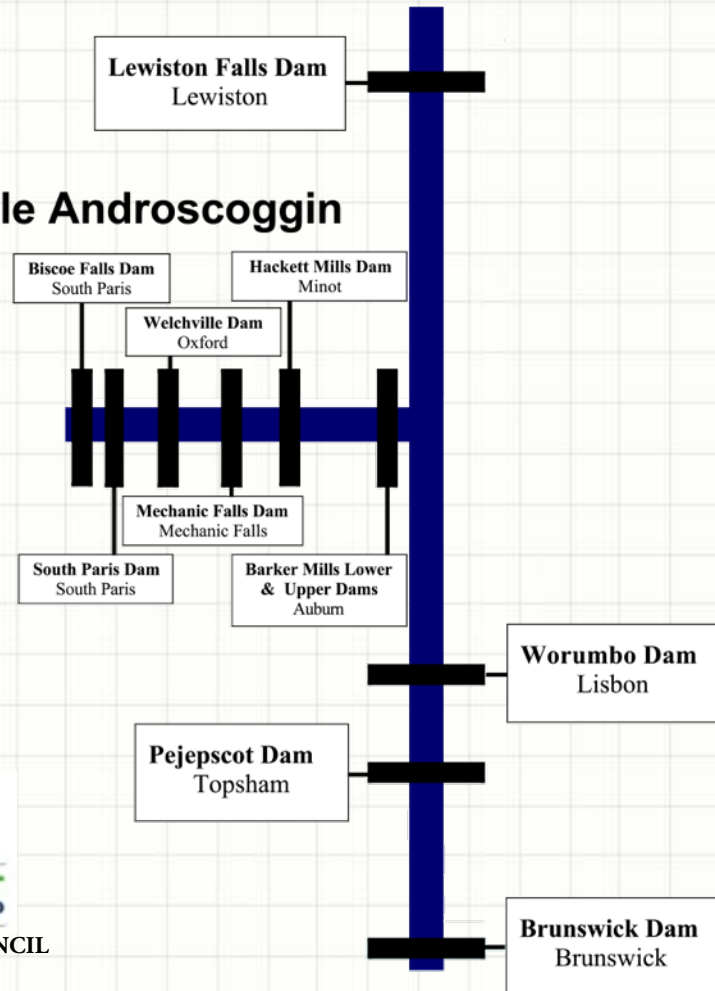


RESTORING THE LOWER ANDROSCOGGIN

Androscoggin River

Little Androscoggin

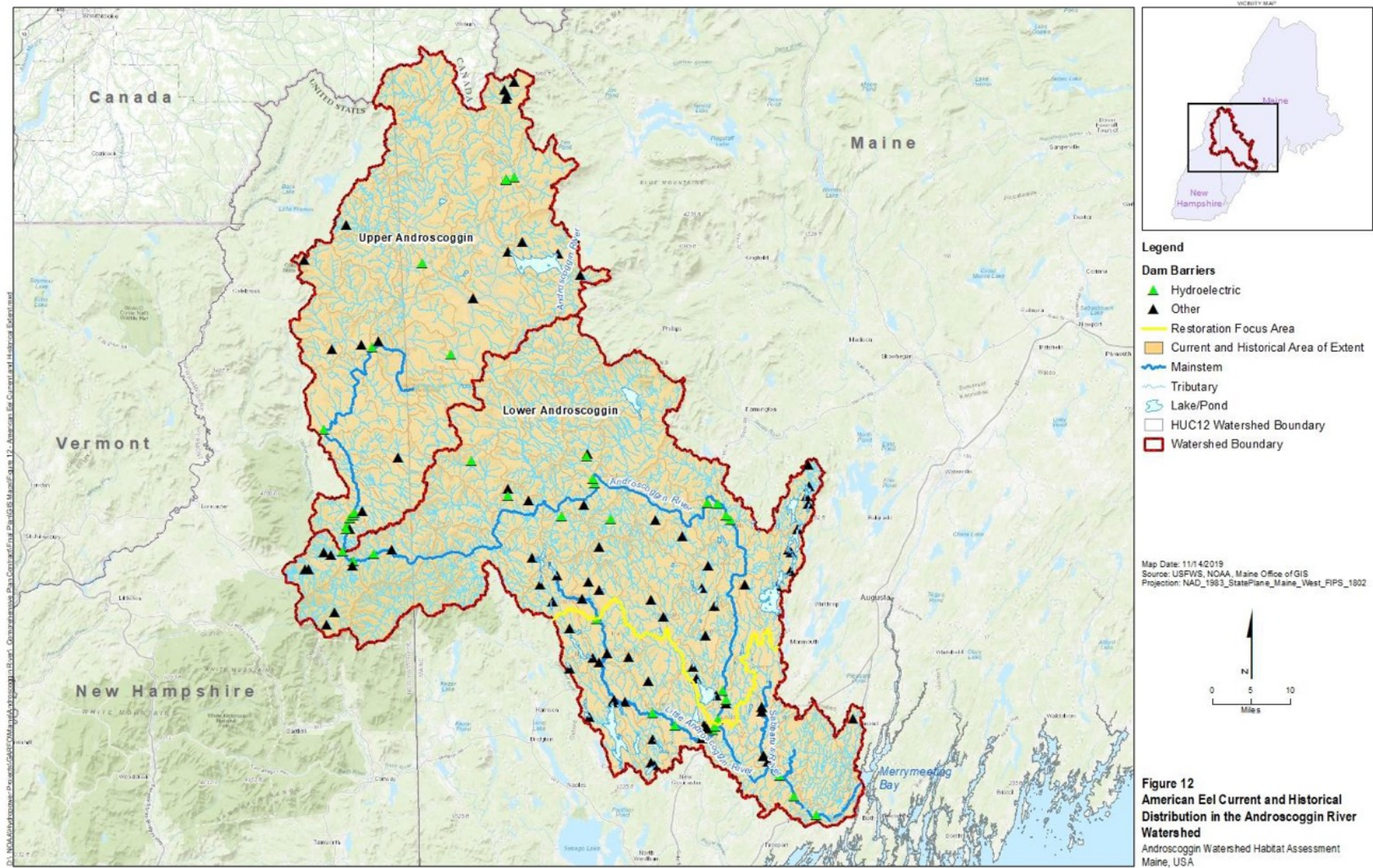


Steve Heinz
February 9, 2022

The Androscoggin Watershed

- The Androscoggin River, Maine's **third largest river**, is an interstate waterway with a drainage area of 3,530 square miles above tidewater
- Approximately **80% of the drainage is located in Maine** and 20% in New Hampshire
- The Androscoggin River is **178 miles long**, and joins the Kennebec River at Merrymeeting Bay. The combined waters travel another 20 miles before reaching the Gulf of Maine
- The **Little Androscoggin River has a drainage area of 260 square miles** running from Bryant Pond to its confluence with the Androscoggin

The Androscoggin Watershed



Historic Range of Diadromous Fish

- Atlantic Salmon
 - Androscoggin to Rumford Falls
 - Little Andro to Snow Falls
 - Little River
- River Herring (alewives and blue back herring)
 - Androscoggin to Great Falls at Lewiston
 - Little Andro to Biscoe Falls
 - Sabattus River to Sabattus Pond
- Other species
 - American eels, sea lamprey, sturgeon, striped bass, etc.



Runs eliminated by the 1850s due to construction of dams without fish passage

What's at Stake?



- Some notable victories, but over 50 years after the passage of the Clean Water Act:
“Over 470 dams impair or block access to approximately 90 percent of freshwater habitat necessary to support Atlantic salmon spawning and rearing of juveniles.”

Source:

<https://www.greateratlantic.fisheries.noaa.gov/protected/atsalmon/conservation/background/dams/index.html> (no longer posted)

