan, the annual run is below expectations. The cause for the decline in the annual run is not clear. There are several factors that may be impacting annual returns. In the early 2000's the dam at the outlet of the lake was reconstructed to make repairs and improve the harvest area. The existing Denil fishway is sufficient to pass fish into the lake but the existing configuration may make it difficult for fish to find the downstream passage. There are periods of time when downstream passage appears to be nonexistent due to low flow during the summer and fall.

Winnegance Lake is one of several river herring spawning habitats effected by sea level rise. The dam is low enough that the Kennebec River regularly flows back into the lake during above average high tides. The salinity of the river water flowing into the lake can be as high as 15ppm. Once this water enters the lake there is no way for the denser seawater to exit the lake. Prior to the 2017 season the Department deployed a sonde into the lake soon after ice out to collect water quality data. Data indicates that the salinity within the deeper parts of the lake can exceed 7ppt during the summer.

In recent years, northern pike and black crappie were illegally introduced into the lake and predation on adult and juvenile river herring has likely increased. Both species are known to prey heavily on alewives in Maine's freshwater ecosystems.

Town	River	Lake size (acres)	Threshold (N/acre)
Phippsburg	n/a	137	35


Fishing Location
Phippsburg
Spawning Location
Arrowsic
Georgetown
East Harpswell
Sebasco Estates
Ridley Cove
Reid State Park
Robinhood Cove
Halls Bay
Knubble Bay
Sagadahoc Bay
Atkins
Gunnet Rd
Harpswell Islands Rd
24


US Rte 1
Edgecomb
Walpole
Bristol
North Bath
Bath
Woolwich
Montsweag Bay
Hockomock Bay
Westport
Trevett
Boothbay
South Bristol
Boothbay Harbor
Southport
West Southport
Phippsburg
Georgetown
Kennebec
Reid State Park
Ridley Cove
Sebasco Estates
Popham Beach State Park
Small Point
1

The Winnegance Lake fish trap is located in the lake above the fishway exit.

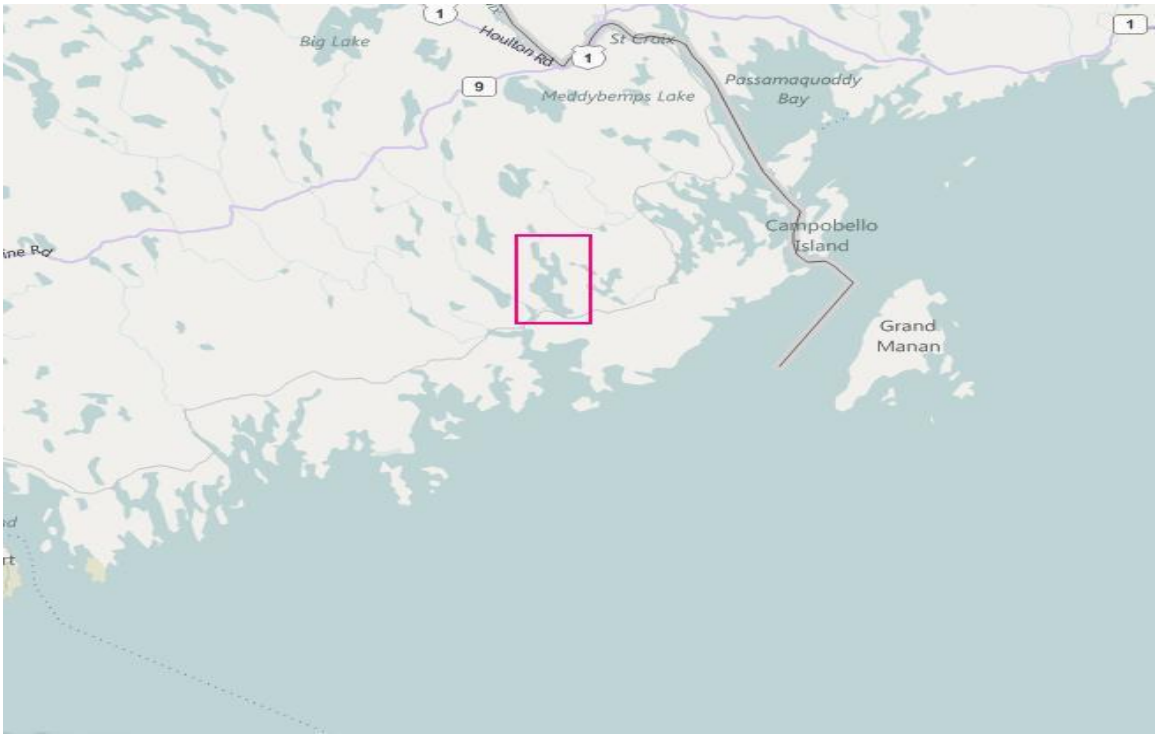
East Machias Commercial Fishery:

The Maine Department of Marine Resources manages Gardner Lake for a commercial escapement of 35 fish per acre. The spawning escapement need for this system is 176,225 river herring passed upstream through three closed days per week for the fishery. The management plan had not achieved returns to meet the 35 fish per acre target escapement developed for other systems for several years prior to 2013. Recent returns meet escapement objectives and the number of older fish in the population are increasing. Commercial harvest did not occur in 2020 due to COVID-19 and concerns by the town regarding gathering at the harvest location.

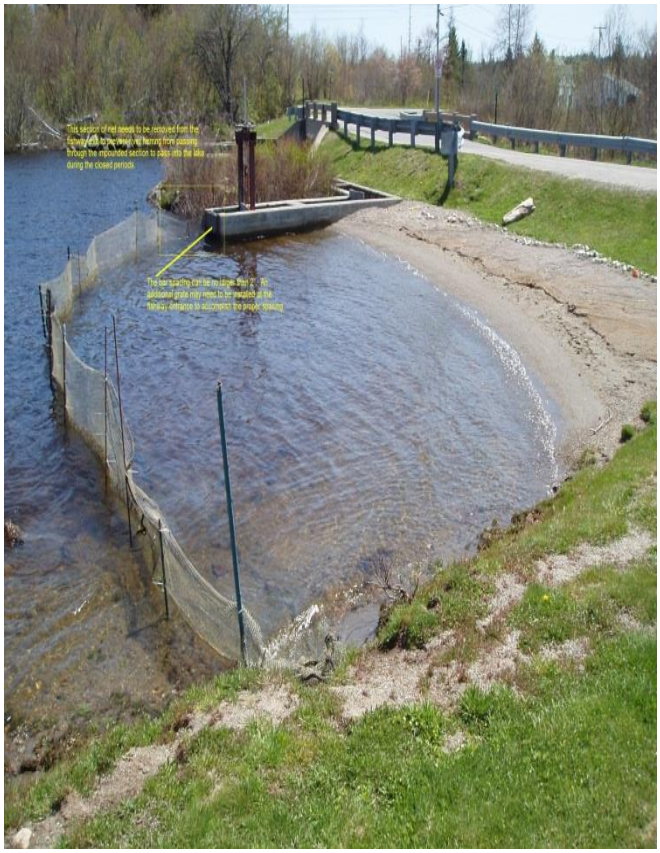
The mainstem East Machias River system has a large run of river herring that is unexploited. The mainstem river remains closed as a conservation measure while allowing a larger harvest at the first tributary on the river at the outlet of Gardiner Lake. An estimated run of 2.1 – 4.5 million river herring ascend the East Machias' 9,000 acres of accessible habitat. An unknown number of blueback herring ascend the river to spawn in the mainstem. These fish are not harvested and are allowed free access up and down the river. The DMR may allow a higher exploitation rate for Gardiner Lake to keep the mainstem of the East Machias open to free passage for all anadromous fish, including Atlantic salmon. The East Machias River has no dams in the mainstem and provides spawning and juvenile habitat for endangered Atlantic salmon.

For several years prior to 2010 the harvest data from the Gardiner fishery was severely underreported. Historical landings data that are the basis for calculating escapement indicate escapement into the lake was far below expectations compared to runs in general. Under new management, and with accurate landings data, the run is closer to meeting expectations. Additional data collected from this system and analysis of the 2022 and 2023 scale samples indicate the population is trending in a positive direction. If indications are that escapement from the commercial fishery is not increasing DMR will impose additional closed days in 2024.

Town	River	Lake size (acres)	Threshold (N/acre)
East Machias	Chase Mill Stream	5,035	35



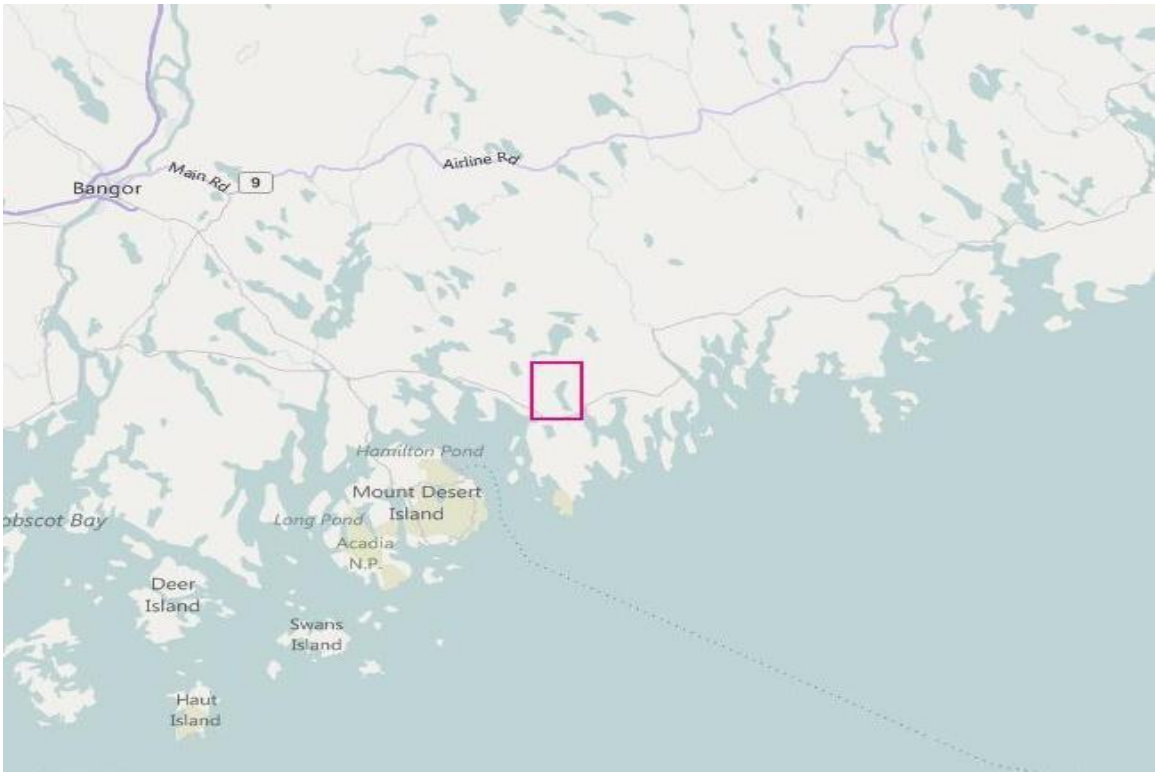
Chase Mill Stream is a tributary to the East Machias River. Fishing gear is deployed at the top of the fishway to capture returns to Gardiner Lake.



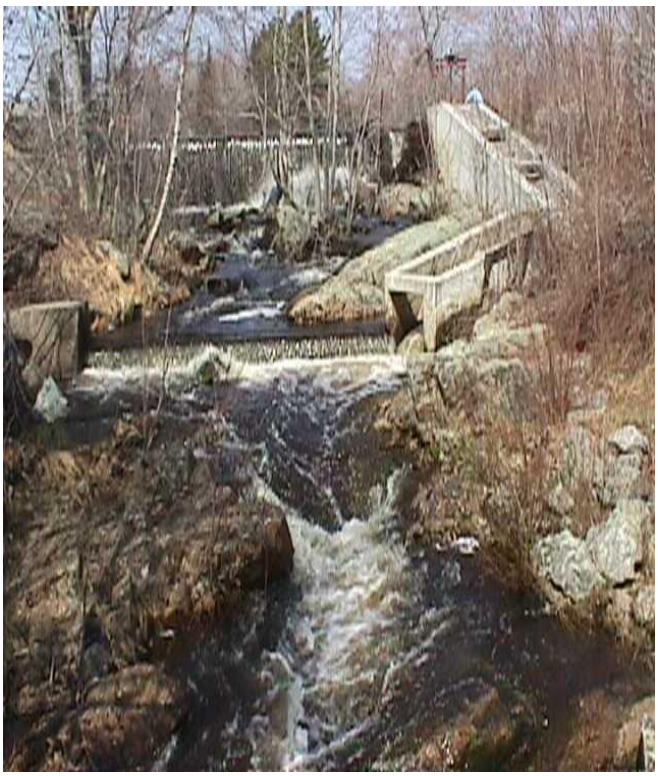
Gouldsboro Commercial Fishery:

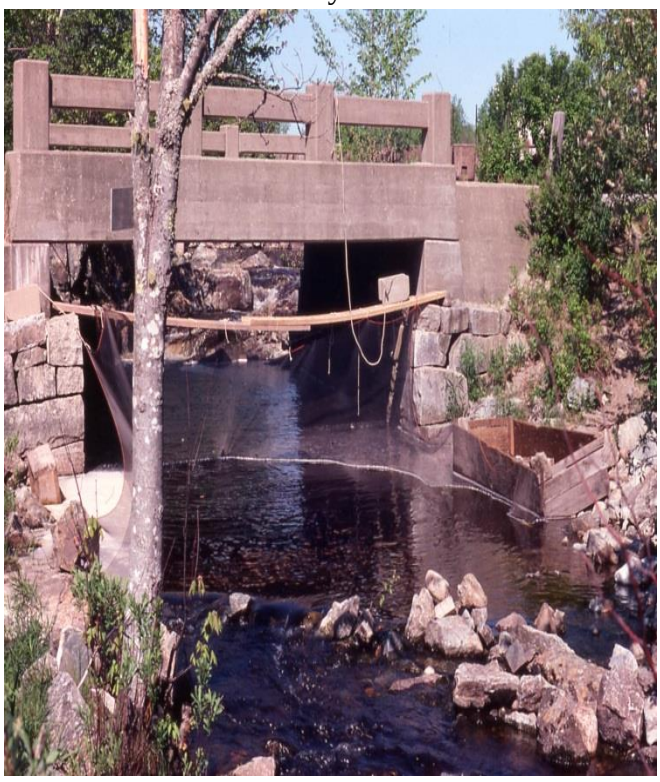
The Maine Department of Marine Resources manages West Bay Pond for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for this system is 3,500 river herring passed upstream through three closed days per week during the season. The management plan has achieved returns to meet the target escapement developed for this system 95% of the years during the past 20-year period or passed the entire run upstream. The fishery failed to meet the escapement threshold in 2017, and the run was closed for 2018 and resumed in 2019. The run is comprised of all alewife and spawning does not occur below the fishery for either alewife or blueback herring.

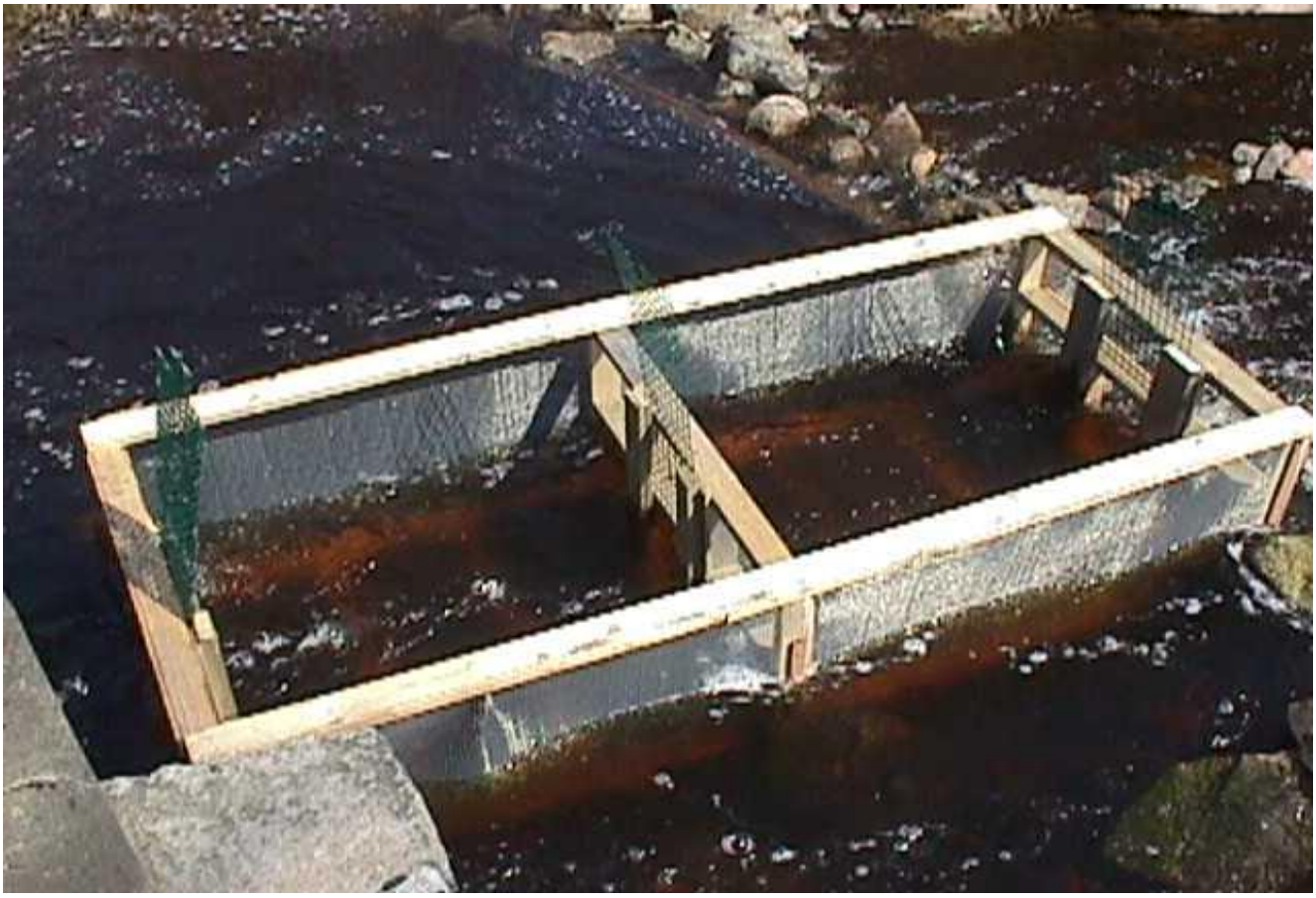
Town	River	Lake size (acres)	Threshold (N/acre)
Gouldsboro	n/a	100	35



Fishway, fishing location, and trap deployed in the Gouldsboro alewife fishery.







Orland Commercial Fishery:

The Maine Department of Marine Resources manages the Orland River system for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for this system is 39,655 river herring passed upstream through three closed days per week during the fishery. The management plan has achieved returns to meet the target escapement developed for this system for 95% of the years during the past 20-year period or passed the entire run upstream. In 2005 floodwaters limited the commercial catch and the numbers of fish that migrated upstream could not be accurately estimated. It is assumed that most of the run passed upstream after floodwaters receded. Only a portion of historic spawning habitat in the Orland River watershed is accessible to river herring. Access to many of the historic spawning habitats is excluded due to conflicts with sport fish species. There is no expectation that additional habitat will reopen in the near future.

