



June 20, 2024

VIA E-FILING

Debbie-Anne A. Reese, Acting Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

RE: Brunswick Hydroelectric Project (FERC No. 2284). Merrymeeting Bay Chapter of Trout Unlimited Comments on the Notice of Intent (NOI)/Pre-application Document for the Brunswick Project (Docket: P-2248).

Dear Secretary Reese:

On behalf of its 300 members and in consultation with the Brunswick Falls Sea Run Fish Coalition, the Merrymeeting Bay Chapter of Trout Unlimited (TU) respectfully submits these comments on the Notices of Intent (NOI) and Pre-application Documents (PAD) for the Brunswick Project (P-2248) filed by Brookfield White Pine Hydro LLC, by Brookfield Renewable US (“Brookfield” or “Applicant”) dated February 21, 2024. This filing has been coordinated with and is supported by the Maine Council of Trout Unlimited and its over 2,000 members.

Introduction and Basis for Action:

The Brunswick Dam is the first dam inland from the Atlantic Ocean located on the Androscoggin River at a site also known as Brunswick Falls. The Androscoggin is Maine’s third largest river with a length of 177 miles, draining a watershed of 3,450 square miles. The Brunswick Dam’s location is at the very heart of the river relative to the health of diadromous species that access the river as part of their life cycle, including the Atlantic Salmon which are listed under the Endangered Species Act.

The dam is now being considered for relicensing by the Federal Energy Regulatory Commission (FERC). It has been 45 years since the current license was issued in 1979. This process represents a rare opportunity to take aggressive steps at a critical juncture in the history of the river’s use for human welfare and the natural riverine communities it supports.

The Merrymeeting Bay Chapter of Trout Unlimited is the primary author of these comments working in step with two other non-governmental organizations (NGOs), Maine Rivers and American Rivers as they are in the

process of forming the Brunswick Falls Sea-Run Fish Coalition with the goal of removing obstacles to sea-run fish (diadromous species) in the Androscoggin River at the site of the Brunswick Dam. The groups' primary goal is to achieve changes in the license terms that will allow remnant populations of diadromous fish to again ascend the falls to reach their historical spawning grounds and complete their respective life cycles with unfettered upstream and downstream passage. With this goal in mind, The Coalition will participate in the relicensing process to prevent the disastrous fish passage from being accepted for another 40 or more years. It is recruiting others and will be welcoming more organizations and individuals to focus with us on the use of best available science and engineering along with direct studies to fix the problems created by the dam and restore unimpaired diadromous fish passage.

A key tenet supporting our action as stakeholders in this process is that the use of a publicly held, common resource like the Androscoggin River to produce hydro-electric power for sale by for-profit entities on open markets is a privilege and not a right. All elements of the river's human and ecological uses must be balanced by FERC when it is considering license renewal. Specifically, FERC is an independent federal agency **with a mission to regulate and oversee energy industries in the economic, environmental, and safety interests of the American public**. This mandate requires FERC to consider public input which is key to making changes in how the dam is operated and fish passage improved.

The river's human and natural communities and their respective economies are intertwined. In these comments, we will contextualize the history of the site as a fishery and an industrial tool. We then provide citations for research and eye-witness accounts that have documented the severe impairment of sea-run (diadromous) fish passage at the site, its nexus to the operations of the dam, and its ongoing contribution to the elimination of over 90 percent of their historical known populations. We will end by using FERC's guidelines for applying the Integrated Licensing Study Criteria to support using the relicensing process to find the best engineered solution for restoring sea-run fish passage at Brunswick Falls. Possible solutions may range from dam removal which we support to modifications of facilities and operational requirements, consistent with the best qualified engineering and biological studies, such as best practices incorporating radio telemetry and tagging studies, as agreed upon by all stakeholders, including objective third party review of these solutions.

Physical and Historic Context of the Brunswick Dam:

Brunswick Falls was once the site of major and economically important diadromous fish runs. Salmon, sturgeon, shad, striped bass and river herring fisheries were critical to Native Americans and later exploited by European settlers as early as the 1600s. Dams have been built at this location since the mid 1700's to power industry (Figure 1 Dam History via Kiosk). But, the grist mills, sawmills, textile mills and paper mills powered by the dams are long gone. Unfortunately, due in large part to these dams, so is the vibrant fishery that once existed.

Today the remaining sea-run fish populations are literally "dammed" because they cannot easily pass the existing structure in either direction. Academic and agency research has determined that sea-run fish populations have declined by well over 90 percent from pre-dam levels. This dam prevents the production of hundreds of thousands, and for some species, millions of new offspring to replenish their populations. For example, sonar imaging of shad populations below the dam conducted in 2023 showed over 7,500 American Shad staging for upstream passage, yet in all of 2023 only thirteen were observed to have passed upstream of the dam. See also Appendix A which includes studies led by Professor John Lichter of Bowdoin College of river herring and shad populations in and immediately below the current fishway. Appendix A also provides a

comparison of alewife passage on two much smaller Maine rivers, where fishways have been materially improved, to the actual passage through the poorly functioning fishway at the Brunswick Dam¹.

The fish being blocked are critical to the health of both river and ocean ecosystems. This leads directly to local economic impacts. Alewives, for example, are a keystone species that are critical to the nearshore fisheries supporting Maine's commercial fishing communities. The damage caused by their population declines due to dams has been directly linked to the loss of nearshore cod as far back as the 1880's (Ames 2004)²

Looking back to 1979 when the Brunswick Dam was last relicensed, the Clean Water Act (CWA) was only seven years old and just beginning implementation. As a matter of fact, the Androscoggin River with its putrid smells and discolored water from industrial and municipal sewage discharges was a major inspiration for then Senator Edmund Muskie of Maine to introduce and champion passage of the CWA. He grew up on the Androscoggin River in Mexico, Maine and witnessed first-hand the heavily impaired river where only remnants of diadromous fishes or any other forms of endemic life were evident and considered meaningful.