Other Species Too

- Diadromous is a general term referring to a fish that migrates between the ocean and freshwater at least once during its lifetime
- Anadromous fish spawn in freshwater
 - Alewife, American Shad, Atlantic Salmon, Shortnose Sturgeon, Atlantic Sturgeon, Atlantic tomcod, blueback Herring, Rainbow Smelt, Sea Lamprey, sea-run brook trout, and Striped Bass
- Catadromous fish spawn in the ocean
 - the American Eel
- Potamodromous fish move in fresh water
 - Brook trout
 - Suckers



What's the Problem?

- Fish need access to diverse habitat:
 - Spawning
 - Salmonids need gravels with some upwelling present
 - Nursery
 - Cover for security
 - Feeding
 - Appropriate aquatic & terrestrial insects
 - Refugia
 - Oxygenation at low flow
 - Springs, seeps, deep (cold) water
 - Winter holding



Many dams coming up for relicensing in Androscoggin Watershed

- Little Androscoggin
 - Lower Barker - Auburn expired 1/2019 *
 - Upper Barker - Auburn expires 7/2023
 - Hackett Mills - Poland expires 8/2024
- Androscoggin
 - Pejepscot - Topsham expires 08/2022
 - Rumford Falls – Rumford expires 09/30/24
 - Lewiston Falls - Auburn/Lewiston expires 08/2026
 - Brunswick - Brunswick expires 02/2029



Other Little Andro facilities in states of disrepair

- Littlefield Dam – Auburn (breached)
- Welchville Dam – Oxford (failing)

Fish passage mandated as licensing condition

- Marcal – Mechanics Falls (2027) per License Article 408, fish passage triggered by a MDMR fishery plan for the Little Androscoggin River