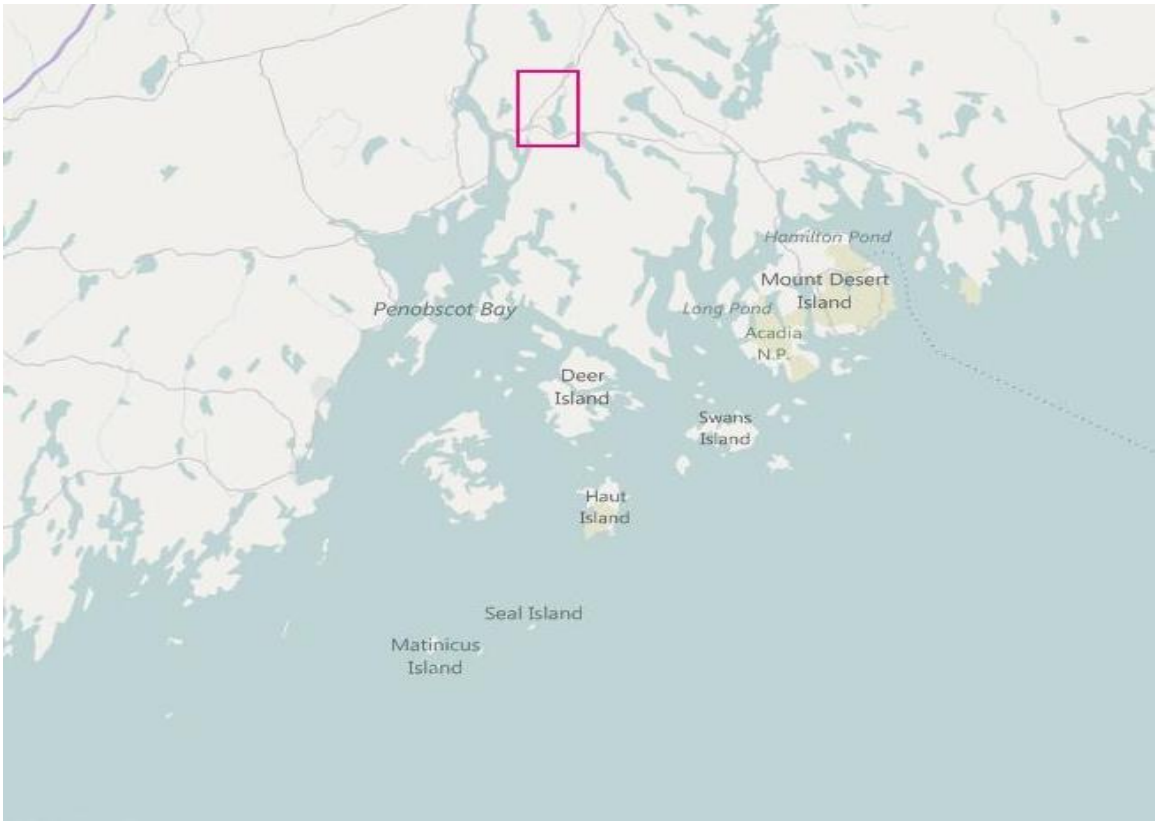
In addition to the closed fishing days the fishery is required to release 200 bushels of alewives upstream to support alewife spawning in Toddy Pond further up in the drainage. This management action was enacted in response to a shift in species composition in the commercial samples which indicated an increase in blueback herring presence without an increase in total river herring landings. Historically blueback herring accounted for 2-5% of the annual river herring catch. In recent years the proportion of blueback herring had increased above 50%. Data suggested that the alewife component of the run was

declining, and these data were supported by independent fishway counts of alewives into Toddy Pond. Recent fishway count data and biological samples show an increase in the alewife proportion of the run during the past three years.

The State of Massachusetts granted the municipality of Orland exclusive harvest rights in 1805. Orland is one of two fisheries that DMR permits to use tidal weirs to fish for river herring due to the size of the river at the fishing location. Like the smaller box traps, tidal weirs can capture the entire run entering the river during the open fishing days. Once river herring pass the fishery, they are prevented from falling back below the weir because the weir spans the entire river at low tide, preventing them from reentering the fishery. Fish remain in the river below the dam while they locate the fishways that provide passage upstream. The Orland River, before it was dammed, likely contained runs of American shad and Atlantic salmon. There have been no observations of either species at this location by field staff or the harvester during the past 20 years.

There is no spawning below the tidal fishways on the Orland River for either species of river herring. The first dam on the Orland River has two Alaska Steep Pass fishways which provide upstream passage and at above average high tides the fish can swim over the dam. Neither of the Alaska Steep Passes are available during two hours on either side of low tide.

Town	River	Lake size (acres)	Threshold (N/acre)
Orland	Orland	1,133	35



Tidal weir located in Orland, Maine

Commercial catches of river herring in May 2010 (left) and May,1970 (right).

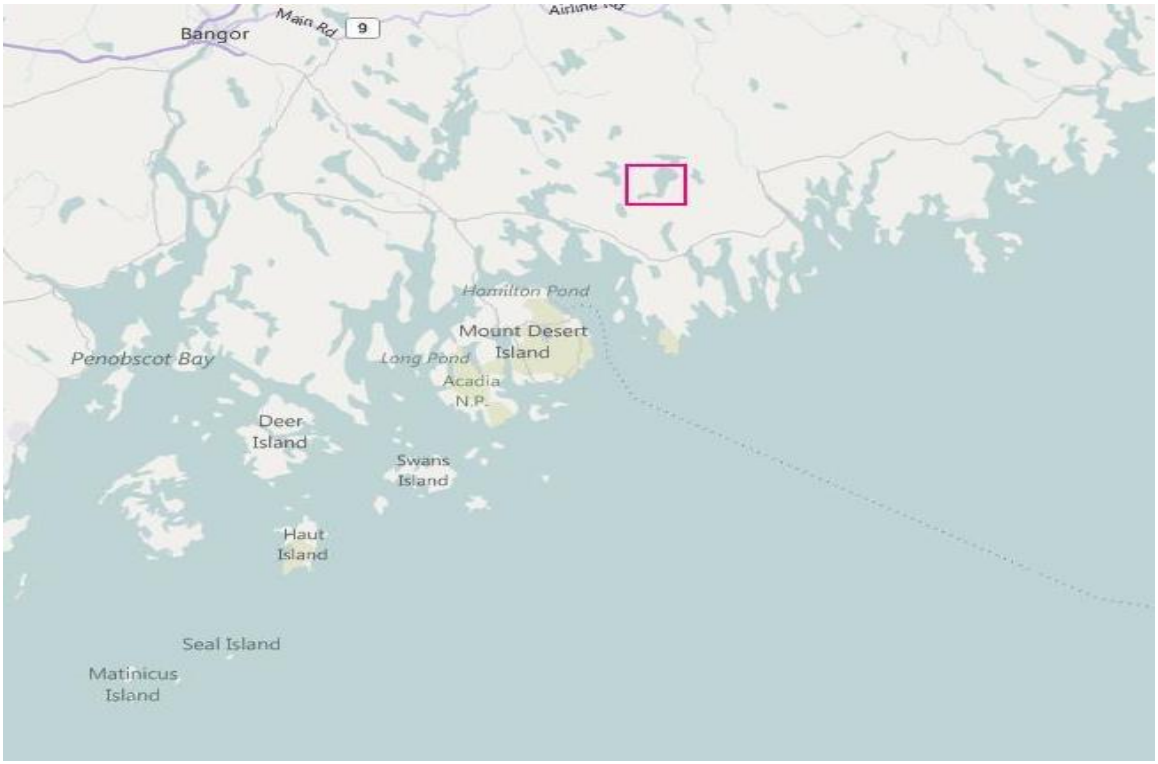
Steuben Commercial Fishery:

The Maine Department of Marine Resources manages this system for a minimum commercial escapement of three fish per acre. The spawning escapement need for this system is 6,213 river herring passed upstream by closing the harvest three days per week. The management plan has achieved returns to meet the target escapement developed for this system or passed the entire run upstream. The Steuben system is located several miles inland and is severely limited by beaver activity along the 15-mile-long brook leading to spawning habitat at Tunk Lake. Alewife production at this site depends on high water during both the spring and fall seasons. As a result, production from this system varies widely. This is one of several systems with landlocked salmon, lake trout, and rainbow smelt that the Maine Department of Inland Fisheries and Wildlife manages for sport fish. Commercial samples indicate the fishery is comprised solely of alewife. There is no known spawning for either river herring species within the mainstem river or streams leading to the spawning habitats.

Due to water quality issues associated with its oligotrophic characteristics, Tunk Lake produces very small juvenile alewives that emigrate to sea from July – October. The lake is nutrient poor and is not as productive as other lakes in the region. It is unlikely that increased escapement beyond the 3 fish per acre would produce consistently higher annual returns. The Steuben commercial fishery was closed

during the period 2018 – 2020 for failing to meet SFMP sampling and repeat spawning metrics. The commercial harvest resumed in 2021.

Town	River	Lake size (acres)	Threshold (N/acre)
Steuben	Tunk Stream	2,071	3

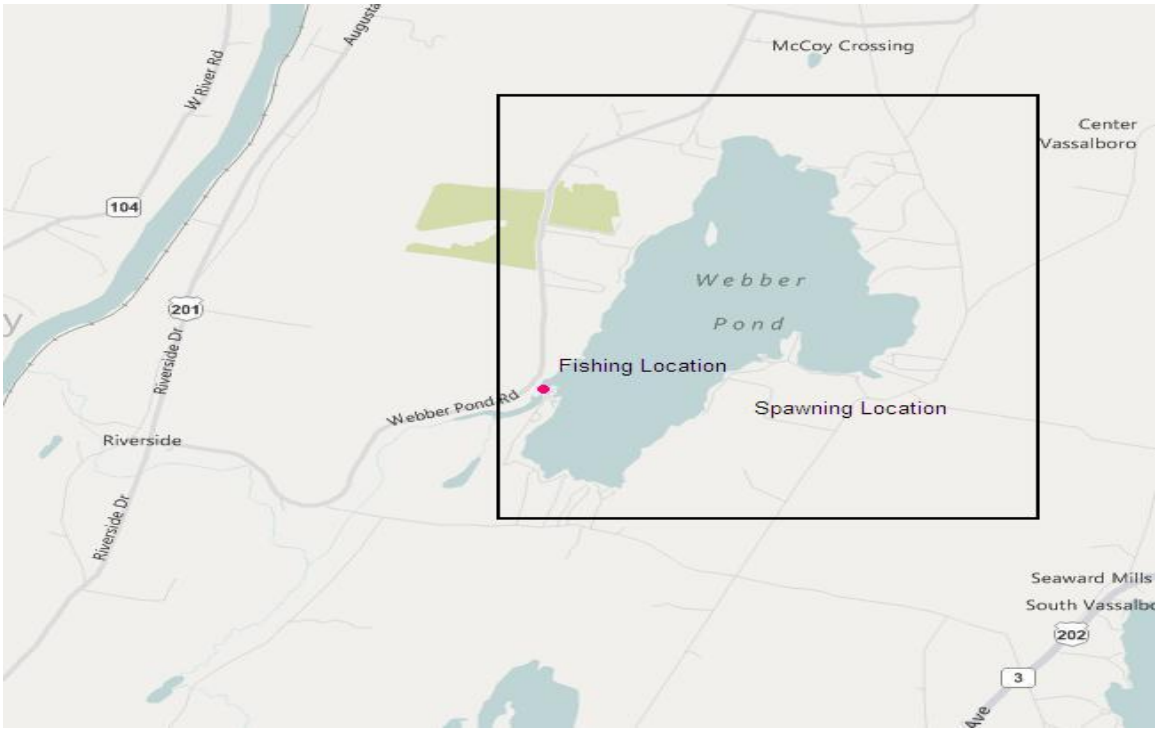


Webber Pond Commercial Fishery:

The commercial fishery at Webber Pond in Vassalboro began in 2009 as the result of a restoration project initiated by the Maine Department of Marine Resources in 2000. Until 2009 alewives were unable to reach spawning habitat in Webber Pond unless they were hand-dipped over the dam. Upstream passage now provides access to spawning habitat within this municipality. The Maine Department of Marine Resources manages this system for a minimum commercial escapement of 35 fish per acre. The municipality currently chooses to have the commercial harvester pass at least 18,000 alewives into spawning habitat before commercial harvest can commence. The minimum spawning escapement need for this system is 42,035 river herring passed upstream through three closed days per week during the season. The management plan has achieved the target escapement developed for this system during all years that the commercial harvest has occurred. Current returns to the commercial fishery are the result of trap and transfer operations that initially stocked the system with approximately 6 fish per acre though an agreement with the Maine Department of Inland Fisheries and Wildlife.

There is no spawning in the stream leading to Webber Pond. Like many of the small streams that lead to spawning habitat in lakes and ponds in Maine the stream is often plugged with beaver dams. The harvester must obtain a permit to remove these dams prior to downstream migration in the fall and the spawning run in the spring.

Town	River	Lake size (acres)	Threshold (N/acre)
Vassalboro	n/a	1,201	35



Outlet dam at Webber Pond. The commercial fishery occurs upstream and to the left of the dam.

Ellsworth Commercial Fishery:

There are two large dams on the Union River. The largest is the Ellsworth dam, approximately 66.7 feet high and has four turbine generators with a FERC-authorized capacity of 8.9MW. Graham Lake Dam is approximately 30 feet high and used only to release water from the Graham Lake impoundment. The water storage dam can expand the size of Graham Lake to over 9,000 surface acres. Since 1996, the hydropower owner has artificially propagated the alewife run through a long-term trap and truck program in lieu of permanent fish passage. Prior to the 1980s the state resource agencies transported fish above the hydropower facility to initiate a river herring run. These stockings resulted in returns as high as 1.8 million returning alewives in the mid-1980s. For the past several years the number of alewife stocked above the hydropower dam occurred as the result of the hydropower company owners trucking as many fish as possible during the closed fishing days.

In accordance with the 2015-2017 Union River Fisheries Management Plan, the company currently stocks a minimum of 315,000 alewives annually upstream into Graham and Leonard lakes. Once 150,000 alewives are captured and stocked upstream, harvesting is allowed Monday through Friday each week. The additional 165,000 alewives are stocked on weekends through June 15 each year to represent the age structure and species composition of the run throughout the entire spawning period. Once the harvester attains the stocking goal, the management plan permits the municipality to harvest all remaining river herring coming up the fishway which ends in the hydropower station parking lot. A placeholder is in effect to transport blueback herring above the dams if they arrive at the trapping location. Biological samples indicated that the run is currently comprised entirely of alewife.

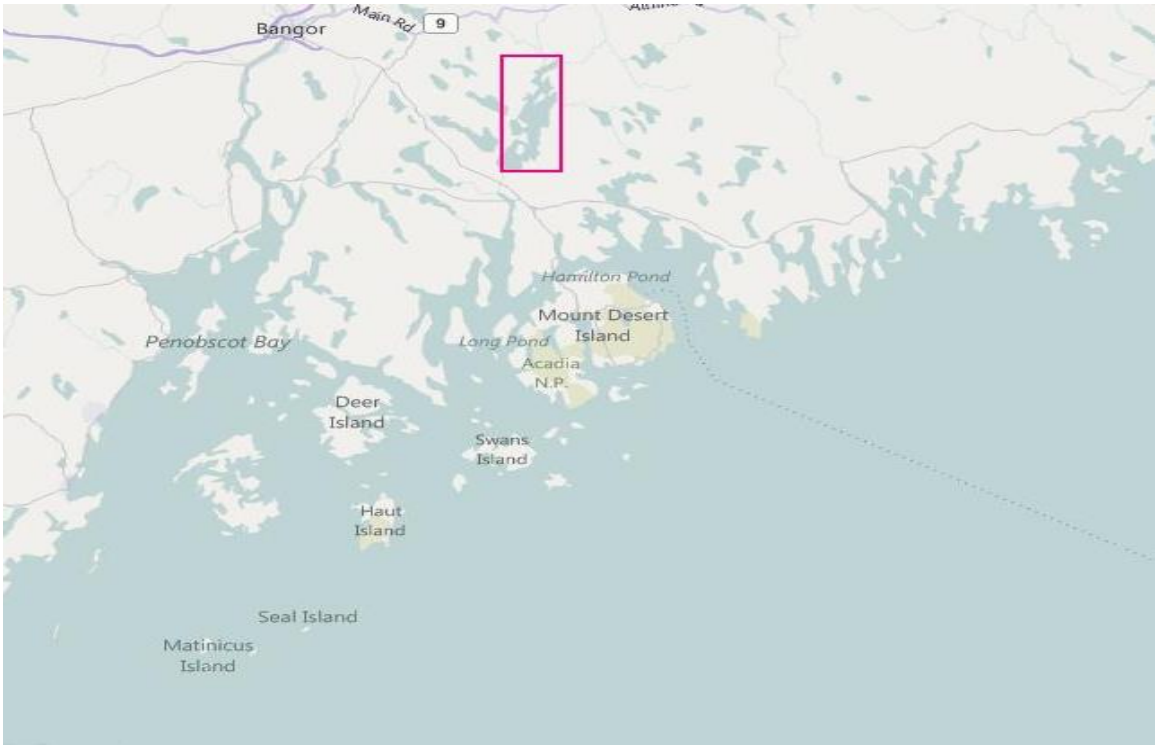
In addition to the dedicated downstream passage at the Graham Lake Dam, migrating fish are also known to pass through the turbines at Ellsworth dam. This can result in high mortality for both adult and juvenile river herring. The number of repeat spawning fish returning to the Union River is low compared to all other rivers in Maine. The lack of repeat spawning fish is likely the result of additional mortality from the turbines and high exploitation rate. As the numbers of fish stocked above the dam increased the number of repeat spawning fish also increased. The management plan has achieved the target escapement developed for this system each year during the past 20-year period solely through the efforts of Black Bear Hydro Partners and the contractors hired for the trap and truck program.

The hydropower facility is a peaking operation where water is stored during the night and passed though the turbines during the day when power demand is highest. Spill conditions exist for only three weeks during the early spring ice melt. During the remainder of the year there is no spill over the dam except during high water resulting from an extreme rain event or station shutdowns that provide spill.

There is no spawning below the dam for either species. The Union River is tidal to the base of the dam and provides little riverine habitat for any anadromous fish species. Atlantic salmon are present during some years and when caught in the trap are trucked upstream to spawning habitat. There are several ponds in the watershed that could support river herring, but alewife reintroductions are not permitted by

the Department of Inland Fisheries and Wildlife because of perceived conflicts with sport fish species, rainbow smelt, or hatchery operations.

Town	River	Lake size (acres)	Threshold (N/acre)
Ellsworth	Union River	7,865	40

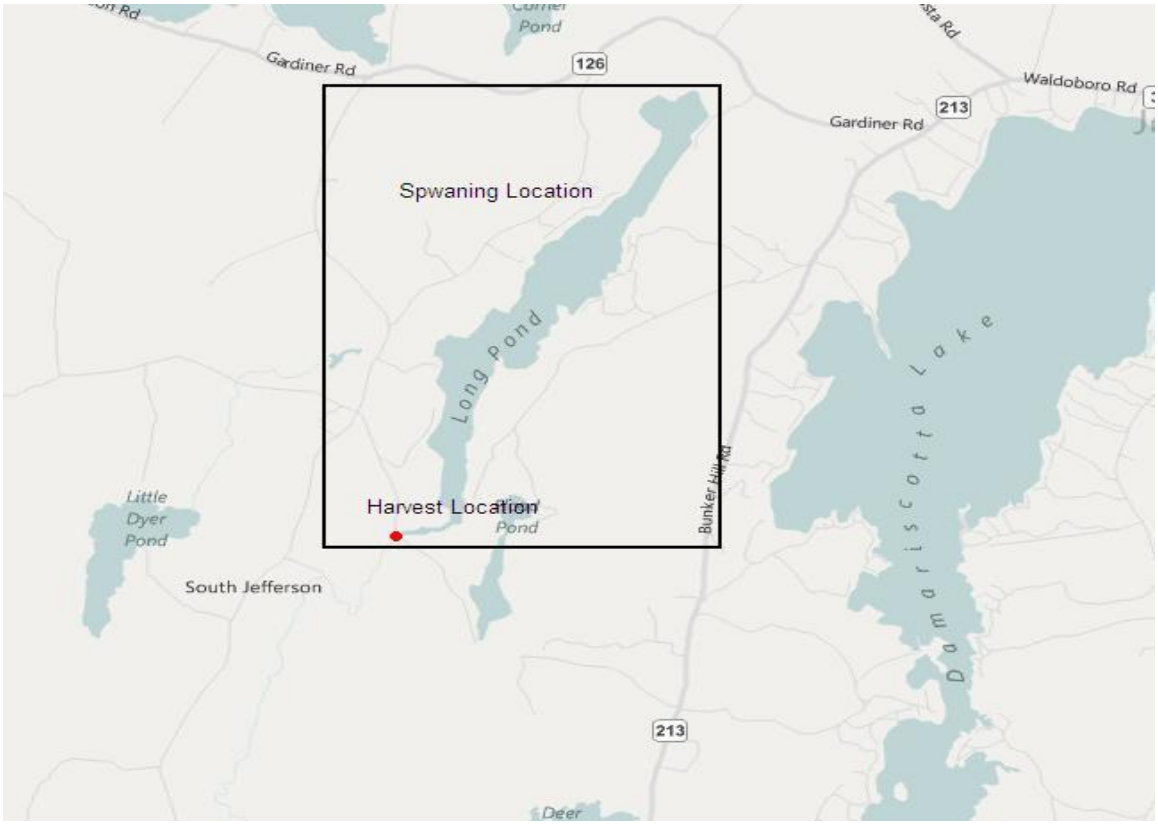


Jefferson Commercial Fishery:

The Maine Department of Marine Resources manages Dyer-Long Pond for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for this system is 14,875 river herring passed upstream through a three-day closed period per week throughout the season. The management plan has achieved returns to meet the target escapement developed for this system or passed the entire run during each year for the past 20-year period. This fishery is typical of the smaller commercial river herring fisheries in Maine. The outlet stream from Dyer-Long Pond is a small coastal tributary to the lower Sheepscot River. This stream is heavily impacted by beaver activity in the fall that delay downstream passage and can obstruct upstream passage the following spring if the dams are not breached or spring flows do not overtop the dams.