Things have now truly changed. We are 52 years beyond the passage of the CWA and 45 years after the issuance of the project's last license. Just two years ago in 2022, the river was legislatively upgraded under Maine's Water Quality Standards from a Class C to a Class B³ water way from Lisbon, Maine downstream to Merrymeeting Bay – a river reach that includes the Brunswick Dam and two upstream facilities. Requirements under Class B include:

- "Class B waters must be of such quality that they are suitable for the designated uses of drinking water supply after treatment; fishing; agriculture; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, The habitat must be characterized as unimpaired."
- "Class B waters must be of sufficient quality to support all aquatic species indigenous to those waters without detrimental changes in the resident biological community."

The CWA and improvement in water quality has ushered in a new era for the health of the river. It is no longer the river it was in 1979 with a perceived value of only being good for turning hydro-power turbines or as a source of free water and an open-air discharge for municipal and industrial waste. Rather it is a river that is dramatically cleaner and has made huge leaps in the restoration of its own ecological health.

Conclusion and Requested Actions:

¹ Lichter, John and others. See Appendix A: Direct observations using sonar and comparisons among river fish passages in Maine (unpublished)

² Ames, Edward, 2004, Atlantic Cod Stock Structure in the Gulf of Maine, Journal of the American Fisheries Society, Vol. 29, No1.

³ Maine Statute: 38-MRS 465 : Title 38: WATERS AND NAVIGATION
Chapter 3: PROTECTION AND IMPROVEMENT OF WATERS
Subchapter 1: ENVIRONMENTAL PROTECTION BOARD
Article 4-A: WATER CLASSIFICATION PROGRAM

The above information points to the opportunity to build on positive momentum in the river's ecological recovery and to be the inflexion point for the renewal of the diadromous fish runs in the Androscoggin River that are currently severely limited by the dam. Renewing fish passage at the head-of-tide where the dam is located is now an entirely plausible action. The elements for success are in place: improved water quality and remnant populations of fish ready to take advantage of access to upstream habitat.

Goals and Objective:

Now, FERC must amend the license to make that success a reality. To that end, as our primary goal and objective, we request that FERC require detailed studies by third-party experts agreed to by federal and state agencies and interested other stakeholders with the goal of fully understanding why the current fish passage infrastructure does not work for each of the diadromous species shown to have passed above Brunswick Falls prior to the history of dam construction. The licensee's suggested studies recognize the problem but are not adequate. The work must go further with the clear objective of providing replicable data that leads to new solutions at the site to allow for unfettered passage of diadromous fish species to known historic spawning sites above and, for catadromous species, downstream of Brunswick Falls.

Potential solutions must objectively consider dam decommissioning and removal as an alternative. A free flowing river would be an ideal solution. The Commission's NEPA analysis cannot be limited to simple consideration of alternative fishways designs. Unfortunately, this is not envisioned in FERC's Scoping Document: it should be going forward. Indeed, the law requires it.

For Atlantic Salmon, the current license provisions are inadequate. The relevant resource management goals apply towards creating the most efficacious designs in support of a restoration methodology that fits within the Gulf of Maine Distinct Population Segment where all the Atlantic Salmon critical habitat must be restored. This population segment has been listed as endangered under the US Endangered Species Act since 2000 and Critical Habitat was designated in 2009, including reaches of the Androscoggin River and its tributaries as cited by The U.S. Fish and Wildlife Service and NOAA Fisheries Management in their 2019 plan for the recovery of this population segment⁴. Given the complex and ambitious salmon recovery goals of the FERC licenses for dams on the Kennebec and Penobscot Rivers, a reassessment of the Brunswick license provision for this species is warranted. This effort is relevant to the human population of Maine as a whole and its Native American populations within that group, all of whom have historically harvested Atlantic Salmon for personal sustenance, economic, and recreational pursuits.

Relevant Resources, Agency Recommendations, and Research Tied to Public Interest Considerations:

Attached in Appendix B, and throughout this document, we respectfully try to address FERC's guidance around the need for existing relevant information and the need for new information by including relevant research citations on the impact of this dam and others on sea-run fish passage. In addition to citations in our main body of this memorandum, Appendix B provides numerous and relevant examples of the body of literature describing the current problems with the existing dam and its predecessor structures dating back more than two centuries.

⁴ U.S. Fish and Wildlife Service and NMFS. 2018. Recovery plan for the Gulf of Maine Distinct Population Segment of Atlantic salmon (*Salmo salar*). 74 pp

Immediately below, we cite four sources that describe the need to significantly improve the fish passage at the Brunswick Dam for improved upstream and downstream alosine species as well as the endangered Atlantic Salmon, the American Eel and Sea Lampreys:

- 1) NOAA Fisheries. 2020. Androscoggin River Watershed Comprehensive Plan for Diadromous Fishes. Greater Atlantic Region Policy Series 20-01. NOAA Fisheries Greater Atlantic Regional Fisheries Office - www.greateratlantic.fisheries.noaa.gov/policyseries/. 136 pp.
- 2) Maine Department of Marine Resources. 2017. Draft Fisheries Management Plan for the Lower Androscoggin River, Little Androscoggin River, and Sabattus River. Prepared by Michael Brown, Paul Christman, and Gail Wippelhauser
- 3) Hall, C.J., Jordan, A. & Frisk, M.G. The historic influence of dams on diadromous fish habitat with a focus on river herring and hydrologic longitudinal connectivity. *Landscape Ecol* 26, 95–107 (2011). <https://doi.org/10.1007/s10980-010-9539-1>
- 4) Weaver, D.M., Brown, M., Zydlewski, J.D., 2019. Observations of American Shad, *Alosa sapidissima*, Approaching and Using a Vertical Slot Fishway at the Head-of-Tide Brunswick Dam on the Androscoggin River, Maine. *North American Journal of Fisheries Management*.