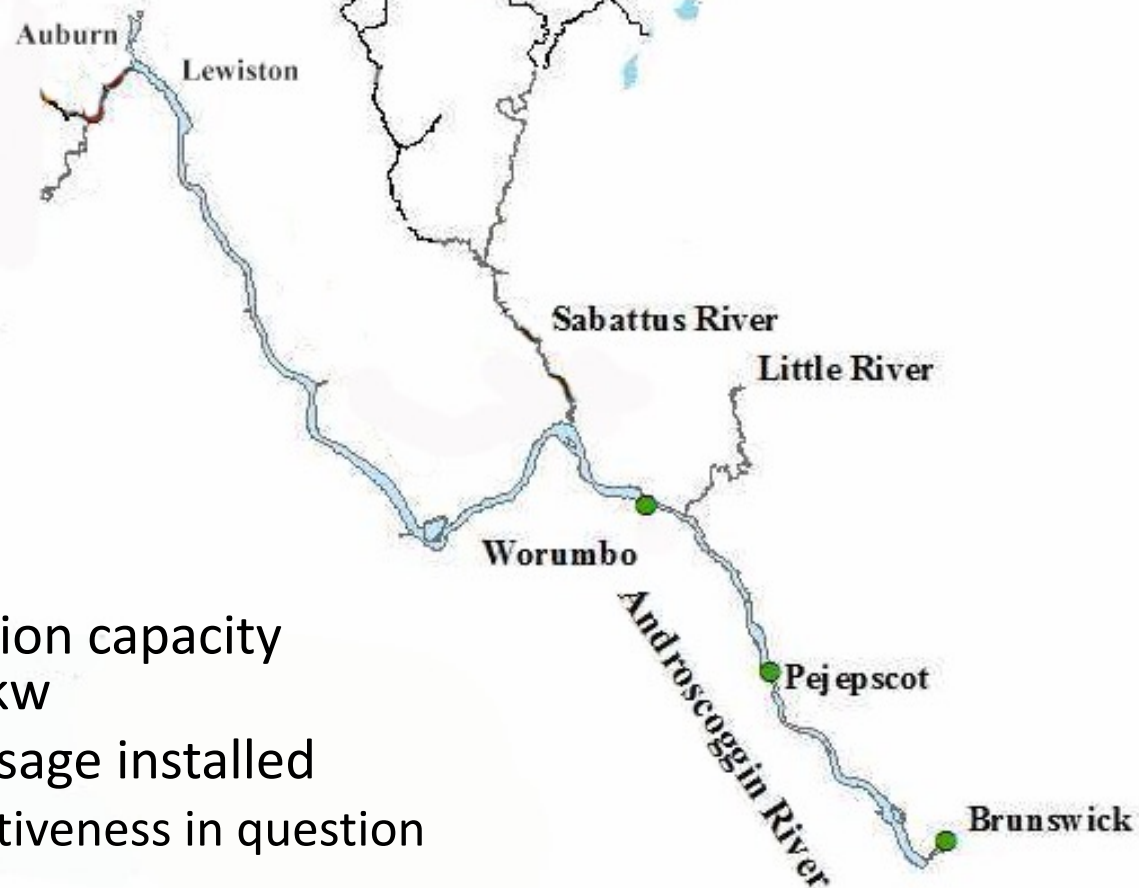
* MDEP fish passage prescription for fishway capacity of 1.7 million alewives appealed by KEI.

Key Documents



- Draft Fisheries Management Plan for the Lower Androscoggin River, Little Androscoggin River and Sabattus River. September 2017.
 - Prepared By:
 - Maine Department of Marine Resources: Michael Brown, Paul Christman, and Gail Wippelhauser
 - Maine Department of Inland Fisheries and Wildlife: Francis Brautigam and James Pellerin
- NOAA Androscoggin River Watershed Comprehensive Plan for Diadromous Fish
 - Parallel federal document
- Brunswick–Lewiston Falls Biological Opinion (BIOP)
 - Issued by NOAA Fisheries December 28, 2022
 - For incorporation into licenses Brunswick to Lewiston Falls

Lower Androscoggin Dams



- Generation capacity
51,980 kw
- Fish passage installed
 - Effectiveness in question

Worumbo P-3428 (Lisbon Falls)

- Expires 11/30/25
 - Currently early in relicensing process
- Capacity 19100 KW
- Eagle Creek Renewable Energy
- Issue - Anadromous fish passage effectiveness
 - Assumed current facilities will require modification



Pejepscot P-4784 (Topsham)

- Expires 08/31/22
 - Due this year, Final License Application (FLA) submitted
- Capacity 13880 KW
- Topsham Hydro Partners LTD (Brookfield)
- Issue - Anadromous fish passage effectiveness
- Studies show fish passage for alosines ineffective
 - 20% for river herring, ZERO for shad
 - Fish stay in eddy below the dam, most do not enter fish lift
- MDMR preliminary fish passage provisions issued
 - Doubles fish passage targets
 - Requires monitoring