The river herring run into Dyer-Long Pond is entirely alewife. Blueback herring are not present in the commercial catches or samples collected by field staff. There is no spawning habitat below the fishway for blueback herring or alewife. Poaching along the stream is a problem at times during the spring migration. The stream is easily accessible at several points along its course to the Sheepscot River.

Town	River	Lake size (acres)	Threshold (N/acre)
Jefferson	Dyer River	425	35



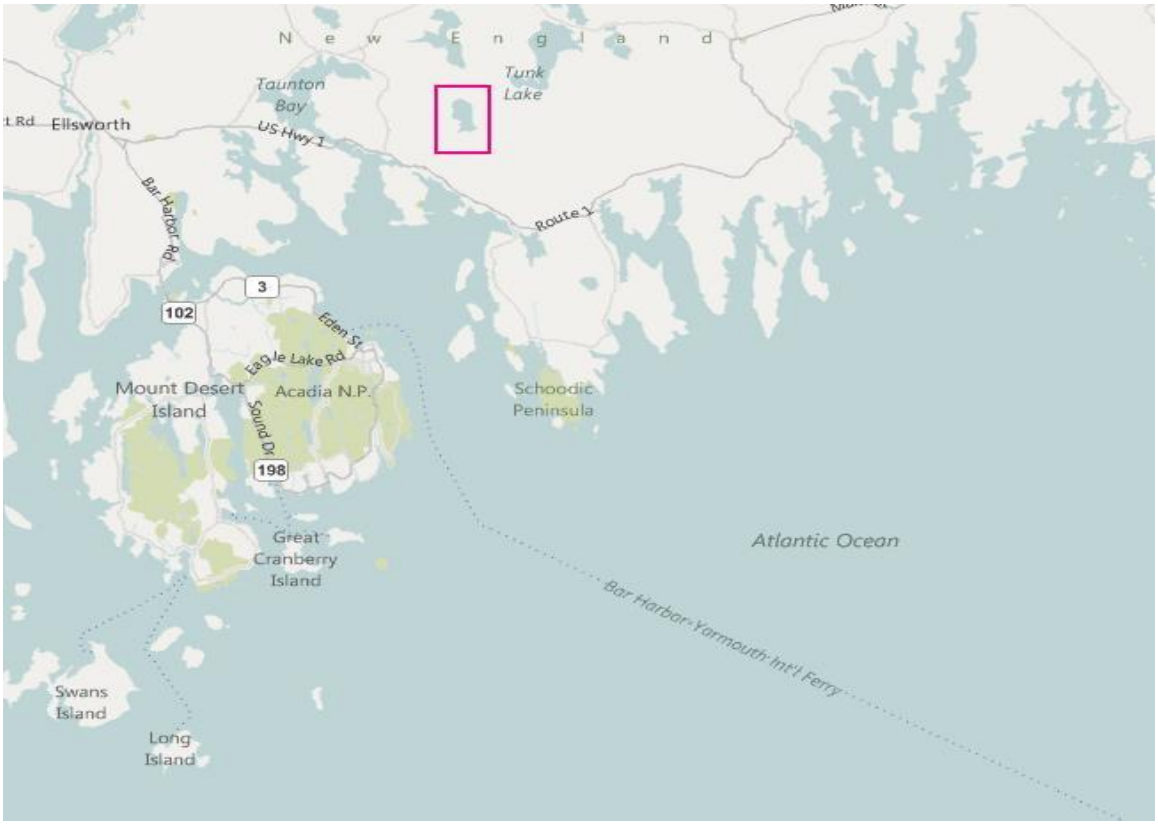
Outlet stream from Dyer-Long Pond, fishway leading into the pond and alewife trap at the pond outlet.

Sullivan Commercial Fishery:

The Maine Department of Marine Resources manages Flanders Pond for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for this system is 3,222 river herring passed upstream through a three-day closed period per week throughout the season. The management plan has achieved returns to meet the target escapement developed for this period system or passed the entire run upstream. The harvester monitors the stream during the spring and fall migration periods to ensure upstream and downstream passage is available. The condition of the outlet dam is poor and water levels can be difficult to maintain due to leaks which complicate fish passage. There is no spawning in the stream below or above the fishery other than the lake habitat. Blueback herring are not observed in biological samples or commercial catches. There are no dams located on the stream, but the previous fishway and culvert did impede upstream passage at certain flows. In 2012 a new bottomless arched culvert was installed, eliminating fish passage issues for anadromous fish in this system, though not at the dam. The commercial fishery was closed during 2021 for failure to meet SMFP metrics, no commercial fishery occurred in 2022, and a limited fishery occurred in 2023, harvesting only 60 bushels. The Sullivan fishery is one of the Maine fisheries that harvests primarily for personal use. Using commercial harvest to estimate escapement if not practical for this location.

Town	River	Lake size (acres)	Threshold (N/acre)
Sullivan	n/a	92	35


Spawning Location
Flanders Pond
Harvest Location
Hog Ba
200
Bert Gray Rd
Sullivan
1
Sullivan
Schoodic Scenic Byway
Sorrento
1
East Sullivan


N e w E n g l a n d
Taunton Bay
Tunk Lake
Ellsworth
US Hwy 1
Bar Harbor Rd
Route 1
3
102
Eden St
Eagle Lake Rd
Mount Desert Island
Acadia N.P.
Schoodic Peninsula
Sound Dr
198
Great Cranberry Island
Atlantic Ocean
Bar Harbor-Yarmouth Int'l Ferry
Swans Island
Long Island

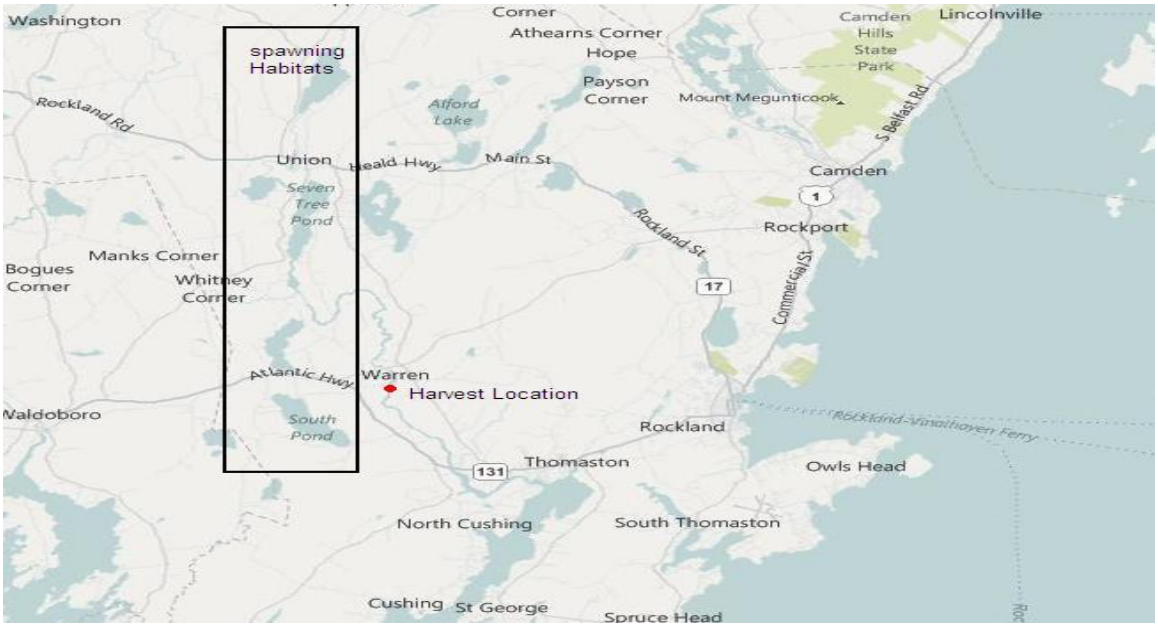
Fishway leading to spawning habitat in Flanders Pond prior to fall of 2012 (left). Removal of the fish ladder and installation of a bottomless arch culvert ready for the 2013 alewife migration (right).

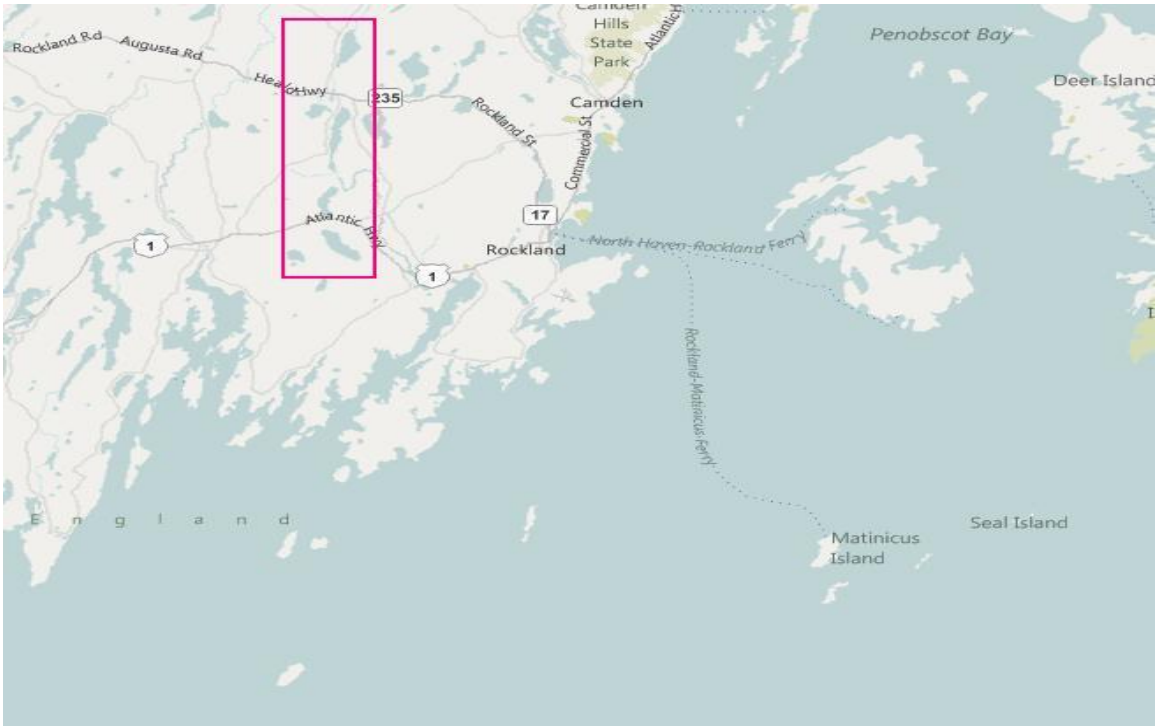
Warren Commercial Fishery:

The Maine Department of Marine Resources manages the St. George River Watershed for a minimum commercial escapement of 35 fish per acre. The management plan has achieved returns to meet the target escapement developed for this system. The spawning escapement need for this system is 66,115 river herring passed upstream by a two-day closure of the fishery each week and a delay in deploying the weir until sometime after May 1 of the fishing year. Due to the size of the weir and spring flows in the river, deploying the weir and active fishing at this location typically does not occur until the second week of May. During most years the delay in deploying the weir allows a larger proportion of the spawning stock to pass upstream compared to typical fisheries. There are several individual and varied spawning habitats within the watershed that act to support the large river herring run, which consists of both blueback herring and alewife.

Warren is one of the oldest and most productive commercial fisheries in Maine. The State of Massachusetts granted Warren exclusive harvest rights in 1802. By 1869 there were 16 dams on the mainstem of the St George River. The mainstem river is now clear of manmade obstructions and most spawning habitat is now accessible to river herring, however there are portions of historic habitat that are still inaccessible in the upper watershed. Dams at lake outlets without fish passage are the biggest obstacle to the full restoration of the watershed. There are blueback herring mixed in with the commercial alewife catches toward the end of the fishing season. Blueback herring continue to migrate upstream in large numbers after the June 5 commercial season closing date. The number of blueback herring in the system is estimated at 950,000 based on available spawning habitat. There is no spawning habitat located in the tidal river, below the town fishery, for either species.

Town	River	Lake size (acres)	Threshold (N/acre)
Warren	St. George	1,889	35





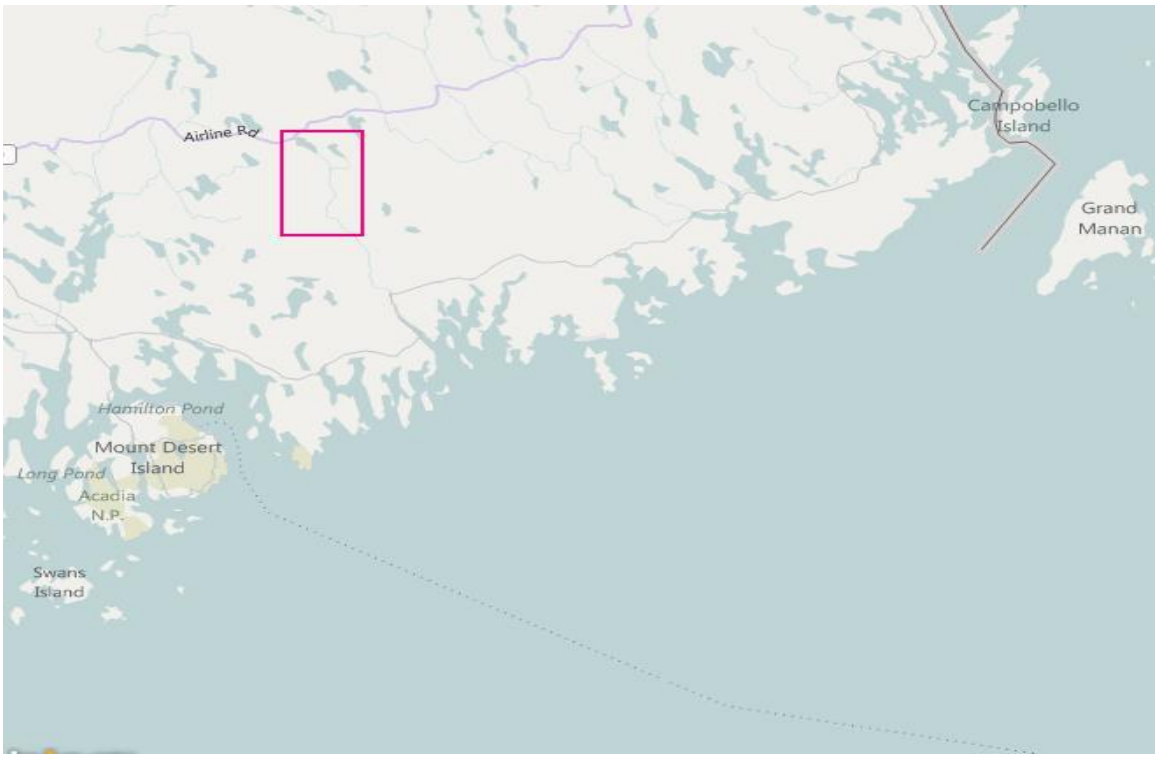
Fishing weir located at the head of tide on the St. George River in Warren, Maine.

Cherryfield Commercial Fishery:

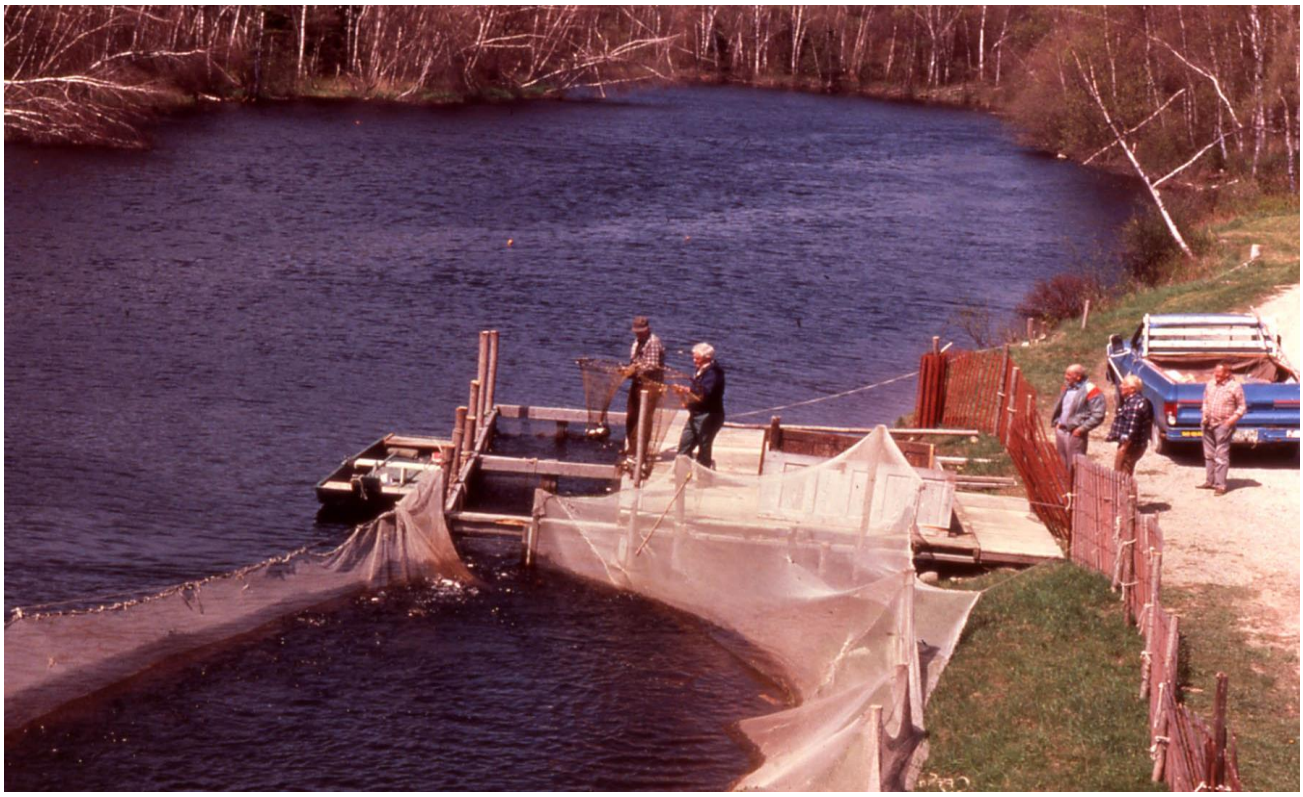
The Maine Department of Marine Resources the Narraguagus River for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for this system is 29,050 river herring passed upstream through the three closed fishing days per week throughout the fishing season. The management plan has achieved the target escapement developed for this system or passed the entire run each year.

The Narraguagus River is an Atlantic salmon river with a significant number of alewives spawning in the lakes upstream of the dam located just above the head of tide. DMR fisheries biologists capture returning Atlantic salmon in a trap before salmon reach the alewife fishery released them into the river above the dam. A small run of American shad also spawn in the river above the dam and provide sport fishing opportunities for the region. There is no indication that blueback herring utilize this river based on commercial samples collected at the fishing location. There is only a short stretch of freshwater below the dam and there is no evidence that river herring spawn in this stretch of river.

Town	River	Lake size (acres)	Threshold (N/acre)
Cherryfield	Narraguagus	830	35



Commercial alewife fishery above the Cherryfield dam during the 1980s.