These four documents and many others cite the Brunswick Dam itself and point to the need for this FERC relicensing cycle to consider and require significantly improved fish passage at the Brunswick Dam site either by dam removal or proven fish passage designs that allow for successful passage of multiple species with restoration of populations to their historically known abundance.

In its 2020 report, the National Oceanic and Atmospheric Administration (NOAA) summarized the problem at the Brunswick dam: *“Under the original license issued in 1979, the Licensee was required to build upstream and downstream fish passage facilities; however, these efforts were largely ineffective at passing most alosines⁵ and salmon”⁶*

This finding is consistent with findings reported by other agencies.

Nexus Between Project Operations and Effects on Diadromous Fish:

⁵ Alosine species include alewives, blueback herring and shad.

⁶ NOAA Fisheries. 2020. Androscoggin River Watershed Comprehensive Plan for Diadromous Fishes. Greater Atlantic Region Policy Series 20-01. NOAA Fisheries Greater Atlantic Regional Fisheries Office - www.greateratlantic.fisheries.noaa.gov/policyseries/. 136 pp.

In addition to the failure of the project to allow adequate diadromous fish passage, other specific incidents that create a nexus between the operation of the Brunswick Dam by the licensee and impacts on diadromous species are already documented in the FERC docket (P-2248) for this project. As an example, we cite an important incidence of a major fish kill of juvenile river herring in October 2016 for which we have first-hand observations. The fish kill appeared to be mostly alewives. Charles Spies a member of Merrymeeting Bay Trout Unlimited and a resident of Water Street in Brunswick directly observed the mortality from this kill below the dam when it happened. The attached description (Appendix C) was written by members of Friends of Merrymeeting Bay, a local NGO (<https://www.friendsofmerrymeetingbay.org/>). It's members also directly observed the incident and took further steps to collect data above and below the dam to pinpoint it as a source of the fish kill of thousands of fish (Appendix C, Friends of Merry Meeting Bay, FERC Comment Ref. P-2284, Brunswick, Maine Androscoggin Dam Killing Fish). As noted, this document and others are already filed with FERC but the incident is important to highlight herein as an example of the nexus between an operational misstep and a resulting extreme fish kill. This incident was ultimately determined by FERC to be an anomaly in the dam's operations due to an upstream release of water at Sabattus Lake which caused many juveniles to exit the lake at once. We respectfully disagree with the case being considered a rare and unusual event. What was actually rare and unusual was the sudden extremely large influx of juveniles and their entrainment in the turbines at the dam's hydro facility. This allowed for enough mortality to be readily observable and measured by outside observers. It is entirely likely that smaller numbers of fish are regularly entrained on their downstream passage, but the evidence is most often not observable by normal river observations from local residents which then bring the matter to the attention of FERC. Smaller fish kills could easily go undetected in the normal course but have an additive affect that equals the incident cited here. This type of mortality is very likely not limited to alewives and affects other out-migrating juveniles, including protected Atlantic Salmon. We request that studies considered under this integrated relicensing effort collect data to fully understand downstream entrainment of diadromous species on a temporal basis and not just for an incident similar to the October 2016 mass river herring kill.

Additionally, we have met with and are aware that the Town of Brunswick has similar views on the importance of restoration of sea run fish populations both environmentally as well as from an economic development perspective. Brunswick has long been working on a plan to improve public access to and along its entire riverfront and will be authoring their own letter to FERC citing the need to improve boating, trail and recreational fishing access along the entire impoundment area above and below the Brunswick dam. The town has made investments through the acquisition of waterfront properties along the river in the last forty years and is looking to make capital investments to improve the current level access to the river specifically to enhance public recreation opportunities and protection of its riverfront resource. Please include a recreational opportunity survey, in addition to any inventories of existing uses and infrastructure, as part of the studies to be conducted.

A Rational Approach to Accounting for Study Proposals Methodology and Costs:

If license renewal is granted without major changes, it will allow operations to continue unchanged for another 40+ years – a long time to preserve that status quo! Simply allowing the status quo is not only wrong now, but a burden that will be put on generations to come. Therefore, when considering economics via level of effort and costs for proposed studies that may be put forward by federal and state agencies as part of the relicensing application process should be calculated as amortized over a period of at least 80 years. This period should account for both the 45-year period the current license has been in place with the benefit of little to no consideration or cost associated with mitigating impaired diadromous fish passage by the licensees of the project and anticipate the next 40 plus years that a new license will permit operation if the dam is not removed.

A FERC license is a privilege and not a right. In this case, it allows users of a public resource, like the Androscoggin, to produce profits for private industry. The dam is owned by a subsidiary of Brookfield Renewable Partners which is a publicly traded Canadian-based, multinational company that generates electricity for sale on the open market. It has been broadly reported that Brookfield and its subsidiaries own more than 80 percent of the hydro-electric production capacity in Maine⁷. This heavily weighted presence by one owner needs to be considered because of the potential for its operations to impact not only Brunswick but nearly every other river in Maine. Recognizing and enforcing the fact that the right to operate hydroelectric facilities by privately held entities is a privilege and that the river systems they use are a public and not a private resource is imperative. Proper management of diadromous fish passage at the first dam on this river inland from the ocean and a demonstrated impasse to federally protected species like the Atlantic Salmon and keystone ecological species like Alewives is also an imperative.