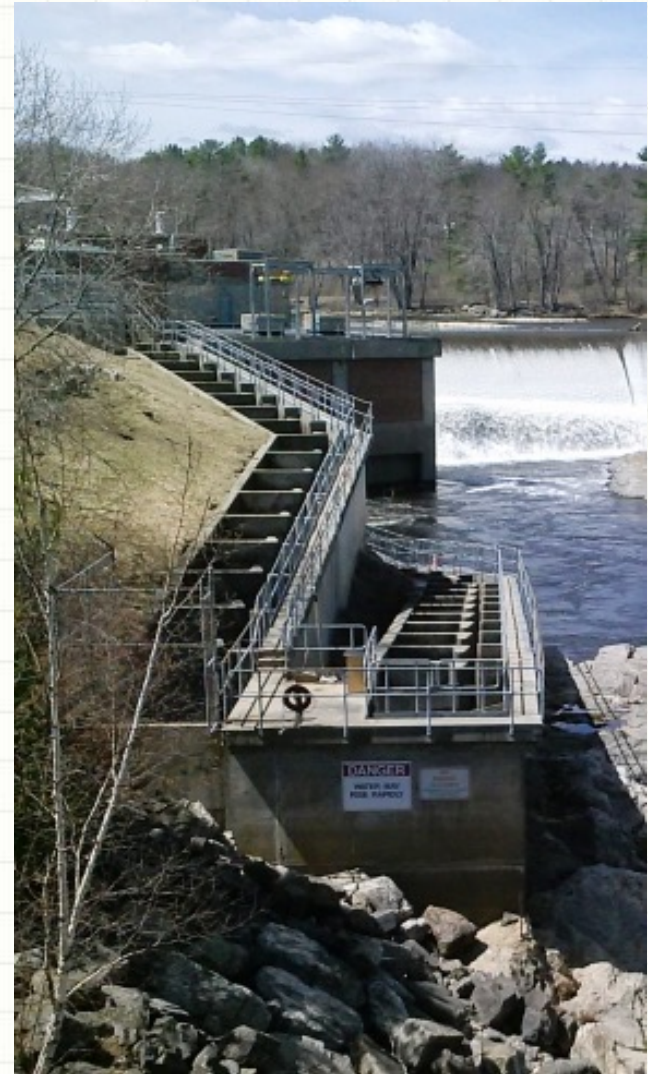


Brunswick P-2284

- Expires 2/28/2029 (Relicensing a few years away)
- Capacity 19000 KW
- Brookfield White Pine Hydro, LLC.
- Issue - Anadromous fish passage effectiveness
- Recent study underscores problems with shad passage: Weaver et al. 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. 2019

Brunswick (cont.)

“Eleven of 57 tagged fish were detected at the fishway entrance and of those only five were detected in the lower fishway. Individuals that were detected were observed making multiple attempts at entering the fishway, but movements were restricted to the lower pools. Our results suggest that this fishway is not conducive to the passage of American Shad. Examining the relationship between hydropower operations and other environmental variables on the behavior and passage of migrating anadromous fish remain an area for further study.”



Brunswick (continued)



- Recent NOAA Fisheries Biological Opinion (BIOP) specified changes in fishway operations, e.g., when trap is operated, and added a camera. Should provide incremental improvement.
- Significant improvement should be driven by Brunswick relicensing.
 - Expect major fishway redesign, provisions for American eel passage, etc.
- Should drive additional changes up river
- Environmental Impact Statement (EIS) ?

Lewiston Falls

- Expires 8/31/2026 (Relicensing just starting)
- Capacity 28440 KW
- Brookfield White Pine Hydro, LLC.
- Issues
 - Scenic flows (falls generally dewatered)
 - Recreational facilities
 - Eel passage
- Recent BIOP addressed flows potentially causing Atlantic salmon strandings downstream



Other Developments

- Grow L+A Workgroup working to upgrade water quality from C to B
- Major Friends of Merrymeeting Bay participation
- Lower river meets Class B DO standards vast majority of the time
- Area changed to from Worumbo downstream
- MBEP approved upgrade
- Maine legislature will decide



Lower Androscoggin

- Issues

- Effectiveness of upstream and downstream fish passage provisions, especially Brunswick
 - Everything is upstream of these dams
- NGO engagement improving
 - Friends of Merrymeeting Bay
 - Grow L+A Workgroup
 - Merrymeeting Bay TU Chapter