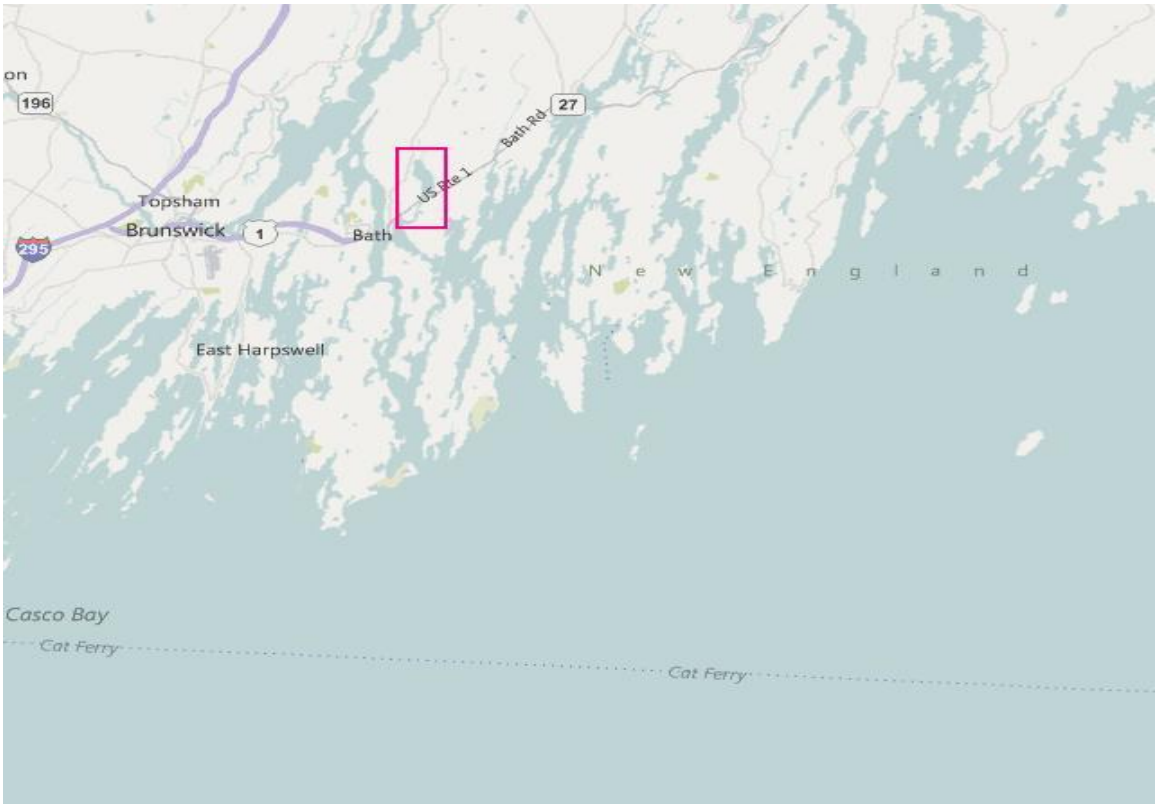
Woolwich Commercial Fishery:

The Maine Department of Marine Resources manages Nequasset Lake for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for this system is 13,720 river herring passed upstream by the harvester. The management plan has achieved returns to meet the target escapement developed for this system or passed the entire run each year for the past 20-year period. This fishery is one of two commercial fisheries that allow constant spawning escapement throughout the run and is closed for an additional 72-hours during the week. To improve passage the fishway was rebuilt in 2014 and monitoring of the new passage structure is ongoing. Escapement counts into the lake are monitored using the VisuCount protocol and provide an alternative method of determining escapement at this location compared to estimates from commercial catches.

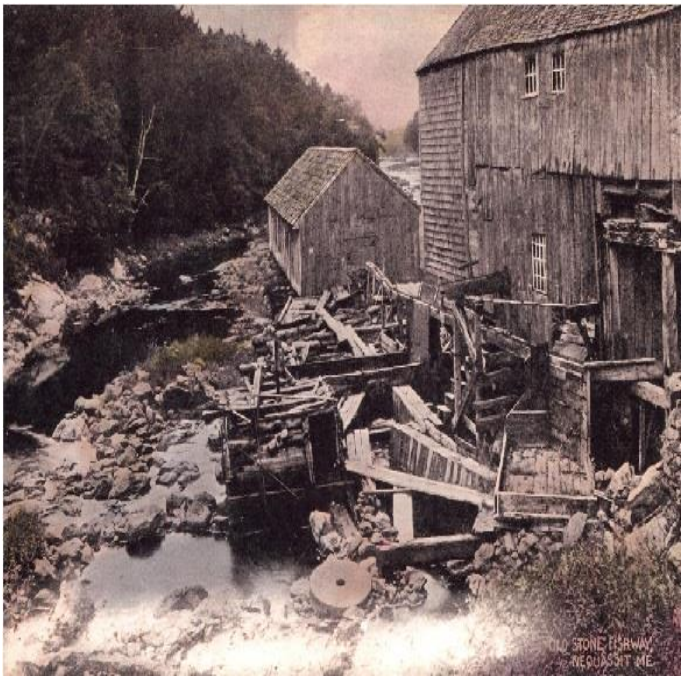
The fishery is located at the entrance to the tidal fishway that leads to Nequasset Lake. The Nequasset fishery is one of a handful of locations that harvest river herring for food. River herring are salted and smoked as a seasonal delicacy. Smoked alewives sell for $90.00 per/bushel compared to $35.00 per/bushel for lobster bait. Alewives sold as bait at Nequasset are rationed between the numbers of fishermen that arrive in the morning to pick up bait. Nequasset, like most fisheries, cap the number of alewives sold to any one fisherman per day. At Nequasset the daily limit per buyer is 2-4 bushel per day. The sale format allows the limited amount of bait caught on any one day to supply a larger number of individual fishermen.

Nequasset Lake is a municipal water supply for several towns in the surrounding area. Maintaining high water quality is important to the water district. Currently there are no limitations on the number of alewives permitted into the lake to spawn, though some municipal water districts prohibit alewife reintroduction. There is no evidence to this point that alewives are causing water quality concerns.

Town	River	Lake size (acres)	Threshold (N/acre)
Nequasett	Kennebec	392	35



Historic picture of the Nequasset Mill and fish passage to spawning habitat and the trapping facility prior to 2014 rebuild.



The Nequasset fishway and entrance to the trapping facility after repair in 2014.

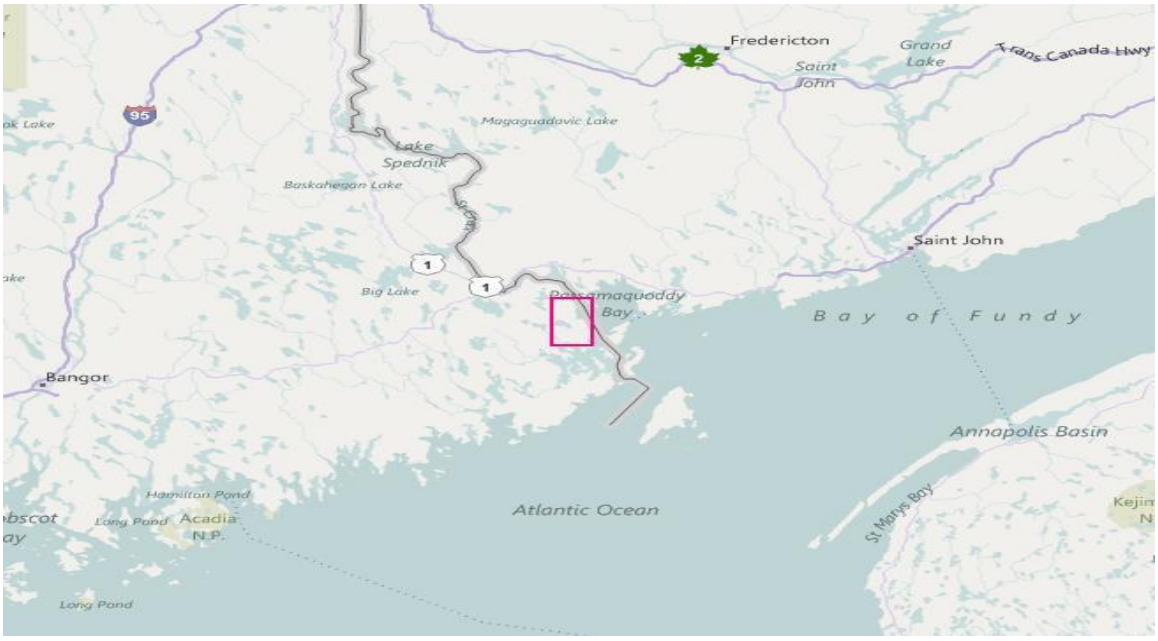
Perry Commercial Fishery:

The Maine Department of Marine Resources manages Boyden Lake for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for this system is 59,570 river herring passed upstream through a three day per week closure in the fishery. The management plan has achieved the target escapement developed for this system or passed the entire run each year.

This system has significant issues with beaver dams that restrict upstream and downstream migration throughout the season. Fish that escape the commercial fishery may, or may not, reach spawning habitat depending on water conditions. Boyden Lake is a municipal water supply operated by the Passamaquoddy Indian Tribe. Fluctuating water levels during upstream and downstream migrations influence the number of annual returns and survival of postspawn adults migrating downstream. The system is responsive when spawning fish can access the pond. There is no spawning habitat below the dam for either species of river herring. Beaver dams and low water flows that fail to attract fish to the stream or fishway entrance are the main obstacles to producing a larger run. Commercial harvest did not occur for several years prior to 2004.

The fishery in the town of Perry is operated by a commercial fisherman who chooses to harvest fish for personal use and not commercial retail sale. The harvester elects to pass fish upstream in addition to the required closed days. As a result, the harvest reported for this system is lower than expected and estimates of escapement based on harvest are low. The Maine Department of Marine Resources and Maine Sea Grant periodically install electronic fish counters at this location to assess escapement to ensure the fishery meets SFMP metrics.

Town	River	Lake size (acres)	Threshold (N/acre)
Perry	Little River	1,702	35



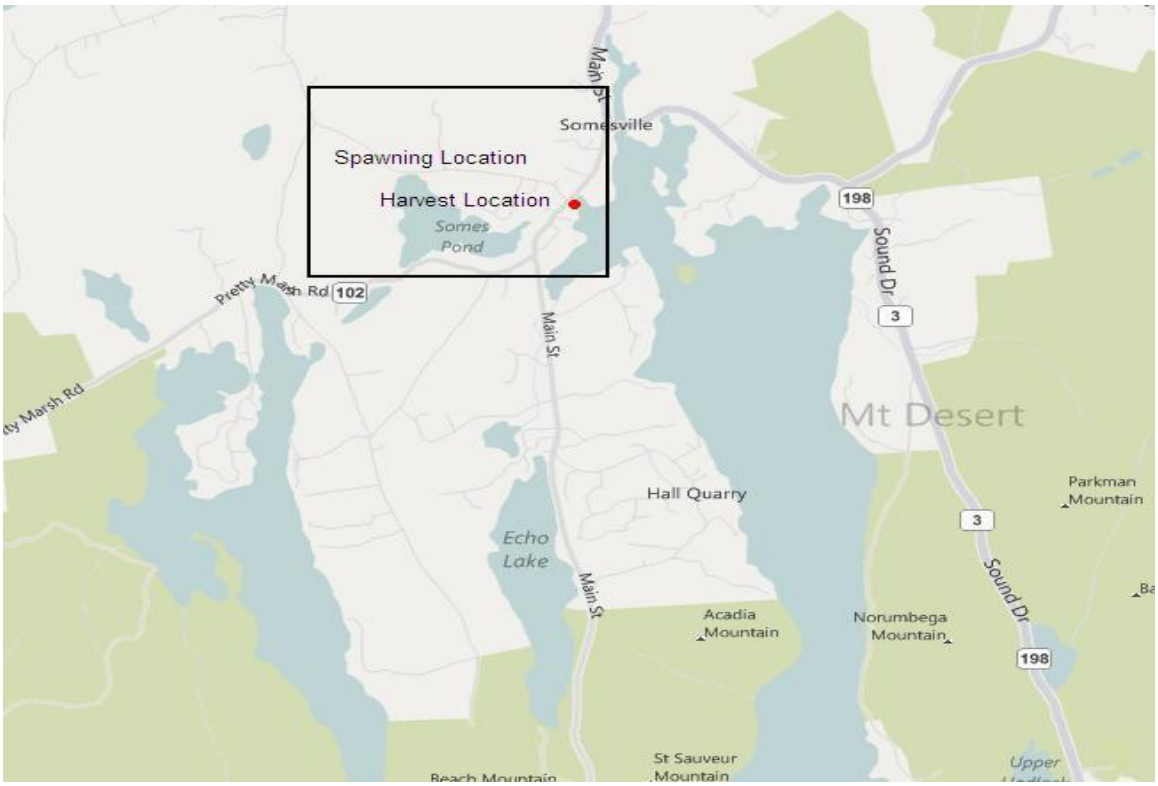
Dam and fishway under high flow conditions in 2006. Note harvest box and sluice pipe located at the corner pool of the fishway used to transport harvested fish into totes.

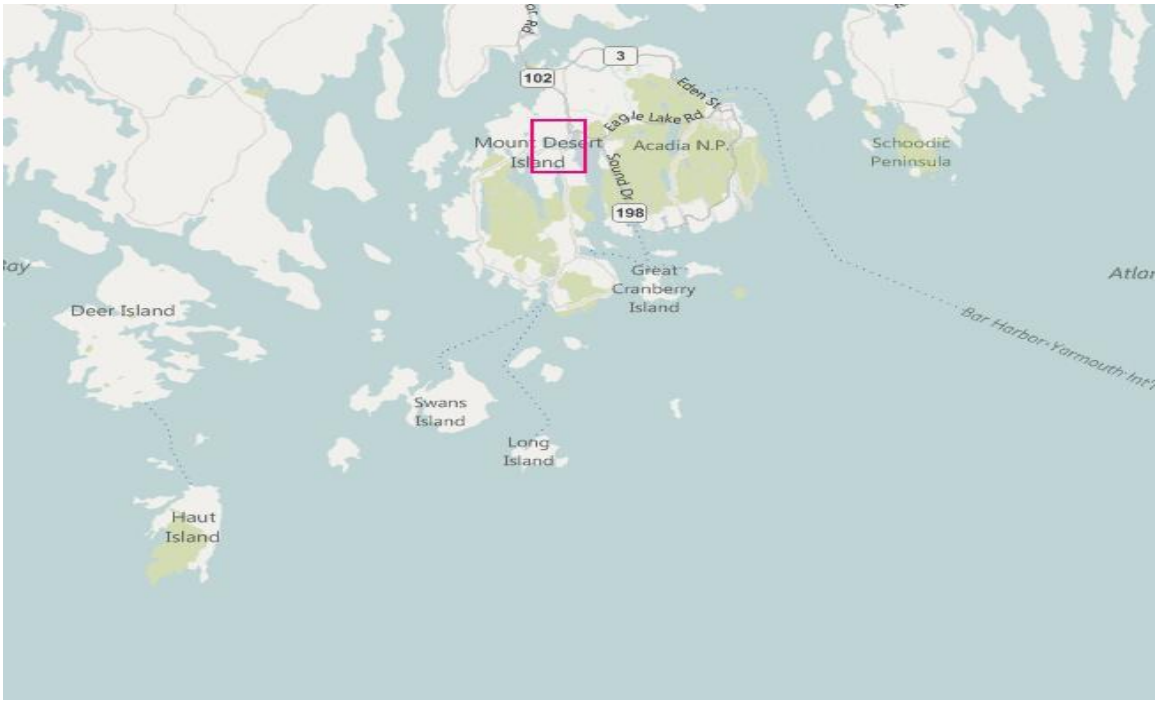
Mount Desert Commercial Fishery:

The Maine Department of Marine Resources Somes Pond for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for this system is 3,640 river herring passed upstream. The municipality of Mount Desert selects to keep the run closed for conservation at this time, though recent counts indicate that a harvest is possible and has been approved by ASMFC. Fisheries staff began to collect age and repeat spawning data at this location in 2010. The spawning habitat at this location is limited and historically never produced large numbers of fish which could migrate to Somes Pond or Long Pond. Passage is difficult and several fishways are required to reach Long Pond spawning habitat. The run is entirely alewife based on analysis of the biological samples collected within the system.

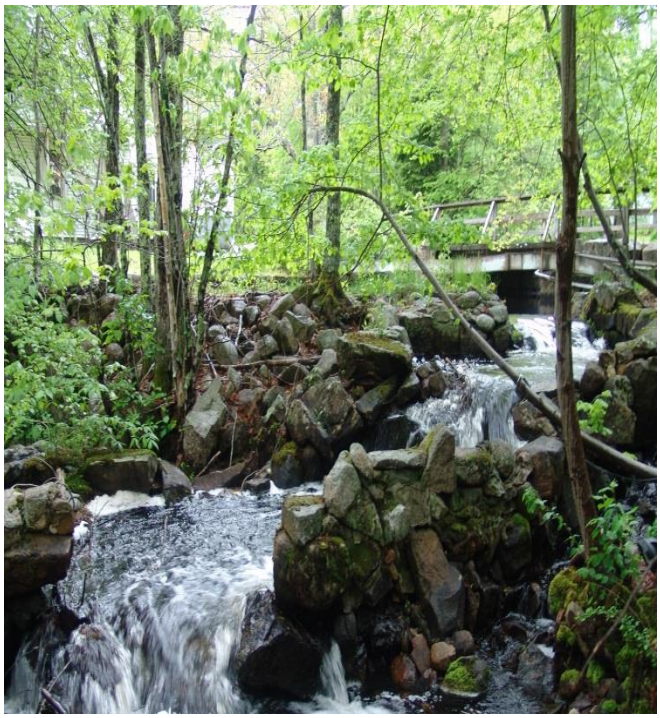
The fishway is a tidal fishway that is accessible only as the tide rises to meet the fishway entrance. This limits the time fish can access the fishway and migrate to spawning location upstream. This is common at several commercial harvest locations throughout the state. This emphasizes the need to maintain, clean, and monitor the tidal fish passages daily to ensure unobstructed upstream passage. The harvesters hired by the municipalities often fill this role, freeing state personnel to address other passage issues. At this location the local wildlife sanctuary monitors passage and maintains the fishways.

Town	River	Lake size (acres)	Threshold (N/acre)
Mount Desert	n/a	104	35





Tidal Denil fishway located in Somes Harbor and Somes Brook leading to Somes Pond.



Benton Commercial Fishery:

In 2009, the Town of Benton resumed a commercial fishery for river herring for the first time in 198 years. The fishery is the result of the removal of the Edwards Dam in Augusta, Maine and a ten-year fisheries restoration program in the Kennebec River and Sebasticook River watersheds. The Maine Department of Marine Resources currently manages this system for a minimum commercial escapement

of 35 fish per acre. The minimum spawning escapement need for this system is 379,890 river herring passed upstream into several spawning habitats in the Sebasticook River drainage.

Soon after the restoration project began, the Maine Department of Inland Fisheries and Wildlife and Maine Department of Marine Resources permitted a limited dip net fishery in the river below the first dam (2000-2006). DMR staff believes landings for this period were underreported based on the numbers of fishing permits issued and the number of landings reported at the end of the fishing season. The DMR closed the fishery in 2007 to allow the municipality of Benton to reacquire historical rights to the harvest. The Town of Benton conducted its first commercial dip net fishery in the Sebasticook in 2009 and the Town maintained this harvest method through 2024.

The Maine Department of Marine Resources began the Sebasticook River Restoration Project by stocking 6 fish/acre into available historic spawning habitat as permitted by the Maine Department of Inland Fisheries and Wildlife. The initial stocking, which placed 57,533 pre-spawn adults within the 10,854 acres of spawning habitat, created an estimated run on the Sebasticook River ranging between 1.5 and 3.5 million fish within six years. There was no permanent upstream passage available until the State of Maine and conservation groups removed the Fort Halifax Dam in 2008. Prior to 2007, an unlimited commercial dip net harvest below the first dam on the river captured returning adults. The fish escaping the fishery remained below the dam until they dropped out of the system during early summer. Estimates of the number of river herring remaining below the dam ranged from 1.25 - 3 million individuals.