It is the intent of Merrymeeting Bay Trout Unlimited and the Coalition to work with the licensee, FERC, authorized regulatory agencies, and other stakeholders in consultation to arrive at a well-researched and stakeholder supported solution that removes diadromous fish passage problems at the Brunswick Dam site.

‘Merrymeeting Bay Chapter of Trout Unlimited appreciates the opportunity to comment on the relicensing of the Brunswick Project so key to the restoration of the Androscoggin River.

Questions concerning this submission be directed to Chip Spies at Merrymeeting Bay Trout Unlimited, Chapter 329. He can be reached at chipspies@gmail.com.

Respectfully submitted,

Charles James Spies III

Member of the Board of Directors for Merrymeeting Bay Trout Unlimited, Chapter 329
Resident of Water Street, Brunswick, Maine

⁷ Carpenter, Murray, “Brookfield: The Dam King of Maine”, June 2, 2024 edition of The Maine Monitor (<https://themainemonitor.org>).

Figure 1. Historical Industrial Development of Brunswick Falls showing extended dam history

TOPSHAM'S MILL ISLAND
 BOWDOIN MILL OF THE PEJEPSCOT PAPER COMPANY
 THE 1880 "IRON BRIDGE" CONNECTING TOPSHAM AND BRUNSWICK
 C. 1900 CABOT MILL
 BRUNSWICK ELECTRIC POWER AND LIGHT COMPANY'S HYDROELECTRIC PLANT
 MIDDLE DAM
 ORIGINAL GRANITE AND BRICK MILL WAS REPLACED BY A LARGER BRICK MILL IN STAGES BETWEEN 1890 AND 1920

THE TOWNS THAT RIVER POWER BUILT
 Damming the Androscoggin harnessed the power that attracted industry. From sawmills, woolen mills, then the Cabot cotton mill, to Topsham's pulp and paper mills, the river provided cheap and plentiful power. It drew entrepreneurs who built the industries that then helped build Topsham and Brunswick.

1900 For nearly 150 years, three dams along the falls powered the mills. Today a single dam generates electrical power.

1835 ...Brunswick Manufacturing Company built this mill of granite to produce cotton textiles. It later was part of:
 1847 Worumbo Mill
 1853 Cabot Company
 1857 Cabot Manufacturing Company

1880s Cabot Mill
1910 Mill during rebuilding and expansion between 1890 and 1920
1942 Robert Verney buys mill. Mill closed in 1955

The mighty Androscoggin drives development

CREDITS: IMAGES: Maine Memory Network, Pejepscot Historical Society, Acadia National Park, Maine Historical Society, University of Maine, Brunswick & Coaling, BESSY, Inc., and others.

STATE FUNDING by The Androscoggin Brunswick Topsham Riverwalk Advisory Committee, the Town of Topsham in part with federal funds from the National Park Service, Department of the Interior. However, the contents and opinions do not necessarily reflect the views and policies of the Department of the Interior, nor does the mention of trade names or commercial products constitute endorsement or recommendation by the Department of the Interior. The Maine Historic Preservation Commission receives federal financial assistance for identification and protection of historic properties under Title VI of the Civil Rights Act of 1964 and section 504 of the Rehabilitation Act of 1973, the U.S. Department of the Interior prohibits discrimination on the basis of race, color, national origin, or handicap in its federally assisted program. If you believe you have been discriminated against in any program, activity, or facility as described above, or if you desire further information, please write to: Office of Equal Opportunity, National Park Service, 1849 C Street, N.W. Washington, D.C. 20540