- Needs

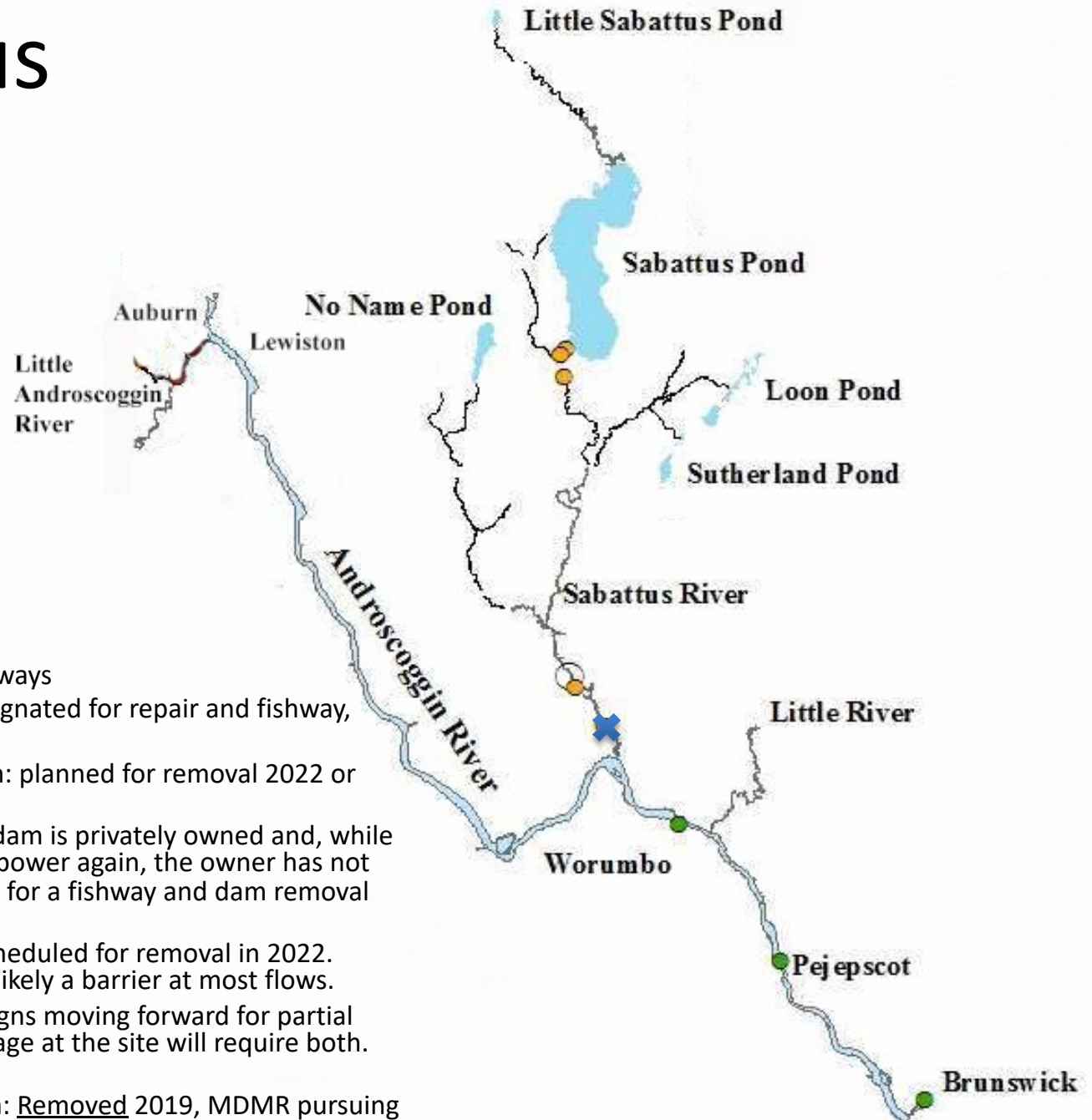
- Increased local involvement
- Support of NMFS efforts in relicensing processes

Sabattus Pond

- One of sites where river herring from Brunswick are trucked and stocked
- Large production potential - 419,945 fish
- Efforts underway by MDMR to provide free-swim connectivity from mainstem of the Androscoggin



Sabattus River Dams



Dams (north to south)

● Non-hydro without fishways

D1080 – Sleeper Dam: Designated for repair and fishway, designs moving forward

D1032 – Mill Remnant Dam: planned for removal 2022 or 2023

D1081 – Fortier Dam: The dam is privately owned and, while not likely to ever generate power again, the owner has not agreed to removal. Designs for a fishway and dam removal are both moving forward.

○ D1082 – Upper Dam: scheduled for removal in 2022. Breached in 2012, but still likely a barrier at most flows.

D1083 – Farwell Dam: Designs moving forward for partial removal and fishway. Passage at the site will require both. Scheduled for 2023.

✕ D1085 – Mill Street Dam: Removed 2019, MDMR pursuing designs for fish passage due to extensive alteration of site

Near-term Sabattus Restoration

- D1085 – Mill Street Dam: Removed 2019, MDMR pursuing designs for fish passage due to extensive alteration of site
- D1082 – Upper Dam: scheduled for removal in 2022. Breached in 2012, but still likely a barrier at most flows
- D1083 – Farwell Dam: Designs moving forward for partial removal and fishway. Passage at the site will require both. Scheduled for 2023