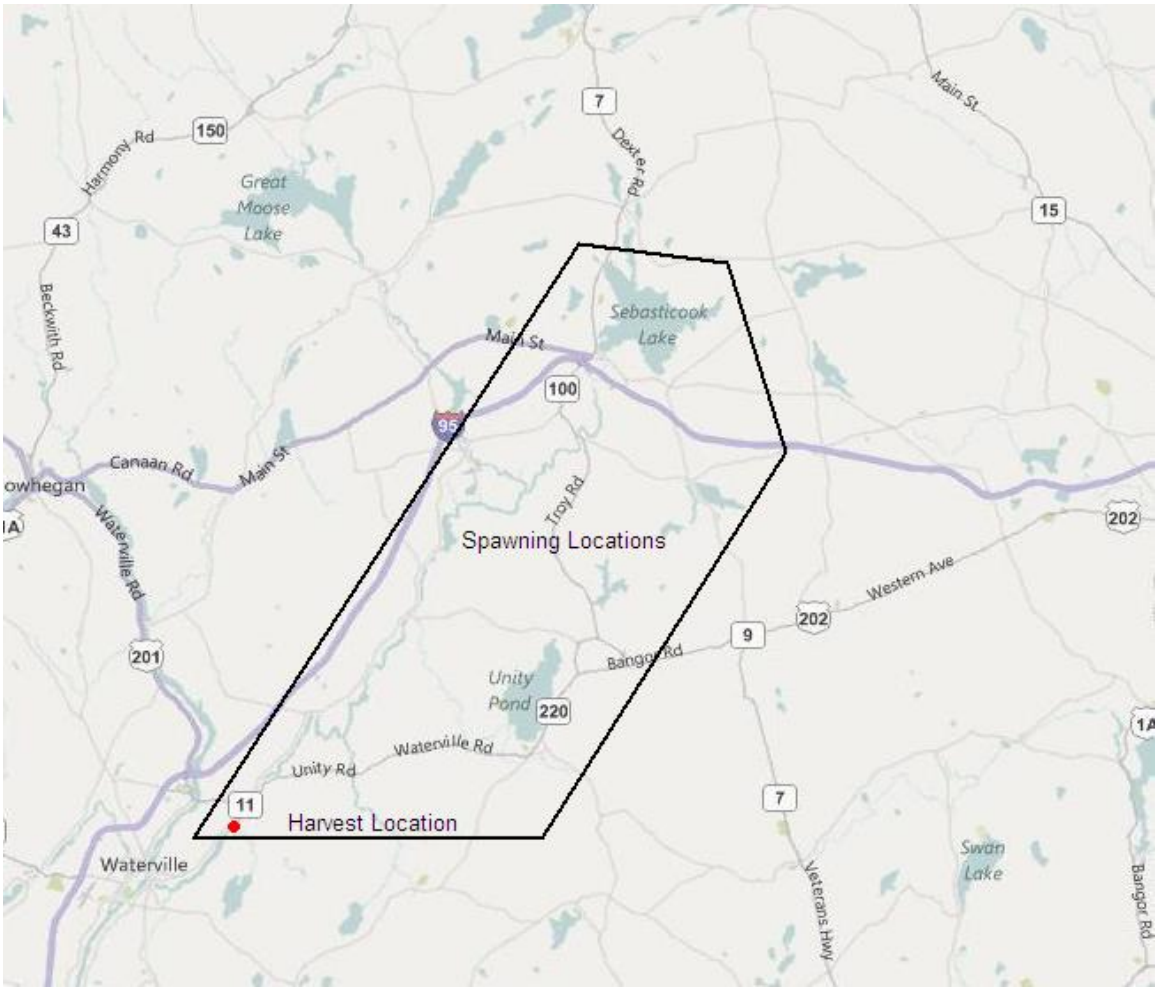
The mainstem river and several lakes and ponds within the Sebasticook River drainage provide excellent spawning and nursery habitat for river herring. These habitats currently support one of the largest monitored river herring runs in Maine. Restoration efforts in the watershed will continue to open additional historic spawning areas over the next several years. The Maine Department of Marine Resources, in conjunction with the hydropower company, operate and monitor upstream passage on the Sebasticook River. There are two hydropower dams that remain on the mainstem of the Sebasticook River. Both dams have dedicated upstream and downstream passages for anadromous fish. The passage efficiency for both sites is currently unknown, though the Benton Falls fishway does pass more than 2 million fish per year on a regular basis and passage counts have been as high as 6.5 million in recent years.

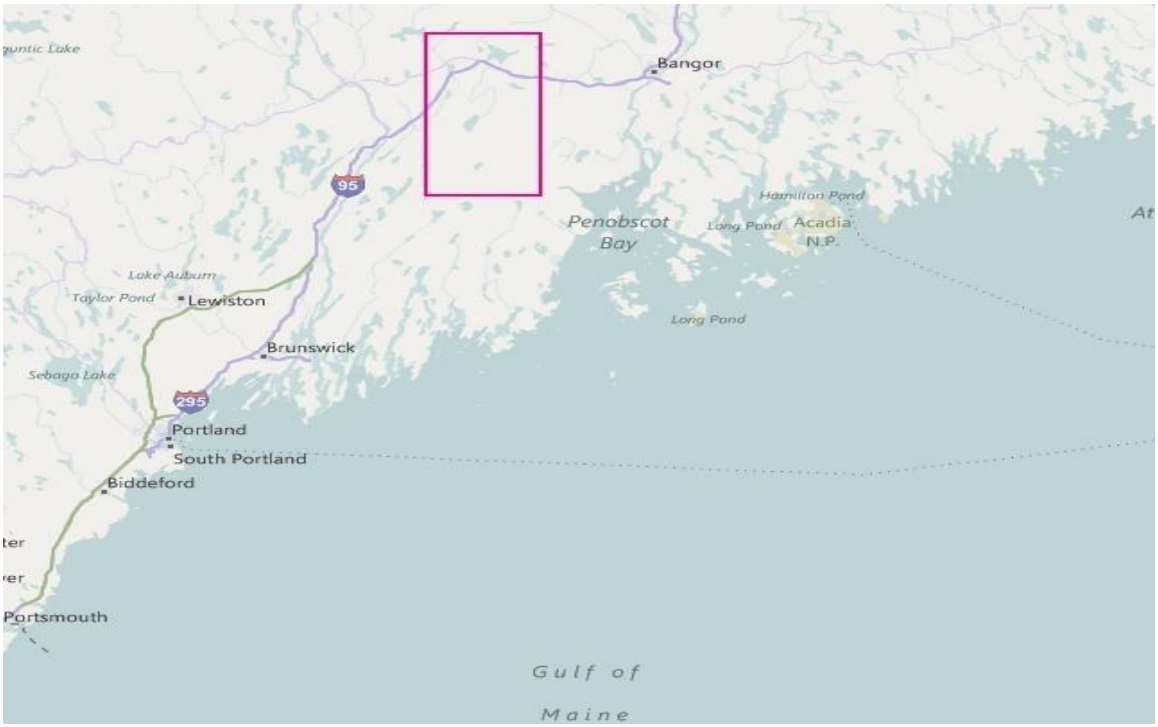
Upstream passage is a priority at this location with 200,000 fish required to pass upstream prior to commencing harvest activities. The municipal commercial harvest plan restricts harvest gear at the base of the hydropower dam to dip nets and cast nets. Discussions on how to improve harvest are occurring between the harvester and the Town. These gear types permitted severely limit the numbers of fish that the harvester can access during the fishing season.

Spawning habitat is available in the river above and below the dam for blueback herring and American shad but not alewife. There is a mix of blueback herring in the commercial alewife catch toward the end

of the season. Most of the blueback herring escape the commercial alewife fishery due to the June 5 end date for the commercial season. If the species composition in the commercial catch exceeds 60% blueback herring the commercial fishery is closed for the season, prior to the June 5 closed date. This management effort is used to provide additional protection for blueback herring colonizing the river above the Benton Falls hydropower dam. Blueback passage numbers at the Benton fish lift often exceed 1 million during the season.

Town	River	Lake size (acres)	Threshold (N/acre)
Benton	Sebasticook River	10,854	35





Benton Falls Hydropower Station. The commercial fishery occurs below the dam.

Arrowsic Commercial Fishery:
The Maine Department of Marine Resources manages Sewall Pond for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for this system is 1,505 river herring. The management plan for Sewall Pond has achieved the target escapement developed for this system or passed the entire run for the past several years.

Sewall Pond is the smallest of the existing Maine systems with a current river herring fishery. For the past five years (2020-2024) the town had the option of operating a limited harvest under an ASMFC approved addendum to the Maine SFMP, though they elected to harvest during only two of those years 2023-2024. The approval to fish provided through the addendum ended at the conclusion of the 2024 fishing season and DMR is currently seeking ASMFC approval to continue the fishery. The town of Arrowsic historically fished for river herring and maintained their status regarding exclusive harvest rights to the river herring resource throughout the moratorium. Harvest was intermittent for several decades prior to implementation of Amendment 2 and harvest had not occurred for several years preceding 2012.

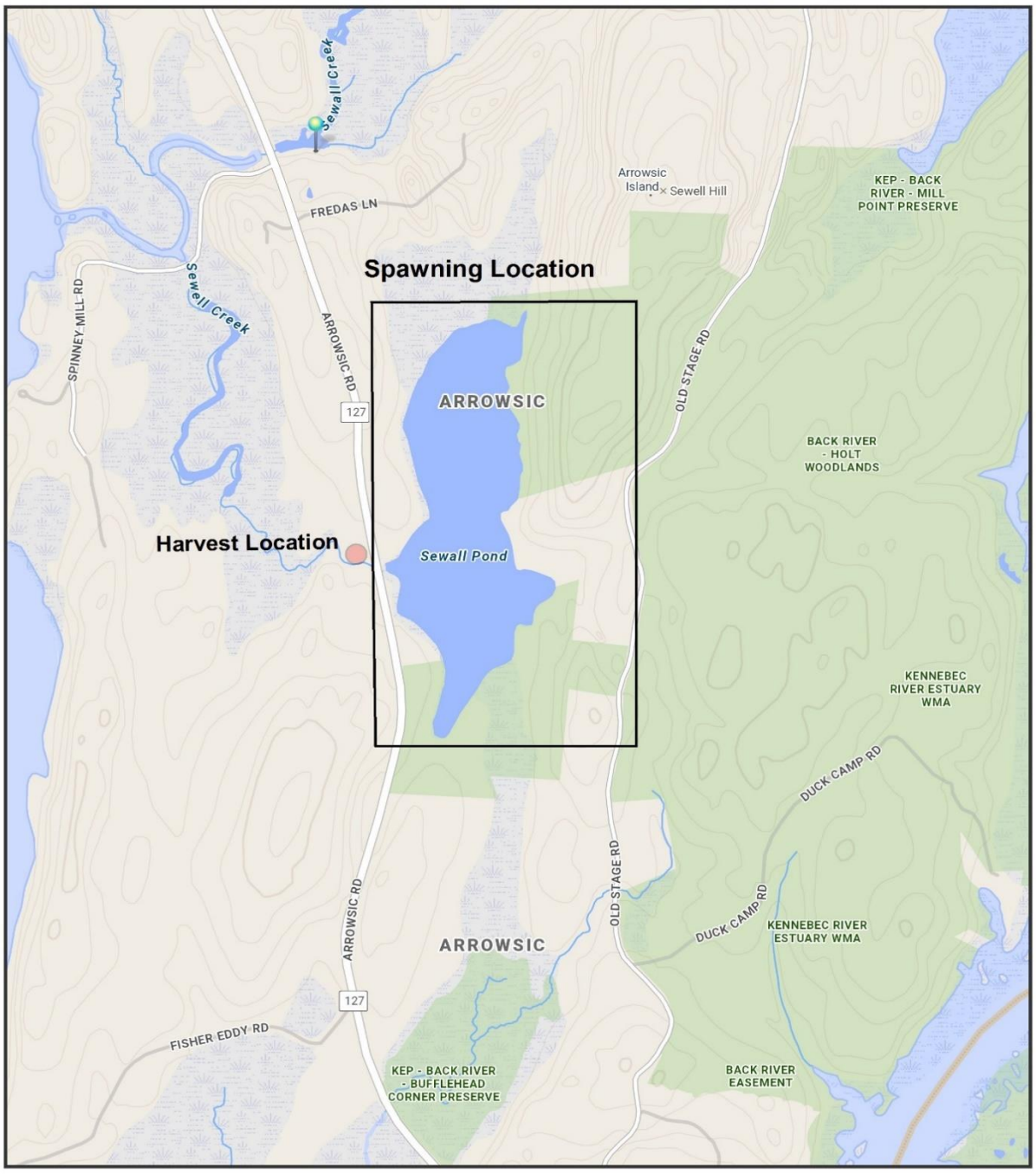
Through local efforts to improve passage and support river herring restoration activities, the river herring run into Sewall Pond has grown to several thousand fish. The largest improvement occurred in 2014 with the installation of a fishway under Route 127 which crosses the outlet of Sewall Pond. The culvert was failing and passage through the culvert leading to the pond was impossible under most flows. The culvert was replaced by a state-of-the-art passage corridor that contains a fishway that passes fish as well a subterranean pathway that passes other species (mammals, amphibians, reptiles).

Sampling conducted by the Arrowsic Conservation Commission documents run counts, run timing, and species composition of river herring returns. Scale samples collected by the Commission are analyzed by the Maine Department of Marine Resources to develop and track biological metrics regarding the Sewall Pond river herring population. The Commission also collects juvenile river herring samples as juveniles leave the pond and return to the ocean. Most biological data collected from recent returns originate from the coordinated sampling efforts of the Arrowsic Conservation Commission.

The population of river herring returning to Sewall Pond will likely never expand to reach population levels over 100,000 returns due to the size of the spawning habitat. The significance of the commercial fishery is also expected to be very modest. If a fishery is approved for this location beyond 2024 the Commission has expressed their interest in conducting an annual event or demonstration harvest that serves as a living history educational opportunity for those in the community and surrounding area. Fish captured at Sewall Pond in 2023 and 2024 were donated to a local fisherman and were not sold commercially. Sewall Pond is also experiencing the effects of sea level rise as water from the tidal Kennebec River enters the pond during extreme high tides.

Town	River	Lake size	Threshold (N/acre)
Arrowsic	Kennebec	43	35

SEWALL POND SPAWNING LOCATION



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0.2 Miles

1 inch = 0.24 miles

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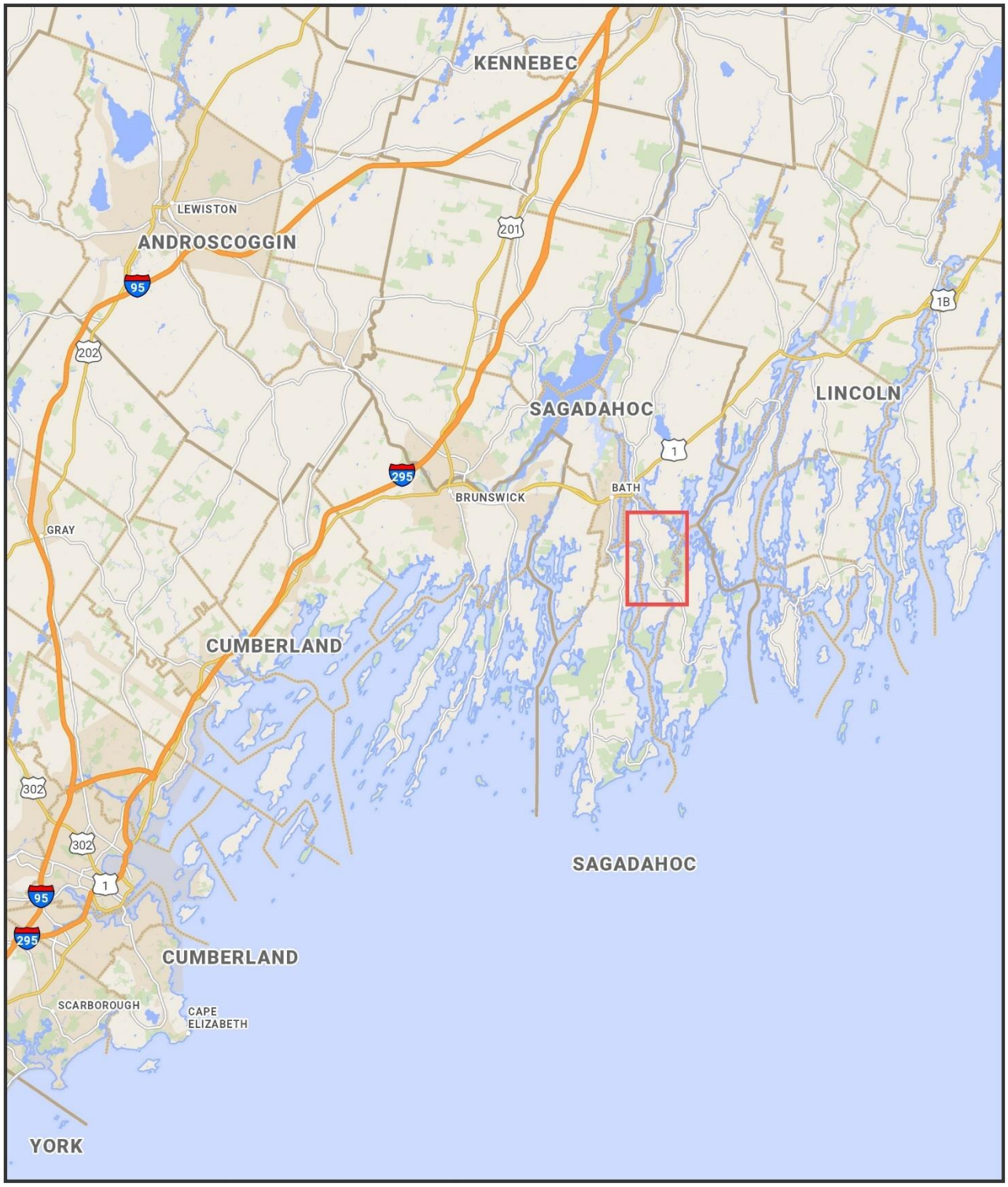
Time: 9:04:02 AM

SEWALL LOCATION



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7 Miles

1 inch = 7.71 miles

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Time: 9:20:54 AM

Installation of the new fish passage and removal of the existing outlet dam and fishway.

Intrusion of water from the Kenebec River into Sewall Pond during an extream high tide event

Pembroke Commercial Fishery:

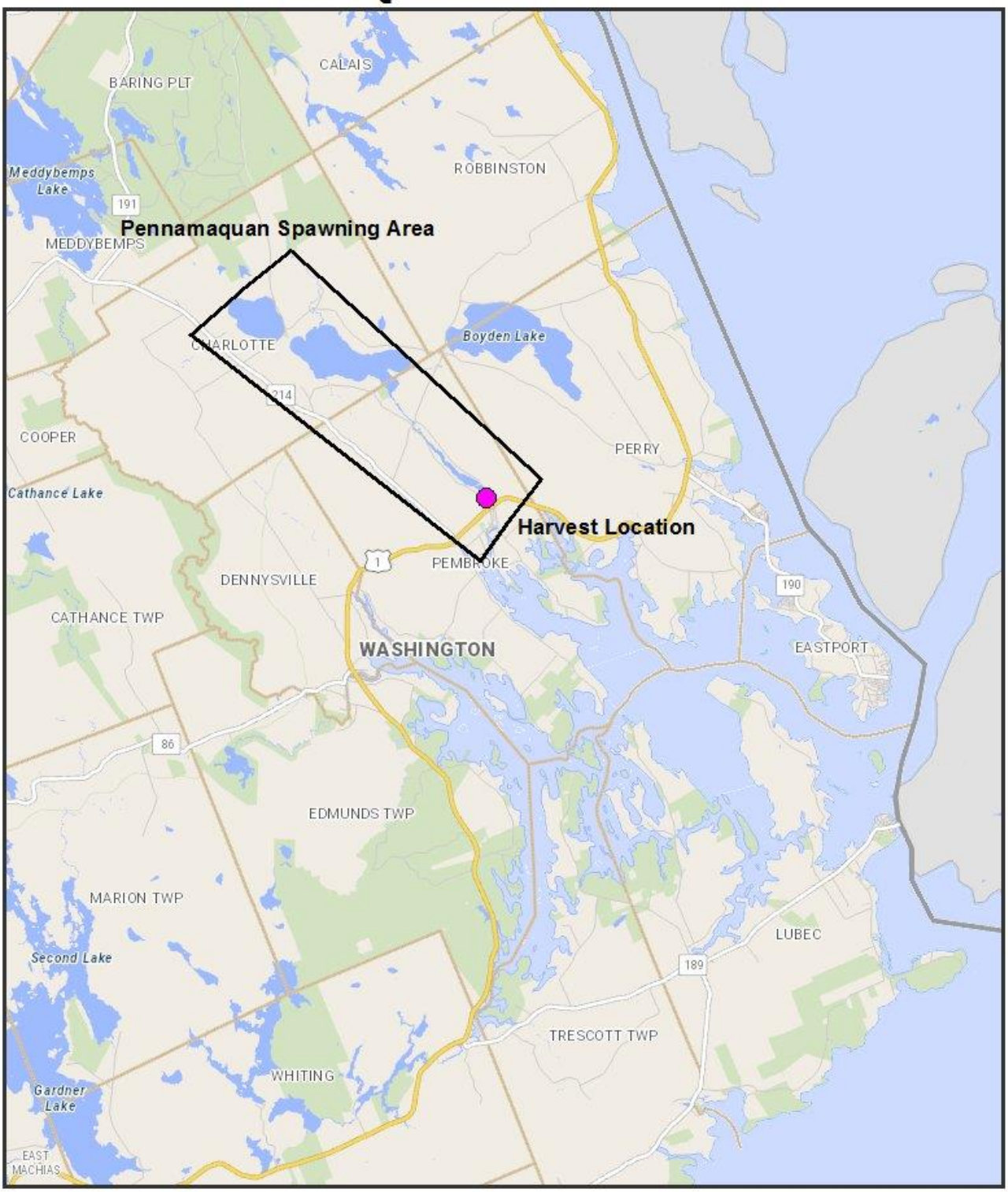
The Maine Department of Marine Resources manages the Pennamaquan system for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for the Pennamaquan system is 42,315 river herring. The management plan for Pennamaquan has achieved the target escapement developed for this system and passed the entire run upstream since 2012.