Though periodic destroyed dams, mills they were q

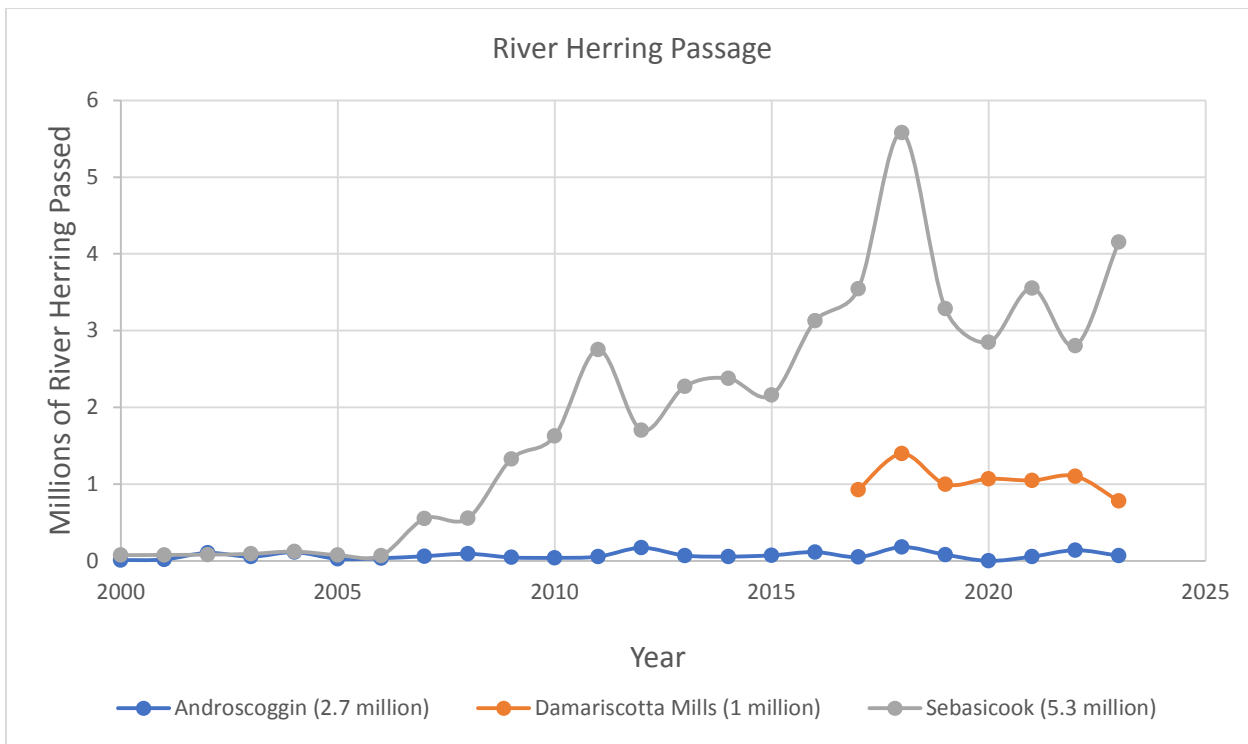


Figure 2. River herring passage at Brunswick on the Androscoggin River, Damariscotta Mills, and Benton Falls on the Sebasticook between 2000-2023 in millions of fish passed. Estimates of potential river herring production are 2.7 million/year for the Androscoggin, 1 million/year for Damariscotta Mills, and 5.3 million/year for the Sebasticook. By 2009, two dams had been removed and three fish lifts installed in the Sebasticook/Kennebec system allowing passage of millions of river herring. In 2017, the Damariscotta Mills fishway had been reconstructed allowing passage of ~1 million alewives each year into a single lake. The Androscoggin, however, has been left behind with inadequate fish passage. The fishway at Brunswick has only passed 71,087 river herring on average each year between 2000 and 2023, only 2.6% of its potential productivity.

Shad surveys

In 2011, Professor John Lichter and Bowdoin College students worked with NextEra Energy, the owner of the Brunswick hydroelectric at that time, along with the Maine Department of Marine Resources, U. S. Fish and Wildlife Service, and the Androscoggin River Alliance to conduct an experiment to determine whether upstream passage of American shad could be improved by increasing the water flow of the attraction stream at the Brunswick Fishway. In 2013, the experiment was repeated in collaboration with Brookfield Renewable Power. The results were reported in the American Shad Habitat Plan, Maine Dept. of Marine Resources, 2020. Relatively few shad made it to the entrance of the fishway despite thousands being in the tail race. Since 2013, Professor Lichter, Bowdoin College students, and the Friends of Merrymeeting Bay have used an ARIS hydroacoustic instrument to count American shad moving upriver toward the fishway from a point just below the F. W. Wood bridge on the Brunswick side of the river. The following student report and table 1 describe these surveys along with the results. To summarize, there were usually 1000 to 12,000 American shad counted moving upriver in a single half-tidal cycle (4-6 hours) each year, whereas only a few hundred at most were successful finding the fishway and scaling the ladder in a given year.

Relevant studies

Wipfelhauser, G. S. 2012. Shad passage study at Brunswick Project. Maine Dept. of Marine Resources. Maine Department of Marine Resources. 2020. American Shad Habitat Plan. With contributions by M. LeBlanc (Brookfield Renewable Energy), J. Stevens (NOAA), J. Lichter (Bowdoin College).

Bowdoin student work in 2017

Efficacy of fish passage over the Brunswick-Topsham hydroelectric dam by American shad (*Alosa sapidissima*) in 2017

Meera Prasad ('19), Biology Department, Bowdoin College

Faculty mentor: John Lichter, Professor of Biology and Environmental Studies

Dams at Brunswick-Topsham have obstructed passage of anadromous fish species migrating upriver to preferred spawning habitat in the Androscoggin River since the early 19th century. The American shad is a key anadromous fish species that historically migrated as far as Lewiston, Maine to spawn each year. However, dam construction, overfishing, and water pollution decimated the shad population along with several other anadromous fish species over the last three centuries. Shad is an important component of Maine's river ecosystems. Their young-of-year consume and export excess nutrients out of the riverine ecosystem and after migrating out to sea, they serve as a prey base for several piscivorous fish species in the Gulf of Maine.

In 1982, a volitional fish ladder was constructed at Brunswick-Topsham to facilitate fish passage at the dam. However, the fish ladder has not been effective for American shad. To quantify shad attempting to migrate upriver at Brunswick-Topsham, I used an ARIS Sonar instrument to count fish moving past a point below the bridge connecting Brunswick and Topsham on the Brunswick side of the river. This acoustic technology provides video-like recordings of fish passing through an approximately 8 x 20-m footprint (Figure

1). Over six sample days lasting 5-6 hours each, I recorded an average of 3495 migrating shad between June 21 and July 18 moving upriver past the sonar footprint. The peak of the migration was on July 10 in which 4791 shad were observed. At the top of the fish ladder, an employee of the Department of Marine Resources or a volunteer counts the number of fish that successfully make it to the top of the ladder. Only a single shad made it to the top of the ladder indicating that there are many more shad attempting to scale the ladder than actually succeed. Although I was able to get clear video imaging of the river ecosystem, the sonar footprint only reached halfway across the river channel below the tail race of the dam (Figure 2). Thus, my counts were at best minimal estimates of the number of shad present.