- Casey Clark MDMR POC

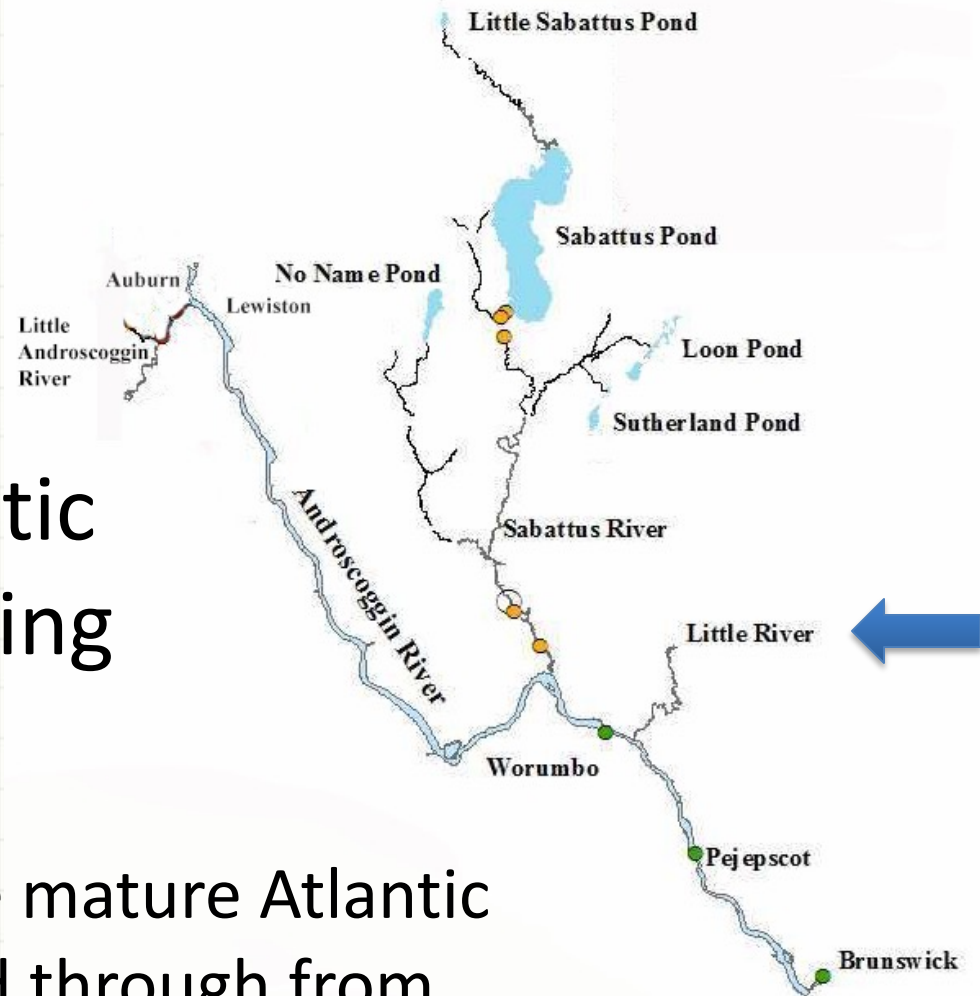


Longer-term Sabattus Restoration

- D1080 – Sleeper Dam: Designated for repair and fishway, designs moving forward
- D1032 – Mill Remnant Dam: planned for removal 2022 or 2023
- D1081 – Fortier Dam: The dam is privately owned and, while not likely to ever generate power again, the owner has not agreed to removal. Designs for a fishway and dam removal are both moving forward.

Little River

- Contains Atlantic salmon spawning habitat
- Redds and possible mature Atlantic salmon that passed through from Brunswick observed in watershed
- Needs comprehensive spawning habitat survey by MDMR



Little Andro Dams

- None of the seven dams in the main stem of the Little Androscoggin River nor the multiple dams located in its tributaries currently provide upstream fish passage



Current Restoration Effort

- Emphasis on Little Androscoggin – historically:
 - 92% of Atlantic Salmon spawning habitat
 - 30% of American Shad and Blueback Herring spawning habitat
 - 77% of Alewife spawning habitat (lakes and ponds)
 - 12 ponds are located in the Little Androscoggin River Watershed: Upper Range Pond, Middle Range Pond, Lower Range Pond, Taylor Pond, Whitney Pond, Marshall Pond, Hogan Pond, Tripp Pond, Worthley Pond, Thompson Lake, Pennessewassee Lake* and Little Pennessewassee Lake*
- * Natural barriers – no spawning