The Pennamaquan River and lake system supports a run of both alewife and blueback herring. This system is one of seven systems that contain commercial quantities of both species. The historical fishery occurred below the fishways on the Pennamaquan River and was commercially active prior to the moratorium in 2012. A lack of interest by the Town of Pembroke in collecting or providing data to determine sustainability forced a closure to meet the objectives of Amendment 2. For the past 13 years the State of Maine, Maine Sea Grant, and Passamaquoddy Tribe have collected run count and biological data to assess sustainability and reopen the commercial fishery.

Fishway improvements were made to the Pennamaquan fishways in 2014 and have improved passage into spawning habitat for alewives. The river herring population has responded positively, and returns continue to increase. Biological sampling is conducted mainly by Maine Sea Grant with assistance by the Passamaquoddy Tribe and State of Maine. Scale samples collected by Sea Grant are analyzed by the Maine Department of Marine Resources to develop and track biological metrics regarding the Pennamaquan river herring population. Run count data were collected using an electronic tube counter and was deployed and maintained by Maine Sea Grant. As river herring runs increased, the large numbers of post-spawn downstream migrants were unable to pass downstream through the counting tubes. This required the removal of the counting device to allow downstream passage during the later part of the run. During the periods when the counting tubes were removed upstream migrants were not counted.

Town	River	Lake size (acres)	Threshold (N/acre)
Pembroke	Pennamaquan	1,2093	35

PENNAMAQUAN SPAWNING AREA



3.5 Miles

1 inch = 3.85 miles

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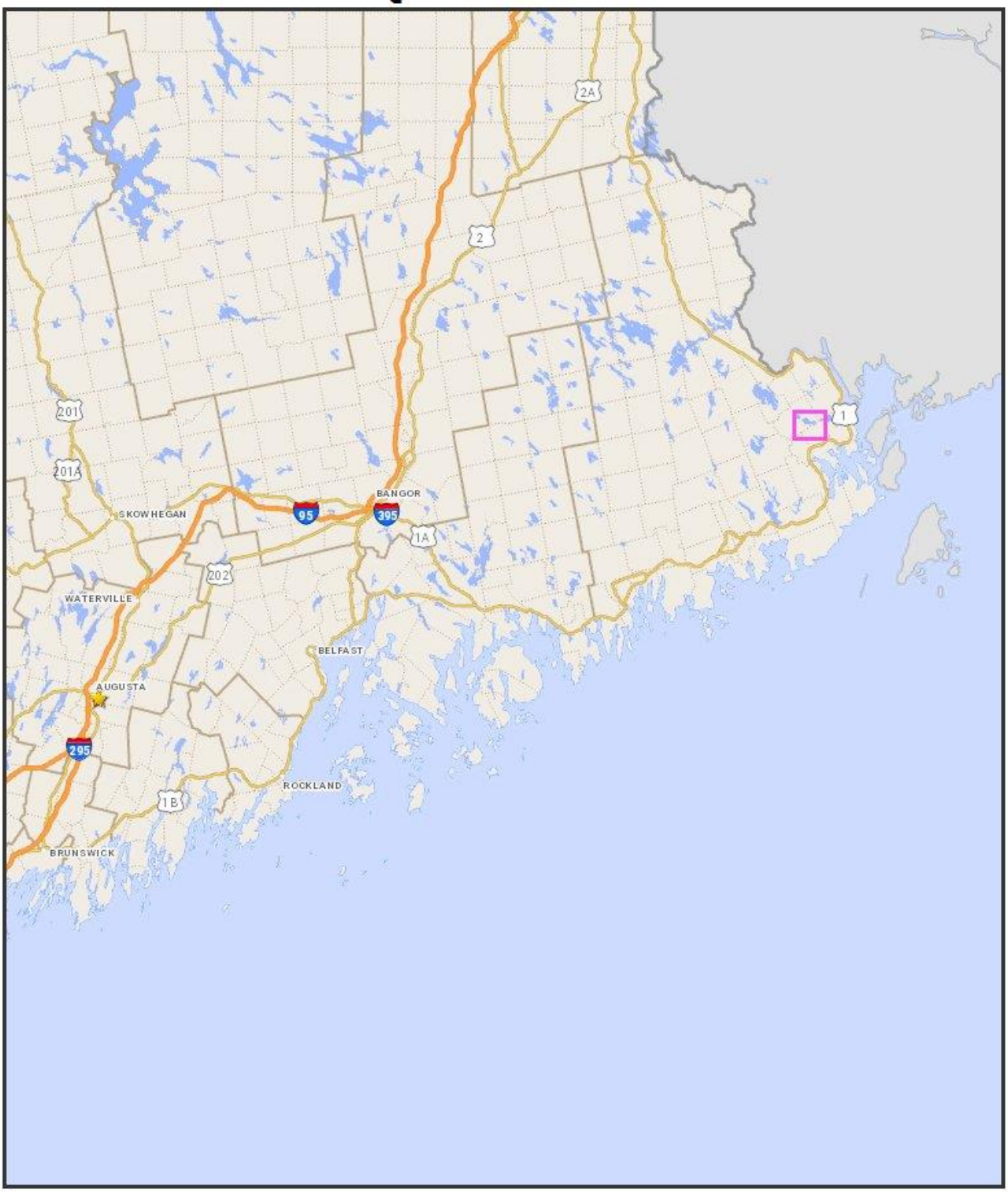
PENNAMAQUAN LAKE LOCATION



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25 Miles

1 inch = 30.83 miles

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Time: 10:24:10 AM

Penobscot Commercial Fishery:

The Maine Department of Marine Resources manages this system for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for this system is 4,735 river herring. The management plan for Wight's Pond has exceeded the target escapement developed for this system for the past 10 years. The escapement for the 2023 season was 927 fish per acre.

For the past five years (2020-2024) the Town of Penobscot conducted a limited harvest under an ASMFC approved addendum to the Maine SFMP except for the 2023 season when no fish were harvested. The addendum ended at the conclusion of the 2024 fishing season and the town is currently seeking ASMFC approval to continue the fishery. The Maine Legislature granted the Town of Penobscot the right to manage, harvest, and sell alewives in 1828 and the town has maintained their status to the exclusive harvest rights to the river herring resource throughout the moratorium.

Working with multiple partners, the Town removed a low head dam with an Alaskan Steeppass fishway and replaced it with a nature-like, pool and weir fishway in 2017. This project improved passage for adult and juvenile alewife and other fish species. Significant improvements to passage within the system will continue to support the opportunity to increase run size. The annual alewife counts have more than doubled since the dam removal.

The town alewife committee is responsible for collecting biological data by recording the length, sex, and species of each sampled fish, documenting the number of fish entering the pond, run timing, and harvest amounts when applicable. The committee also collects emigrating juvenile alewives from the pond outlet as well as juveniles from the Bagaduce River estuary. The Maine Department of Marine Resources analyzes scale samples collected by the committee to track the biological metrics for the Wight's Pond alewife population.

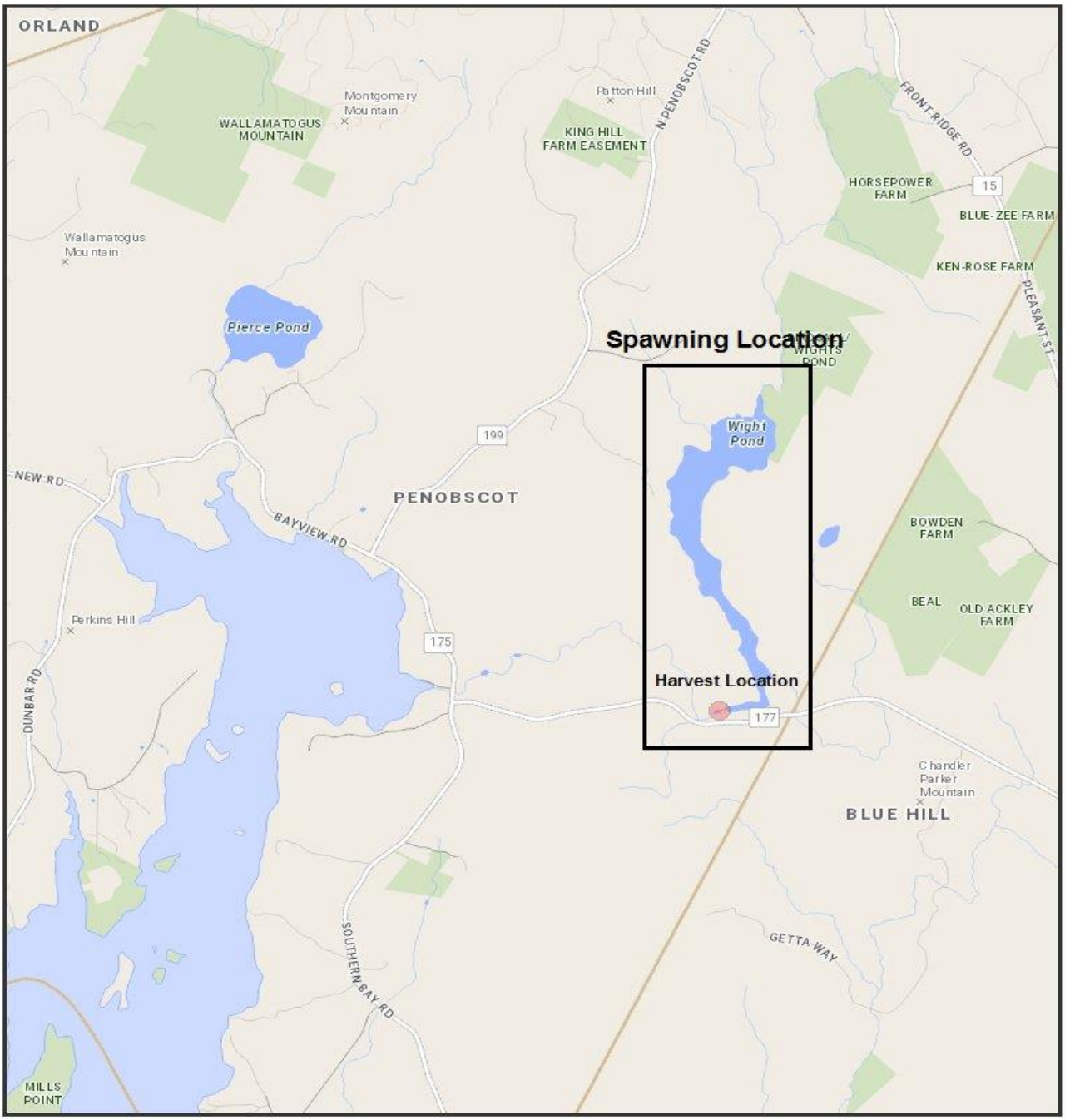
The committee created a public outreach and education program to explain the importance of river herring and their beneficial impacts on the environment. Partnering with land trusts, non-profits, and academia, committee members lead field trips for local elementary school children. In 2024, there were 198 students that participated in these trips. For context, many of these rural schools have a K-8 population of less than 60 students.

Due to a robust alewife population, dozens of bald eagles gather in Penobscot, drawing crowds of spectators. The abundance and diversity of wildlife has raised the environmental awareness of area residents, which is reflected by the attendance of the Bagaduce River Alewife Celebration which draws over 300 people to this three-hour event.

The commercial harvest provides the town and harvester with the incentive to be good stewards of the resource, which is essential to maintaining a sustainable fishery. Municipal revenue from the sale of alewives is placed in a reserve account that is used to fund fishway maintenance, boat landing improvements, public outreach, and educational expenses.

Town	River	Lake size (acres)	Threshold (N/acre)
Penobscot	Bagaduce	135	35

WIGHTS POND SPAWNING LOCATION



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0.9 Miles

1 inch = 0.96 miles

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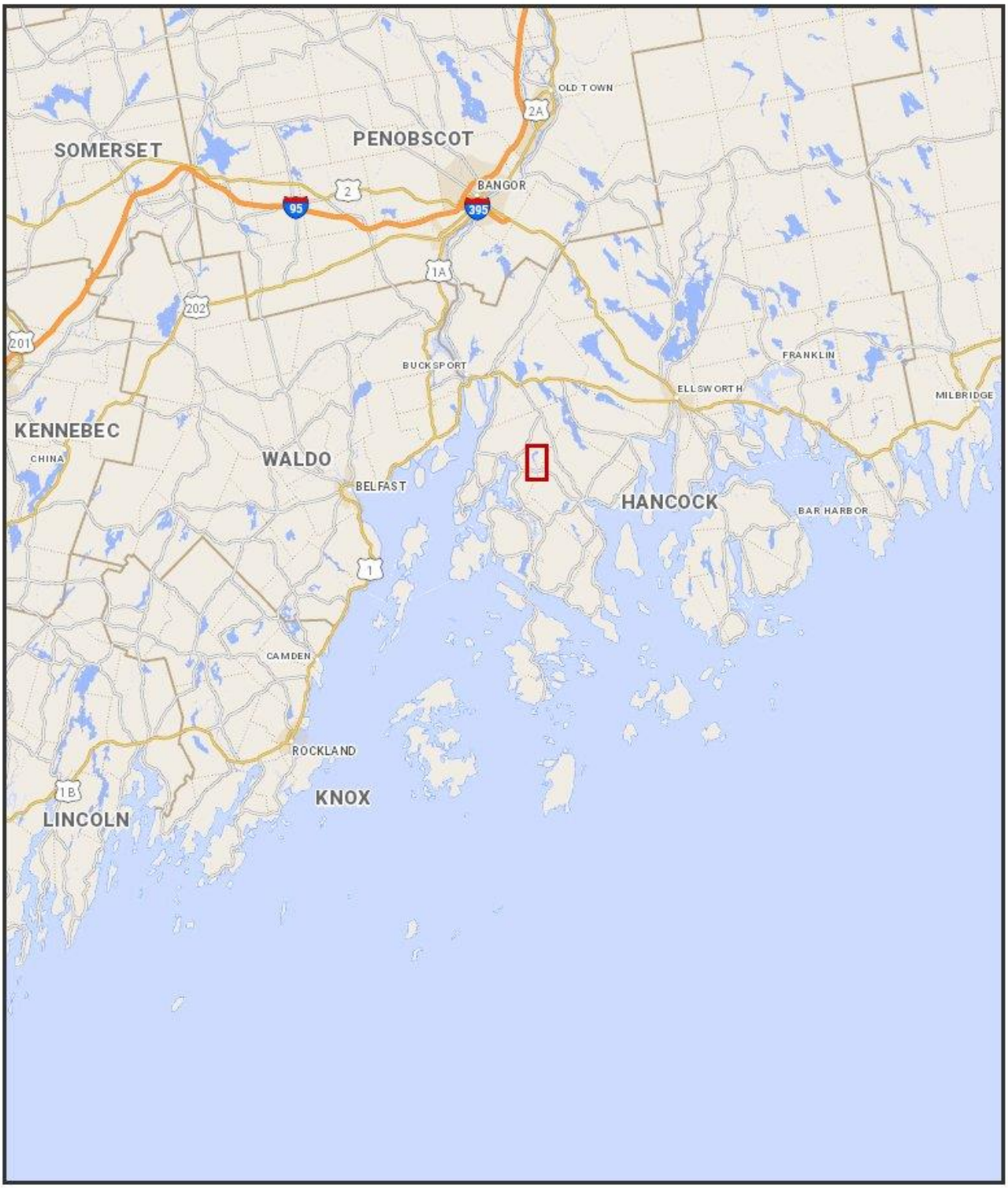
Time: 9:37:56 AM

WIGHTS POND LOCATION



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10 Miles

1 inch = 15.42 miles

Date: 8/5/2024
Time: 9:41:30 AM

Old dam and fishway located at Wights Pond prior to installation of a nature-like fishway

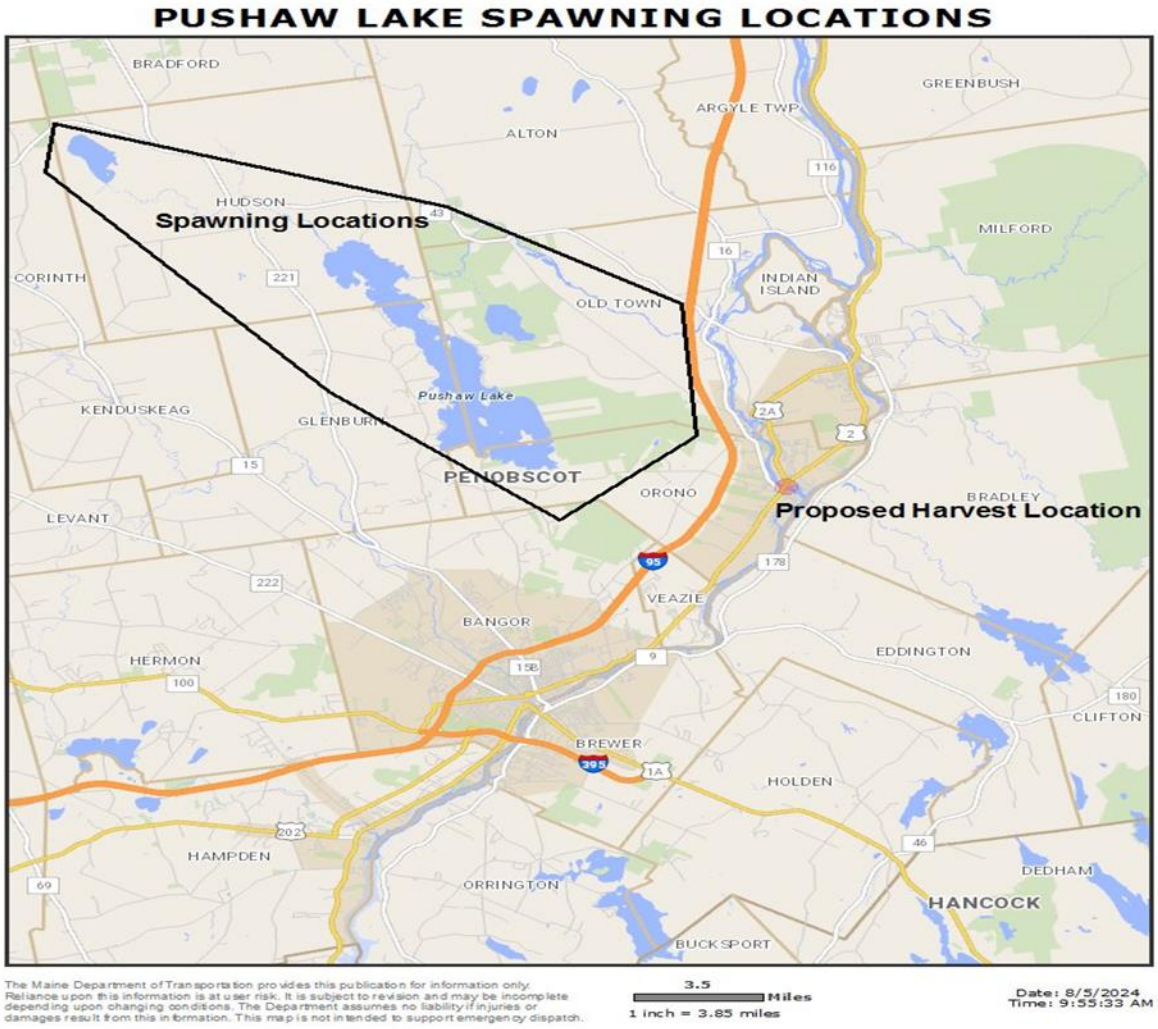
Nature-like fishway installed at Wights Pond

Glenburn Commercial Fishery:

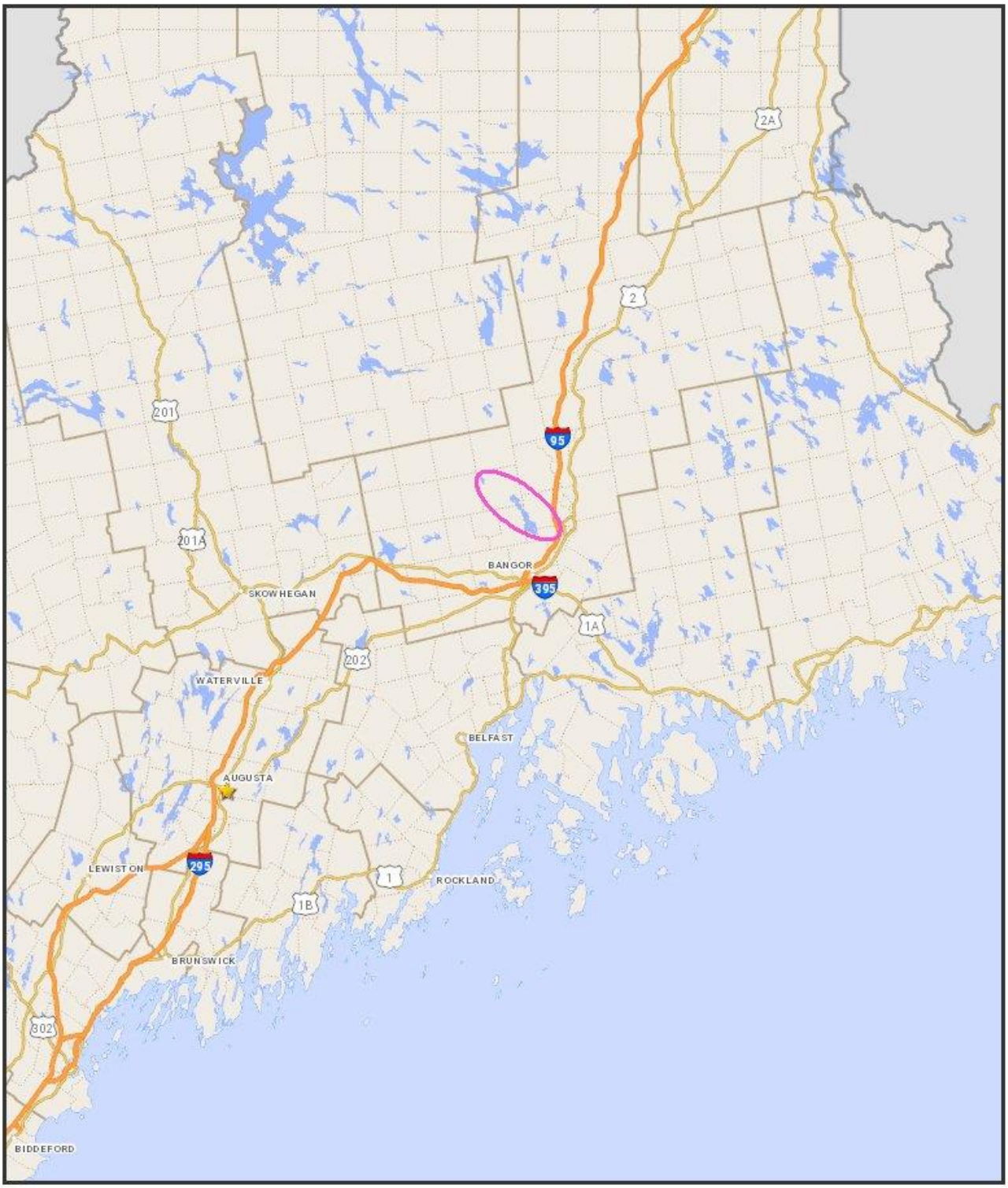
The Maine Department of Marine Resources manages Pushaw Lake by allowing all returns to access the lake to spawn. Access to Pushaw Lake was provided through the dam removals on the mainstem Penobscot River in 2013 and a fishway installed at the outlet dam of Pushaw Lake in 2012. There is currently no commercial fishery at this location. Commercial fishing for river herring in the region declined with the construction of multiple dams on the mainstem Penobscot River coupled with heavy industrial pollution resulting from the logging and paper industries.

If a commercial fishery is approved for this location, it will be managed for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for the Pushaw Lake system is 176,785 river herring. The management plan for Pushaw has achieved the target escapement developed for this system and passed the entire run upstream since 2016.

Town	River	Lake size (acres)	Threshold (N/acre)
Glenburn	Stillwater River	5,0513	35



PUSHAW LAKE LOCATION



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25 Miles

1 inch = 27.87 miles

Date: 8/5/2024
Time: 10:39:36 AM

Existing outlet dam at Pushaw Lake prior to fishway installation

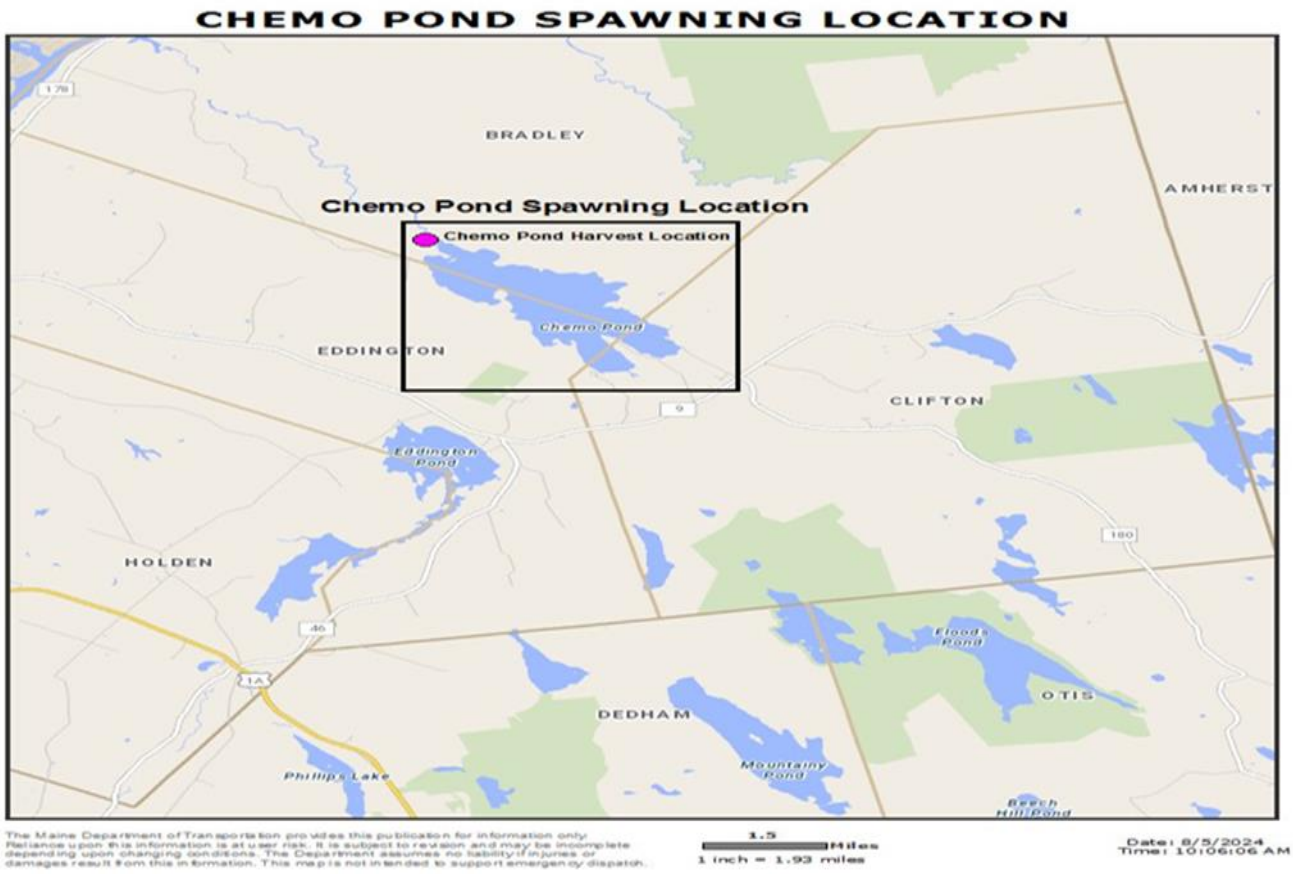
Newly installed fishway and overtopping of the dam during the river herring run.

Bradley Commercial Fishery:

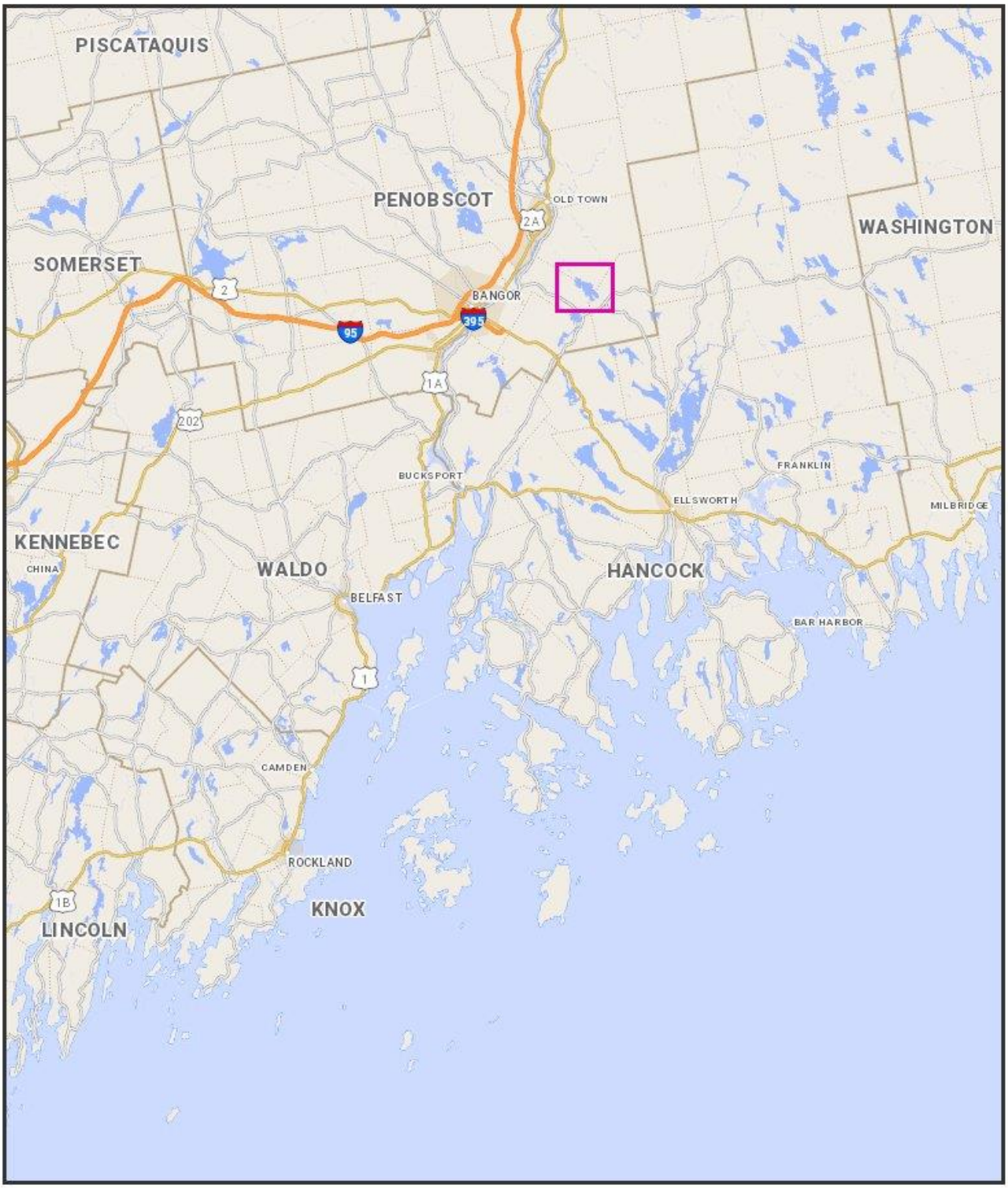
The Maine Department of Marine Resources manages Chemo Pond by allowing all returns to access the lake to spawn. Access to Chemo Pond was provided through the dam removals on the mainstem Penobscot River in 2013 and a fishway installed at the outlet dam at Chemo Pond in 2010. There is currently no commercial fishery at this location. Commercial fishing for river herring in the region declined with the construction of multiple dams on the mainstem Penobscot River coupled with heavy industrial pollution resulting from the logging and paper industries.

If a commercial fishery is approved for this location, it will be managed for a minimum commercial escapement of 35 fish per acre. The spawning escapement need for the Chemo Pond system is 40,110 river herring. The management plan for Chemo has achieved the target escapement developed for this system and passed the entire run upstream since 2014 when natural returns began entering the pond. The proposed harvest would follow the standard 4-fishing days and 3-nonfishing days per week throughout the fishing season.

Town	River	Lake size (acres)	Threshold (N/acre)
Bradley	Blackman Stream	5,0513	35



CHEMO POND LOCATION



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10 Miles

1 inch = 15.42 miles

Date: 8/5/2024
Time: 10:11:47 AM

Newly constructed fishway through the outlet dam leading to Chemo Pond

Lower fishway constructed below the dam

Traditional method of smoking river herring at locations where this traditional activity occurs

Appendix B

§6134. River herring passage; fishways on the St. Croix River

By May 1, 2013, the commissioner and the Commissioner of Inland Fisheries and Wildlife shall ensure that the fishways on the Woodland Dam and the Grand Falls Dam located on the St. Croix River are configured or operated in a manner that allows the unconstrained passage of river herring. [2013, c. 47, §1 (NEW).]

SECTION HISTORY
1995, c. 48, §1 (NEW). 2007, c. 587, §1 (RPR). 2011, c. 598, §12 (AMD). 2013, c. 47, §1 (RPR).

§6041. Pelagic and Anadromous Fisheries Fund

1. Uses of fund. The commissioner shall use the fund for research directly related to Pelagic or Anadromous fishery management and the processing of landings data information. The commissioner may authorize the expenditure of money in the fund for research and development programs that address the restoration, development, or conservation of Pelagic or Anadromous resources.

2. Sources of revenue. The fund is capitalized by surcharges assessed under **Section 2. 12 MRSA §6503**. In addition to those revenues, the commissioner may accept and deposit in the fund money from any other source, public or private.

Sec. 2. 12 MRSA §6503, is enacted to read:

§6503. Commercial Pelagic and Anadromous Fishing License

1. License required. A person may not engage in the activities authorized under this section without a current:

A. Pelagic and Anadromous fishing single license for a resident operator;

B. Pelagic and Anadromous fishing crew license for a resident operator and all crew members;

C. Nonresident Pelagic and Anadromous fishing license for a nonresident operator and all crew members.

2. Licensed activity. The holder of a Pelagic and Anadromous fishing license may fish for or take or possess, ship, transport or sell pelagic or anadromous fish that the holder has taken. The license authorizes crew members aboard the licensee's boat when it is engaged in Pelagic or Anadromous fishing to undertake these activities, if the license provides for crew members.

3. Exemptions. The licensing requirement under subsection 1 does not apply to activities described in this subsection.

A. A person may fish for, take, possess or transport any species of pelagic or anadromous fish if they have been taken by spear gun, harpoon, minnow trap, or hook and line and are only for personal use.

4. Eligibility. A Pelagic and Anadromous fishing license may be issued only to an individual.

5. Fees. Fees for Pelagic and Anadromous fishing licenses are:

A. Forty-one dollars for resident operator;

B. One hundred eleven dollars for resident operator and all crew members; and

C. Seven hundred and fifty-dollars for nonresident operator and all crew members.

6. Surcharges. The following surcharges are assessed on Commercial Pelagic and Anadromous fishing licenses issued by the department:

A. For a resident Pelagic and Anadromous fishing license, $150;

B. For a resident Pelagic and Anadromous fishing license with crew, $100; and

C. For a non-resident Pelagic and Anadromous fishing license with crew, $100.

7. Definition. For the purposes of this chapter, "pelagic fish or Anadromous fish" means Atlantic herring, Atlantic menhaden, whiting, spiny dogfish, alewife, Atlantic mackerel, blueback herring, and squid, butterfish, scup, black sea bass, smelt and shad.

8. Violation. A person who violates this section commits a civil violation for which a forfeiture of not less than $100 nor more than $500 may be adjudged.

Appendix C

Table 1. Fisheries independent monitoring locations to monitor recreational river herring fisheries in Maine.

	River Herring					
Year	**Androscoggin**	**Saco**	**Kennebec**	**Sebasticook**	**Penobscot**	**St. Croix**
1981						169,620
1982						233,102
1983	601					151,952
1984	2,530					152,900
1985	26,895					368,900
1986	35,471					1,984,720
1987	63,523					2,624,700
1988	74,341					2,590,750
1989	100,895					1,164,860
1990	95,574					1,339,050
1991	77,511					358,410
1992	45,050					203,750
1993	5,202	831				289,720
1994	19,190	2,240				362,930
1995	32,002	9,820				215,133
1996	10,198	9,162				645,978
1997	5,540	2,137				225,521
1998	25,189	16,078				177,317
1999	8,909	31,070				25,327
2000	9,551	25,136				8,569
2001	18,196	66,890				5,202
2002	104,520	20,198				900
2003	53,732	26,760				7,901
2004	113,686	32,801				1,299
2005	25,846	388				22
2006	34,239	7,994	4,094	45,960		11,829
2007	60,662	16,084	3,448	461,412		1,294
2008	92,359	22,563	93,775	401,331		12,261
2009	42,759	2,012	45,754	1,327,915		10,424
2010	39,689	19,258	76,947	1,626,872	222	58,776
2011	54,886	39,597	37,846	2,751,473	2,039	25,124
2012	170,191	28,058	179,357	1,703,520	54	36,168
2013	69,267	43,414	94,456	2,272,492	12,708	16,677
2014	55,953	11,576	108,432	2,282,454	187,438	26,893
2015	71,887	53,891	91,850	2,157,983	782,521	93,503
2016	114,874	22,644	224,990	3,128,753	1,259,307	33,016
2017	49,923	44,929	289,188	3,547,091	1,256,061	157,750
2018	170,040	92,836	307,035	5,579,903	2,174,745	270,659
2019	81,025	55,028	240,594	3,287,702	1,986,910	486,500
2020		34,571	143,240	2,847,095	2,074,324	611,907
2021	54,906	135,198	66,009	3,552,813	1,731,496	549,847
2022	139,326	179,366	83,978	2,779,209	2,852,037	712,670
2023	67,927	1,263	137,752	4,154,124	5,490,383	841,357

Figure 1. Locations of Recreational River Herring Monitoring Counts.

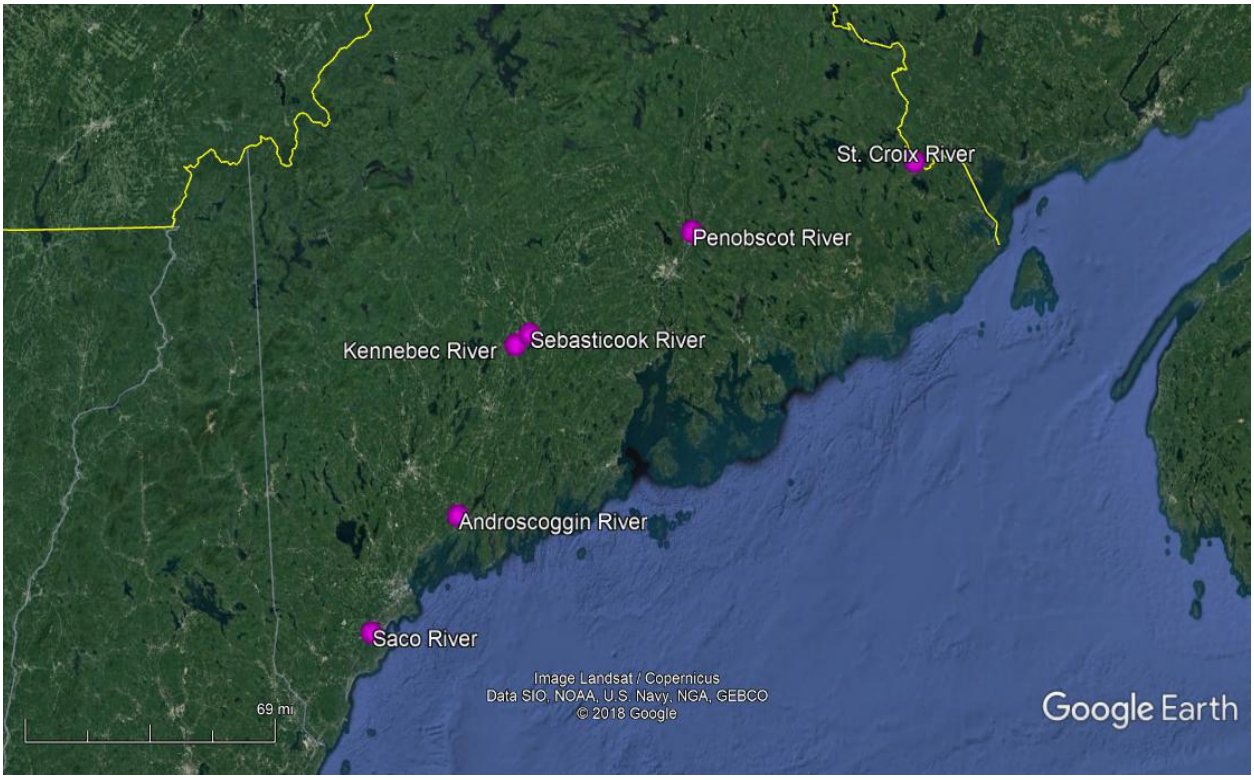

Figure 2. Total fishway counts for the six rivers used to monitor fish populations.