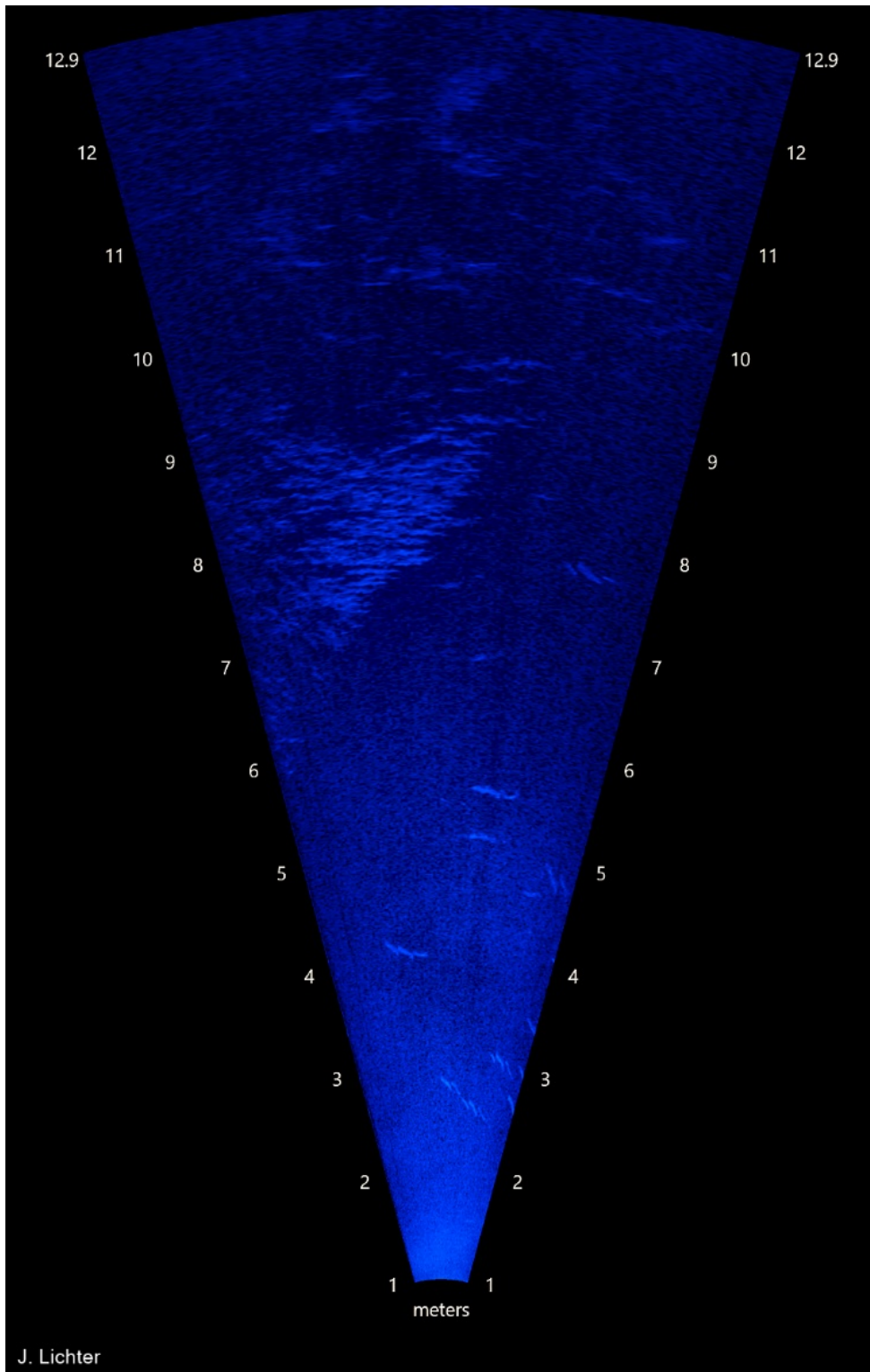
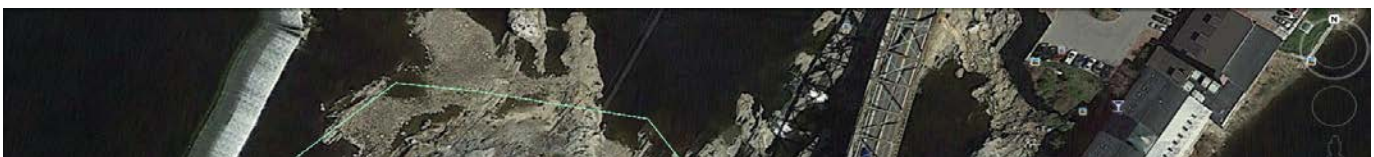


Figure 3. Underwater image from the ARIS Sonar. The light blue fish at 7 to 9 meters on the left side of the sonar footprint are river herring. A few scattered shad range from 2 to 8 meters. The rocky bottom is visible out at 9 to 12 meters.