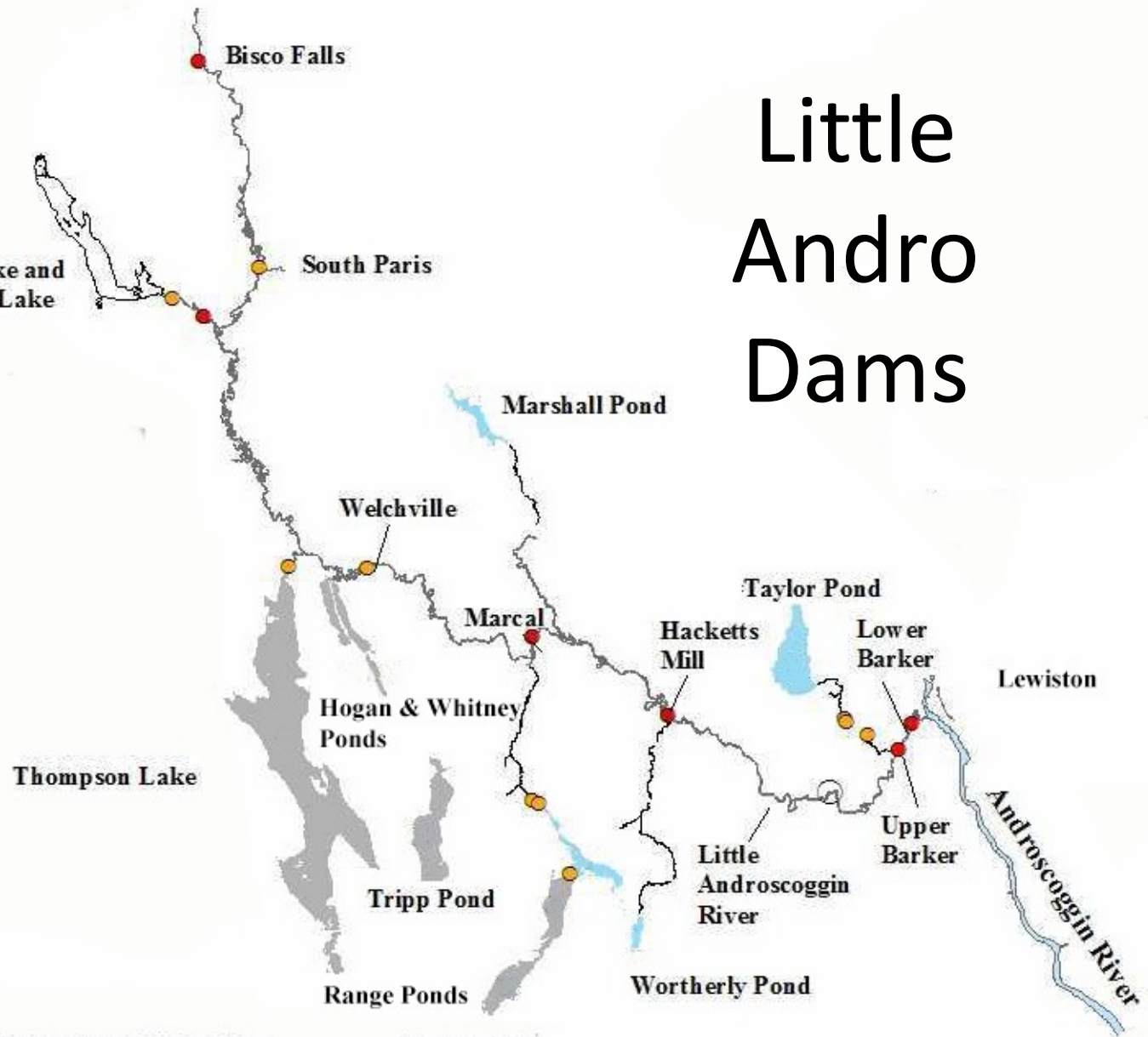
Hydroelectric Power

- Renewable but neither clean or green
- Little Andro Projects Small
 - Lower Barkers - 1500KW
 - Upper Barkers – 950KW
 - Hackett Mills – 485KW
 - Marcal – 1310KW
- Combined 4245KW capacity
- ~.5 percent of Maine's total 735101KW
- Actually worse than that – low summer flows prevent generation then



Little Andro Dams

Pennesseewassee Lake and Little Pennesseewassee Lake



Legend

- Hydro dams with downstream passage but no upstream passage (red circles)
- Non-hydro dams without upstream or downstream passage (orange circles)
- Breached dams (unfilled circles)
- Historically accessible to Alewife currently being stocked (blue) while others are not (gray)
- Pennesseewassee Lake & Little Pennesseewassee Lake not accessible due to natural barriers

Active Relicensings

- Lower Barkers Mill P-2808
 - MDEP issued Water Quality Certification calling for:
 - 1.7M alewife fish passage capability
 - Minimum flows of 113 cfs, or inflow, whichever is less to the bypass reach, and to provide a minimum of 25 cfs to the downstream fish bypass from June 1 through November 30
 - KEI appealed WQC to Maine Board of Environmental Protection
 - ‘Every imaginable grounds’
 - Pending Alternative Dispute Resolution Process
 - NGOs submitted letters supporting agencies
 - Settlement to be announced by March
 - Request for trial type hearing withdrawn by KEI last week

Active Relicensings (continued)

- Upper Barkers Mill P-3562
 - ASF, TU, NOAA & MDMR engagement
 - KEI Study Plan delays Agency requested studies
 - Waiting on Study Reports
- Hackett Mills P-6398
 - Studies of habitat conducted last summer
 - Still awaiting report
 - NOAA Fisheries has requested report status

Other Dams



- Marcal P-11482
 - Next dam above Hackett Mill at Mechanics Falls
 - FERC license says fish passage by 2027
- Littlefield
 - Breached dam above Upper Barkers Mill
 - Renewed interest by City of Auburn Conservation Commission in pursuing grant to remove
- South Paris
 - Non-hydro
 - Maximize Atlantic salmon spawning potential
- Biscoe Falls P-9411
 - FERC Exempt
 - Maximize Atlantic salmon spawning potential

Welchville Dam Background

- Town of Oxford will no longer repair failing Welchville Dam on Little Andro
- Dam has some effect of water levels of Hogan and Whitney Ponds
- Studies conducted in 2016 and 2019 to look at options
- Town decided to implement grade control at outlet of ponds in 2021.
- Should spell the eventual end of Welchville Dam



TU member Scott Stone played key role in town's decision

Importance of Welchville Dam

- Fish passage at the Welchville Dam is key to the restoration of both alewife and Atlantic salmon in the Androscoggin Watershed
- Over 75% of the alewife ponds (7,816 acres) in the Little Androscoggin Watershed are upstream of the dam and the majority of the Atlantic salmon spawning habitat is located upstream of the dam as well