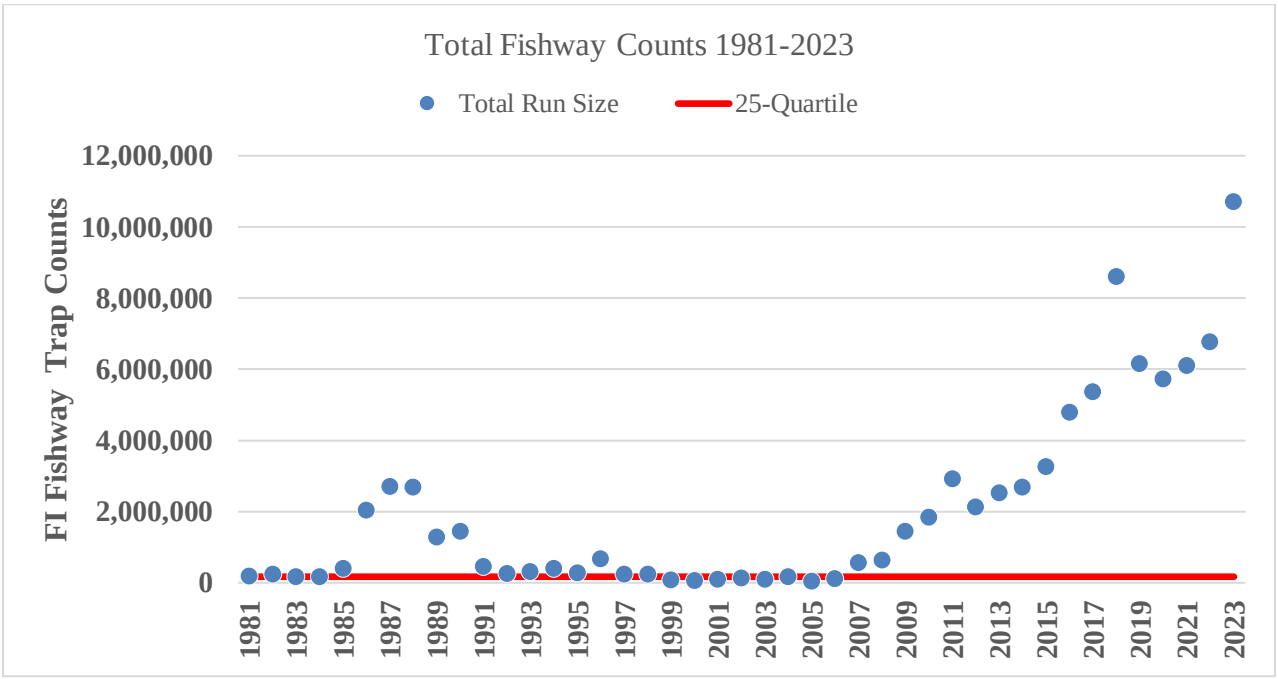

Figure 3. Mean fishway counts for the six rivers used to monitor fish populations.

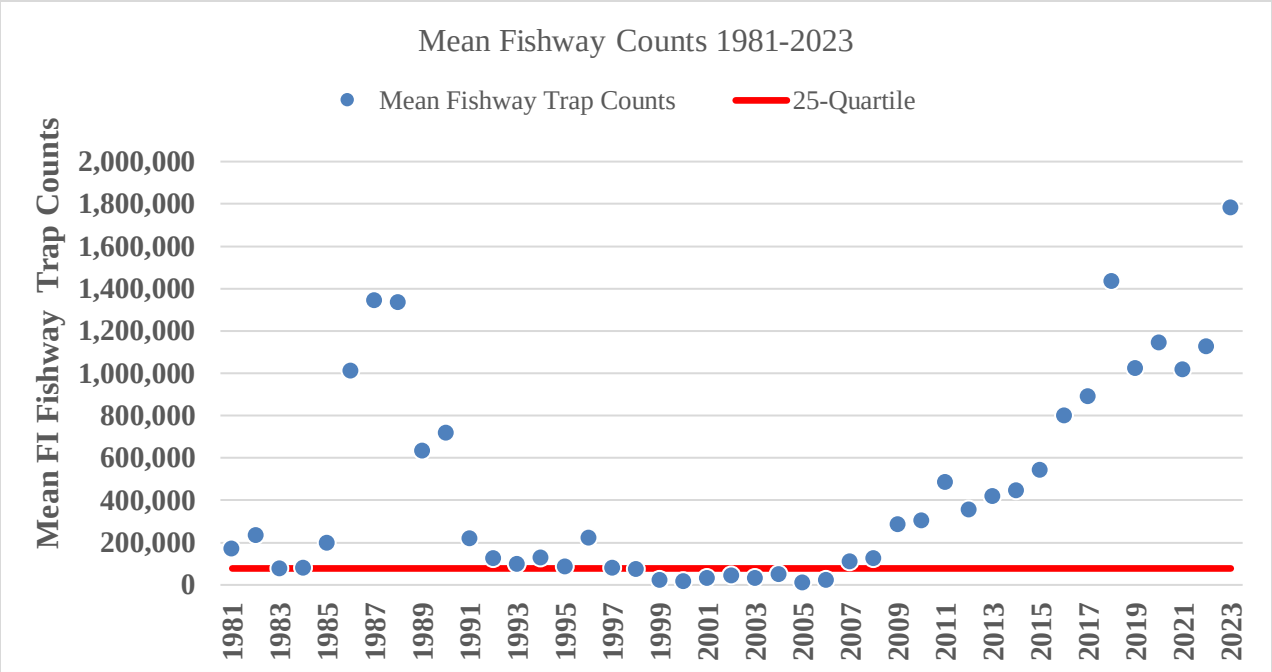

Figure 4. Fishway counts for the Saco River.

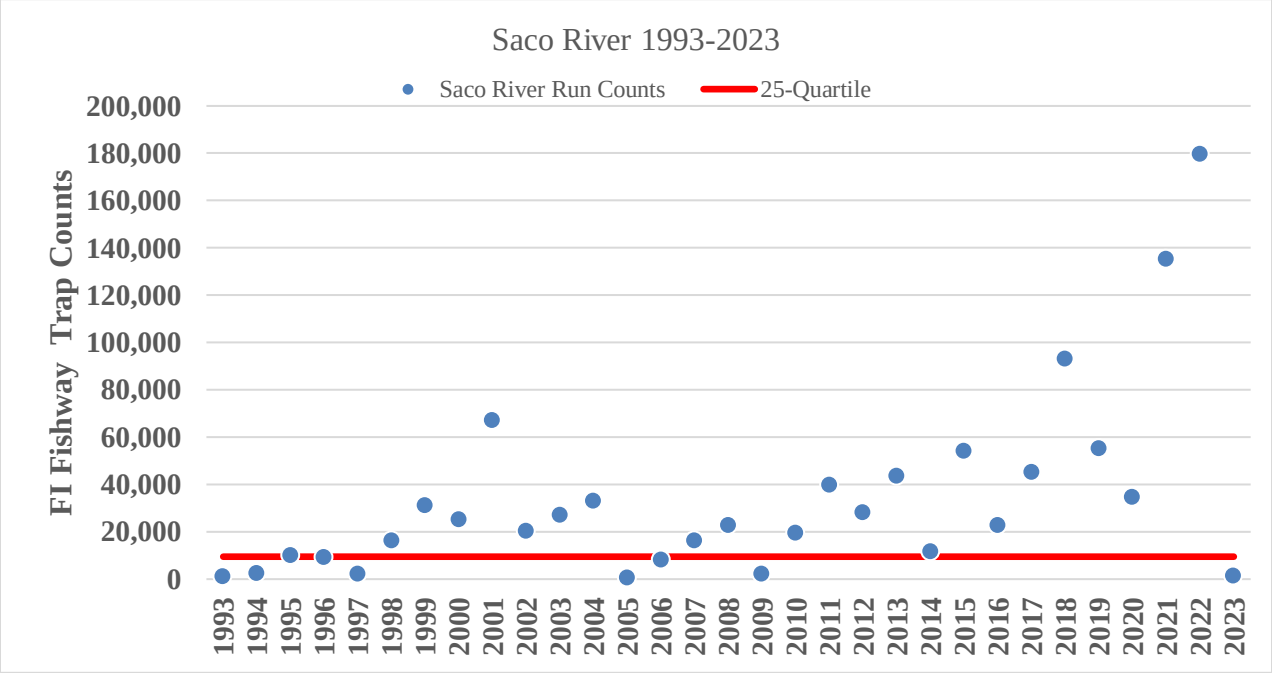

Figure 5. Fishway counts for the Androscoggin River.

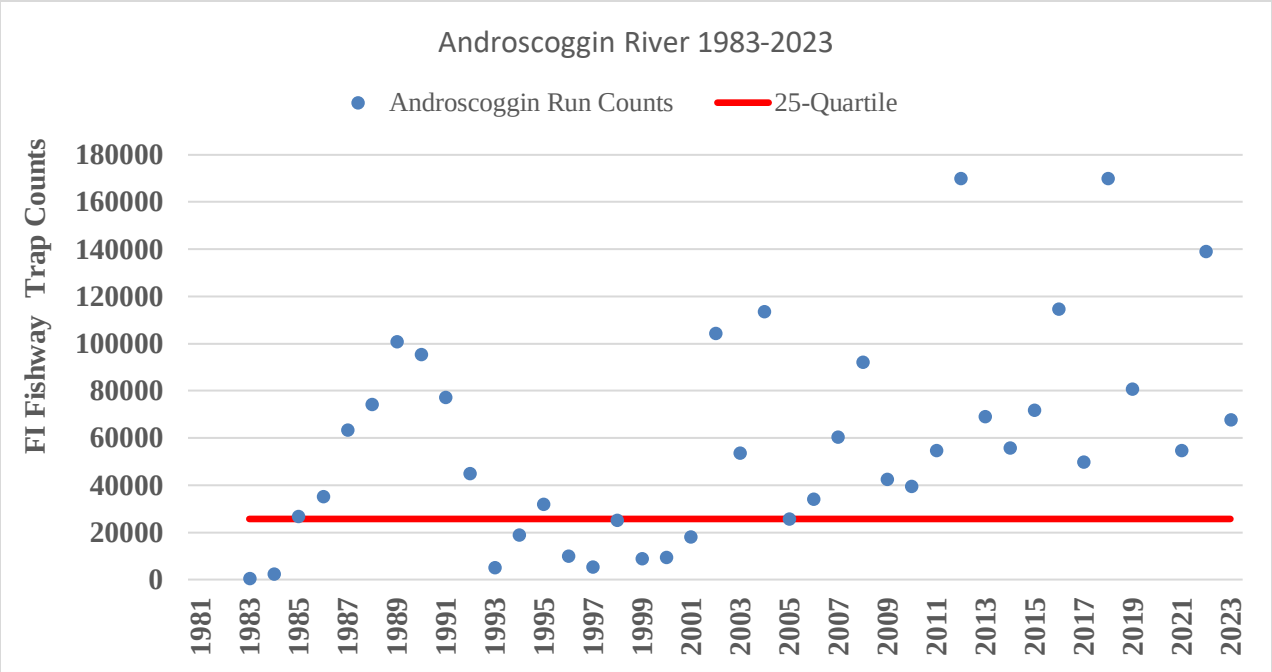

Figure 6. Fishway counts for the Kennebec River.

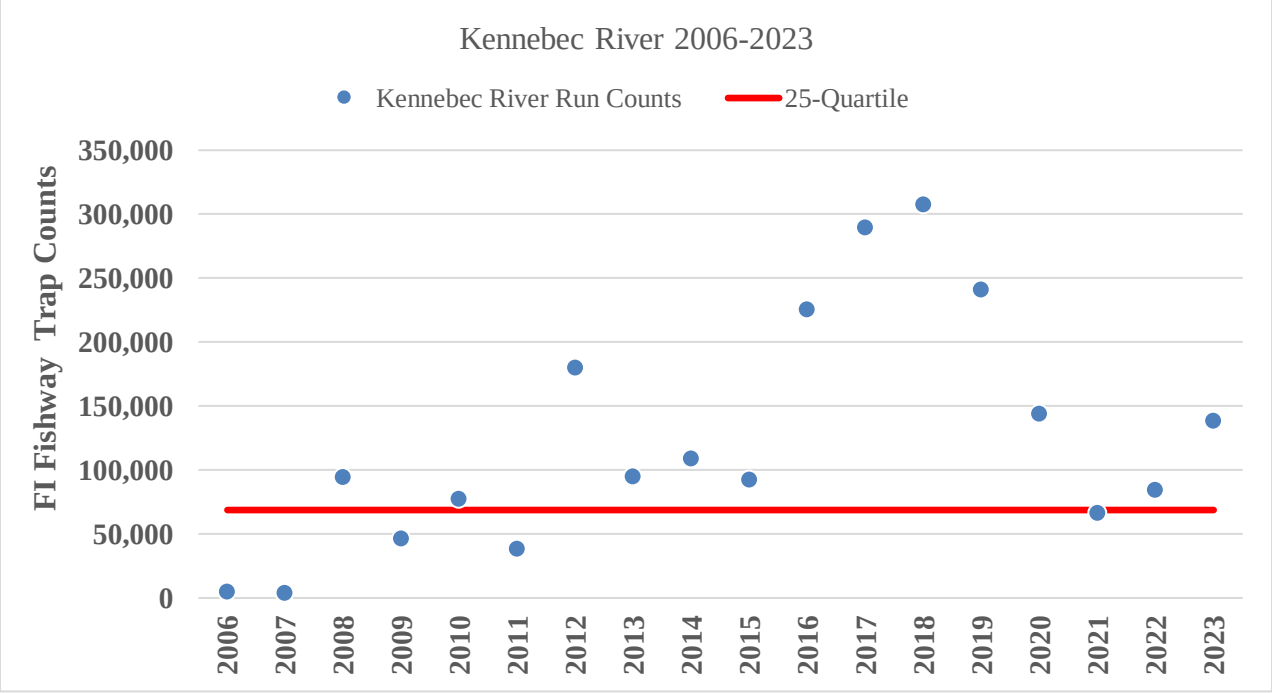

Figure 7. Fishway counts for the Sebasticook River.

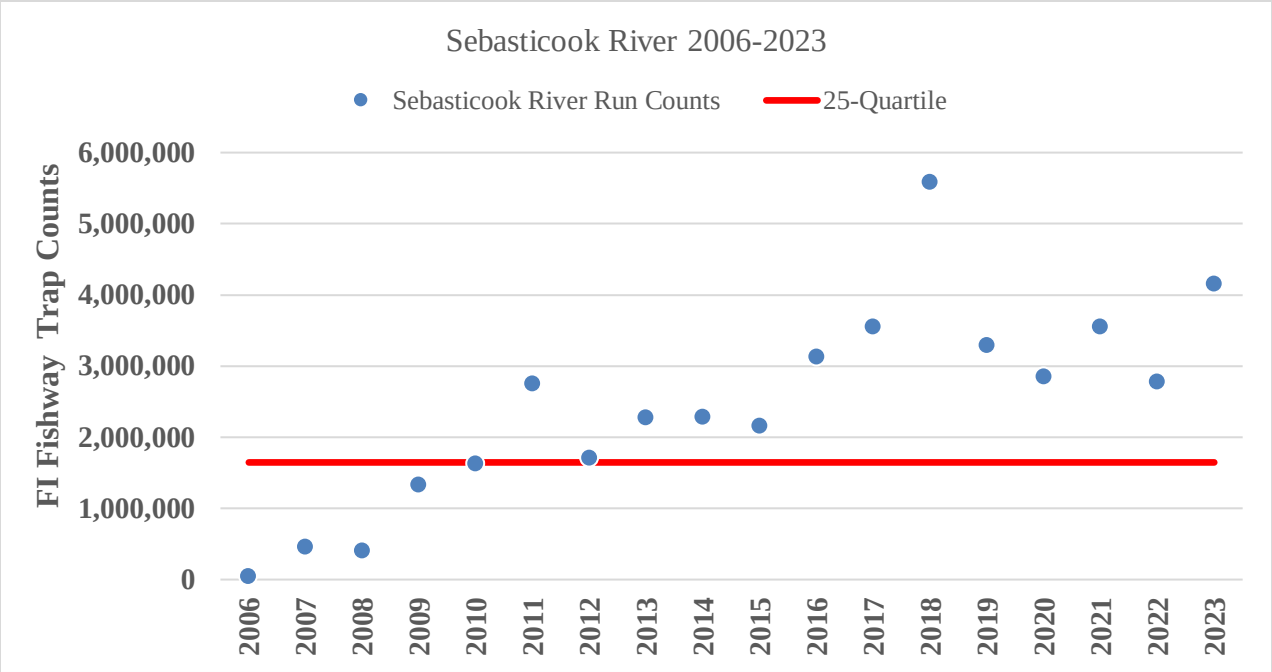

Figure 8. Fishway counts for the Penobscot River.

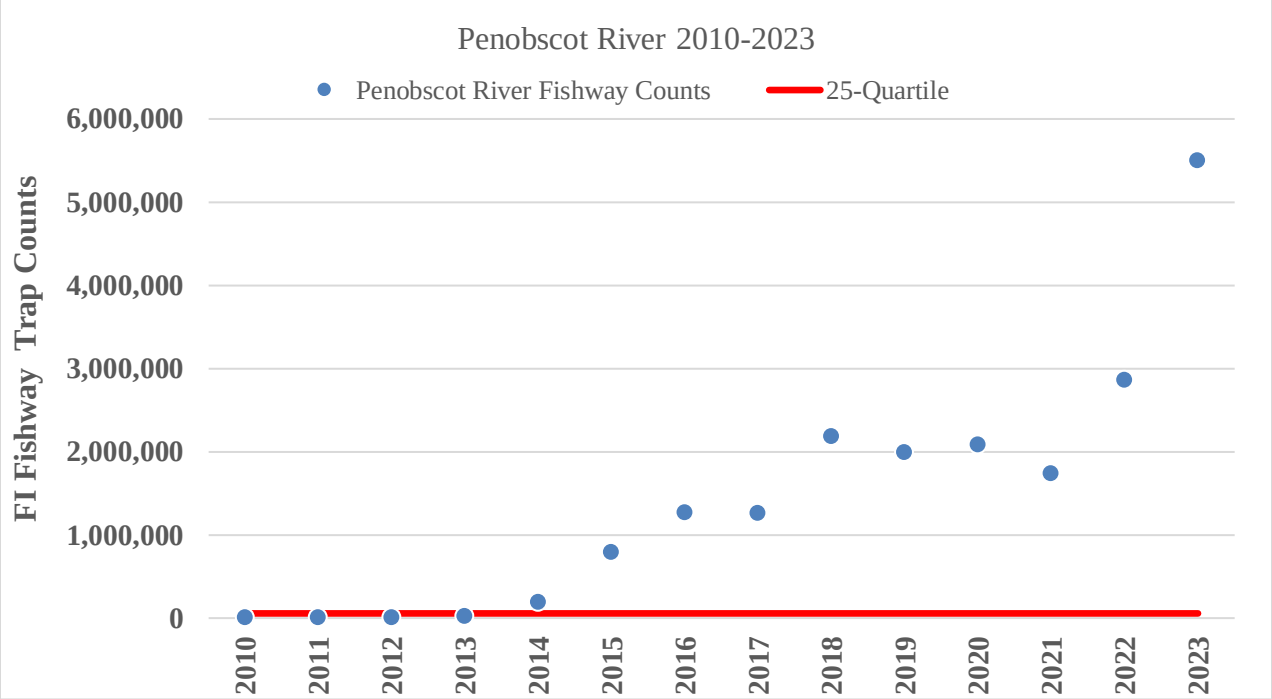

Figure 9. Fishway counts for the St. Croix River.