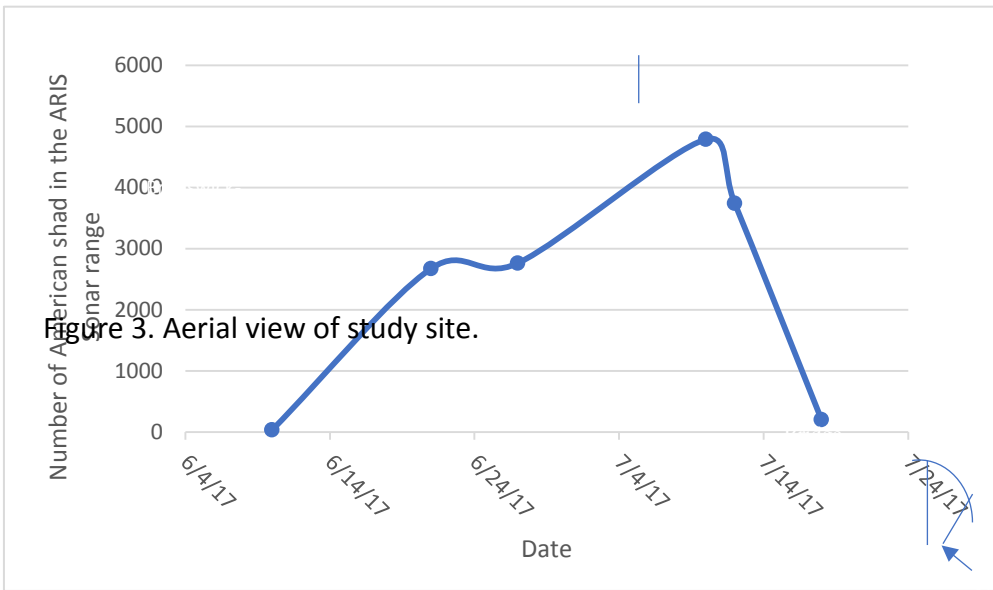


Figure 4. Aerial view of study site.

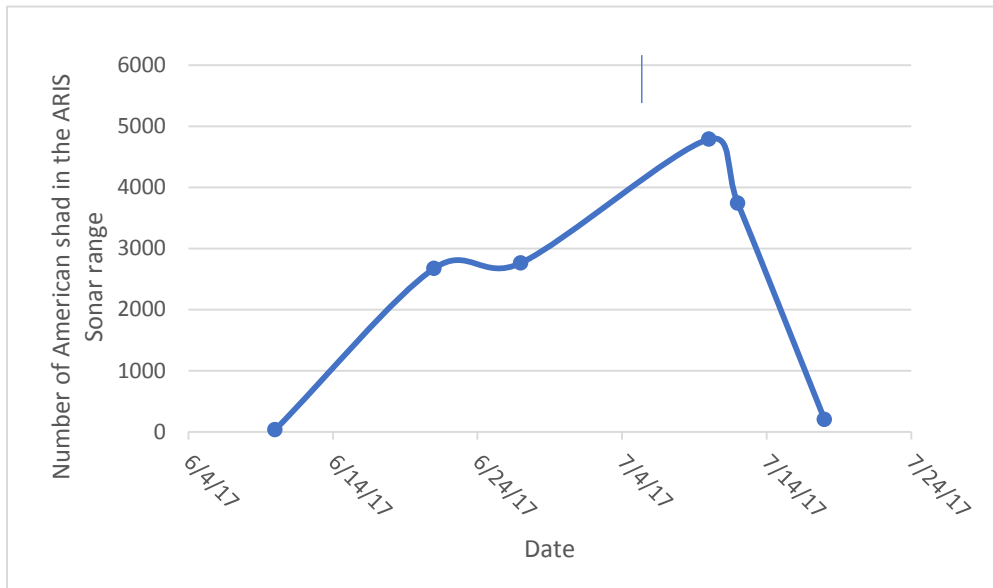


Figure 5. Number of American shad counted for 5 days over the 7-week period of the migration run.

Table 1: Minimum number of shad moving toward dam in a single half-tidal cycle recorded with ARIS sonar and the number of shad successfully finding and scaling the Brunswick Fishway ladder through the entire season.

	<u>#Shad downriver</u>	<u>#Successful shad</u>
7/10/2017	4791	1
7/5/2021	1459	550
6/24/2022	1382	228
5/15/2023	~7500	14
6/18/2024	*9000-12,000	58 as of 6/17/24 per Maine Department of Marine Resources

*Provisional quick count by June 20.

Appendix B: References relevant to dams in Maine.

B1) Effects of dam building on anadromous fish in Maine:

Atkins, C. G. 1887. The river fisheries of Maine. Fisheries and Fishery Industries of America. U. S. Commissioner of Fisheries. *Collapsed fish populations by 1815 with concrete dam.

Atkins, C. G. and N. Foster. 1869. First report of the Commissioners of Fisheries of the State of Maine, 1868. Owen and Nash, Printers to the State, Augusta, Maine.

Atkins, C. G. and E. M. Stillwell. 1874. Obstructions to the upward movement of fishes in streams, and the remedy. In U. S. Commission of Fish and Fisheries, Part II, Report of the Commissioner for 1872 and 1873. Appendix E, Sections XXIII and XXIV. Government Printing Office, Washington, D. C., pp 589-621.

Hall, C. J., A. Jordaan, M. G. Frisk. 2011. The historic influence of dams on diadromous fish habitat with a focus on river herring and hydrologic longitudinal connectivity. *Landscape Ecology* 26:95-107. *History of dam building and loss of diadromous fish habitat.

Limburg, K.E., and J. R. Waldman. 2009. Dramatic decline in North Atlantic diadromous fishes. *Bioscience* 59 (11):955-965.

Poff, N. L. and D. D. Hart. 2002. How dams vary and why it matters for the emerging science of dam removal. *Bioscience* 52(8): 659-668.

Rounsefell, G. A. and L. D. Stringer. 1945. Restoration and management of New England alewife fisheries with special reference to Maine. U. S. Department of the Interior, Fish and Wildlife Service. Transactions of the American Fishery Society 73:394-424.

Saunders, R., M. A. Hachey, and C. W. Fay. 2006. Maine's diadromous fish community: past, present, and implications for Atlantic Salmon recovery. *Fisheries* 31(11)L 537-547.

Weaver, D. M., M. Brown, and J. D. Zydlewski. 2019. Observations of American Shad, *Alosa sapidissima*, approaching and using a vertical slot fishway at the head-of-tide Brunswick dam on the Androscoggin River, Maine. *North American Journal of Fisheries Management*.

B2) Connection of alewives and anadromous fish to coastal marine food web and groundfish fisheries:

Ames, E. P. 2004. Atlantic cod structure in the Gulf of Maine. *Fisheries Research* 29:10-28.

Ames, E. P. and J. Lichter. 2013. Gadids and alewives: structure within complexity in the Gulf of Maine. *Fisheries Research* 141:70-79.

Baird, S. 1872-1873. U. S. Commissioner of Fish and Fisheries Report of 1873. Washington, D. C.

Belding, D. L. 1921. A report on the alewife fisheries of Massachusetts. Department of Conservation, Division of Fisheries and Game. Boston.

Bolster, J. 2012. The Mortal Sea: Fishing the Atlantic in the age of sail. The Belknap Press of Harvard University Press.

Fields, G. W. 1914. Alewife fishery of Massachusetts. *Transactions of the American Fisheries Society* 43(1): 143-161.

Hind, H. Y. 1877. The effect of the fishery clauses of the Treaty of Washington on the fisheries and fishermen of British North America.

Lichter, J. and E. P. Ames. 2012. Reaching into the past for future resilience: recovery efforts in Maine rivers and coastal waters. *Maine Policy Review* 21:96-102.

Mattocks, S. C. J. Hall, and A. Jordaan. 2017. Damming, lost connectivity, and the historic role of anadromous fish in freshwater ecosystem dynamics. *Bioscience* 67(8): 713-728.

Smith, H. M. 1899. Notes on the extent and condition of the alewife fisheries of the United States in 1896. In U. S. Commissioner of Fish and Fisheries Report, Part XXIV for the year ending June 30, 1898

B3) Department of Marine Resources, Sea-run Fisheries Division:

American Shad Habitat Plan 2020. With contributions from M. LeBlanc (Brookfield), J. Stevens (NOAA), J. Lichter (Bowdoin College).

Androscoggin River Anadromous Fish Restoration Program. M. E. Brown, J. Maclaine, and L. Flagg. 2008.

Draft Fisheries Management Plan for the Lower Androscoggin River, Little Androscoggin River, and Sabattus River. 2017. Michael Brown, Paul Christman, and Gail Wippelhauser

Appendix C:



FERC Comment Ref. P-2284 Brunswick, Maine Androscoggin Dam Killing Fish

October 28, 2016 Contact: Ed Friedman, 207-666-3372 [/edfomb@comcast.net](mailto:edfomb@comcast.net)
Who: Friends of Merrymeeting Bay
What: **Brookfield Energy's Brunswick Dam Turbines Kill Thousands of Fish**
When: October 15th & 16th
Where: Androscoggin River, Brunswick, Maine

Turbines at Brookfield Energy's Brunswick/Topsham dam have recently killed thousands of outmigrating young of the year (YOY) alewives and other fish. Locals first noticed the massive kill on Saturday 10/15/16, posting mortality photos from the Brunswick Water Street boat launch on Facebook.

Sunday morning, Friends of Merrymeeting Bay (FOMB) volunteers on their monthly water quality monitoring circuit, noticed the kill at Brunswick and further downstream and reported back to Ed Friedman, the organization's Chair. After documenting 500-800 dead fish just at the boat ramp and others on the rocks below the Green Bridge between Brunswick and Topsham and directly below the Brunswick turbine area, Friedman went up and downstream to rule out other sources (there was no mortality observed above Brunswick nor below and above Pejepscot dam, the next one upstream) before calling the Brookfield Emergency Phone Line later that afternoon to report their dam turbines were killing fish. It is not known what immediate action Brookfield took if any.

When next observed by FOMB Tuesday morning, previous planned dam work was underway with a diver down in the turbine vicinity and all turbines shut off. The Taintor gates were open on the Topsham side of the dam allowing fish passage there. Currently after heavy rain the entire dam is spilling.

In normal conditions, the only way for migratory fish to pass downstream at Brunswick is through an 18" pipe with grate over the upstream end and flows of 40 cubic feet per second (cfs). This downstream passage is located immediately adjacent to the Unit 1 turbine with intake extending to the surface and with a throughput of 5,075 cfs. On the other side of the fish passage pipe are Units 2 and 3 with combined 2,672 cfs and entrances about 20' below the surface. Out-migrating fish, whether alewives, salmon, shad or eels follow maximum flows leaving the designated pipe in this instance, with little chance of attraction success and ensuring passage through the turbines.

Turbine mortality occurs through decapitation, direct concussive strikes, and pressure differentials on opposite sides of turbine blades leading to exploded swim bladders and eyeballs. All of these examples were seen in the recent kills. Similar mortality has been encountered on the Union River at the dam in Ellsworth, also owned by Brookfield.

FOMB has worked for years to ensure safe passage for migratory fish on the Androscoggin and Kennebec Rivers most recently during five years of litigation under the Endangered Species and Clean Water Acts. Despite overwhelming evidence, FOMB lost these cases because in the period from start to finish of litigation, interim species protection plans (ISPP's) were developed and issued by NOAA Fisheries pursuant to a joint cooperative agreement with USFWS and the court ruled FOMB claims no longer valid (even though several years of violations had occurred for which Brookfield should have been liable).

The recent kill is proof the ISPP's don't work. No fish, including endangered Atlantic salmon are adequately protected from turbine mortality at the facility as currently configured and operated. We request FERC take appropriate actions to ensure the dam owner is held liable and future mortality avoided.

An in depth report documenting detailed timelines of this event and agency correspondence will follow.







Note first photo of dam shows 18" fish passage "downspout" next to turbine bays. Dam is over 600 feet long and this is only safe passage unless water is spilling over the top. Last photo tentatively identified by DMR as a fallfish. All photos: Ed Friedman, Friends of Merrymeeting Bay. Available on request as jpgs.