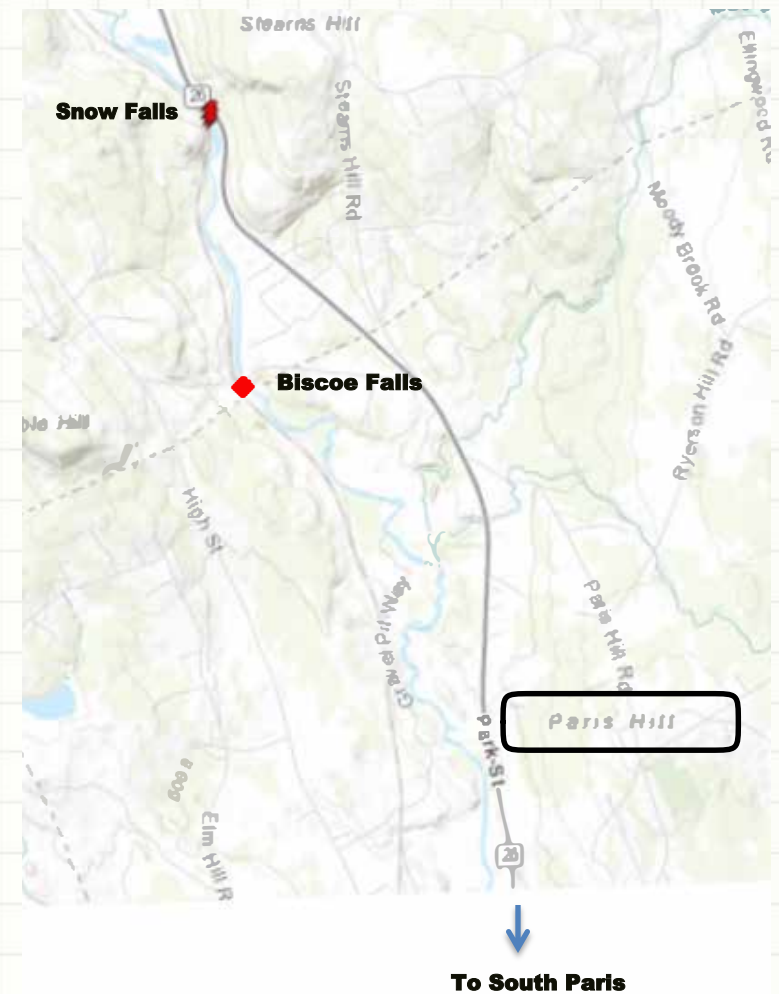
Atlantic Salmon Spawning Habitat

- Braided stream below Biscoe Falls

“On the Little Androscoggin, they [Atlantic salmon] were known to breed opposite Paris Hill, but their ascent was stopped Snow’s Falls two miles from West Paris.”

Source: Reports of the Commissioners of Fisheries of the State of Maine for the Years 1867 and 1868, First Report-1867, page 41

- Bog Brook in Minot
 - Possibly other cold feeder brooks



Alewife Breeding Habitat

- Thompson Lake the jackpot
 - Concerns by camp owners and MDIFW on landlocked salmon fishery
- 4,426 Acres
- Estimate 1,040,110 returning alewives at 235 per acre



Future of Watershed Restoration Depends on:

- Reclassification of lower river from C to B – this legislative session
- Settlement for Lower Barker (and entire Little Androscoggin Watershed) - March 2022
- Terms and Conditions of Brunswick relicensing – February 2029
 - EIS?



What can you do?

- Appreciate and enjoy the resource the Androscoggin River is to the area
- Tell your legislators to support legislation to upgrade the water quality classification of the lower Andro
- Support FOMB
- Support Merrymeeting Bay TU efforts
 - Possible volunteer component to Little River spawning habitat survey
- Support Auburn Conservation Commission efforts to remove the Littlefield Dam
- Participate in FERC relicensing process using eComment -
<https://ferconline.ferc.gov/quickcomment.aspx>

Trout Unlimited Mission

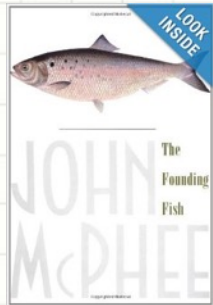
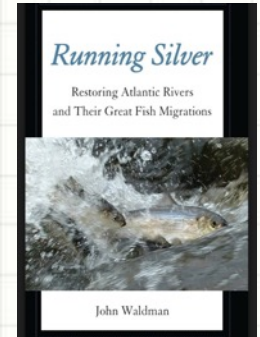


- *“To bring together diverse interests to care for and recover rivers and streams so our children can experience the joy of wild and native trout and salmon.”*
- Charlie Spies of Merrymeeting Bay TU Chapter monitoring FERC dockets for lower river - chipspies@gmail.com
 - Brunswick
 - Pejebscot
 - Worumbo



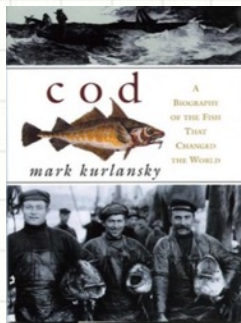
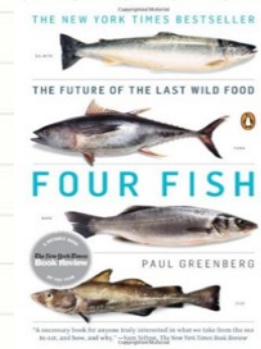
Suggested Reading

Running Silver: Restoring Atlantic Rivers and Their Great Fish Migrations by John Waldman



The Founding Fish by John McPhee

Four Fish: The Future of the Last Wild Food by Paul Greenberg




Cod: A Biography of the Fish that Changed the World by Mark Kurlansky

For More Information

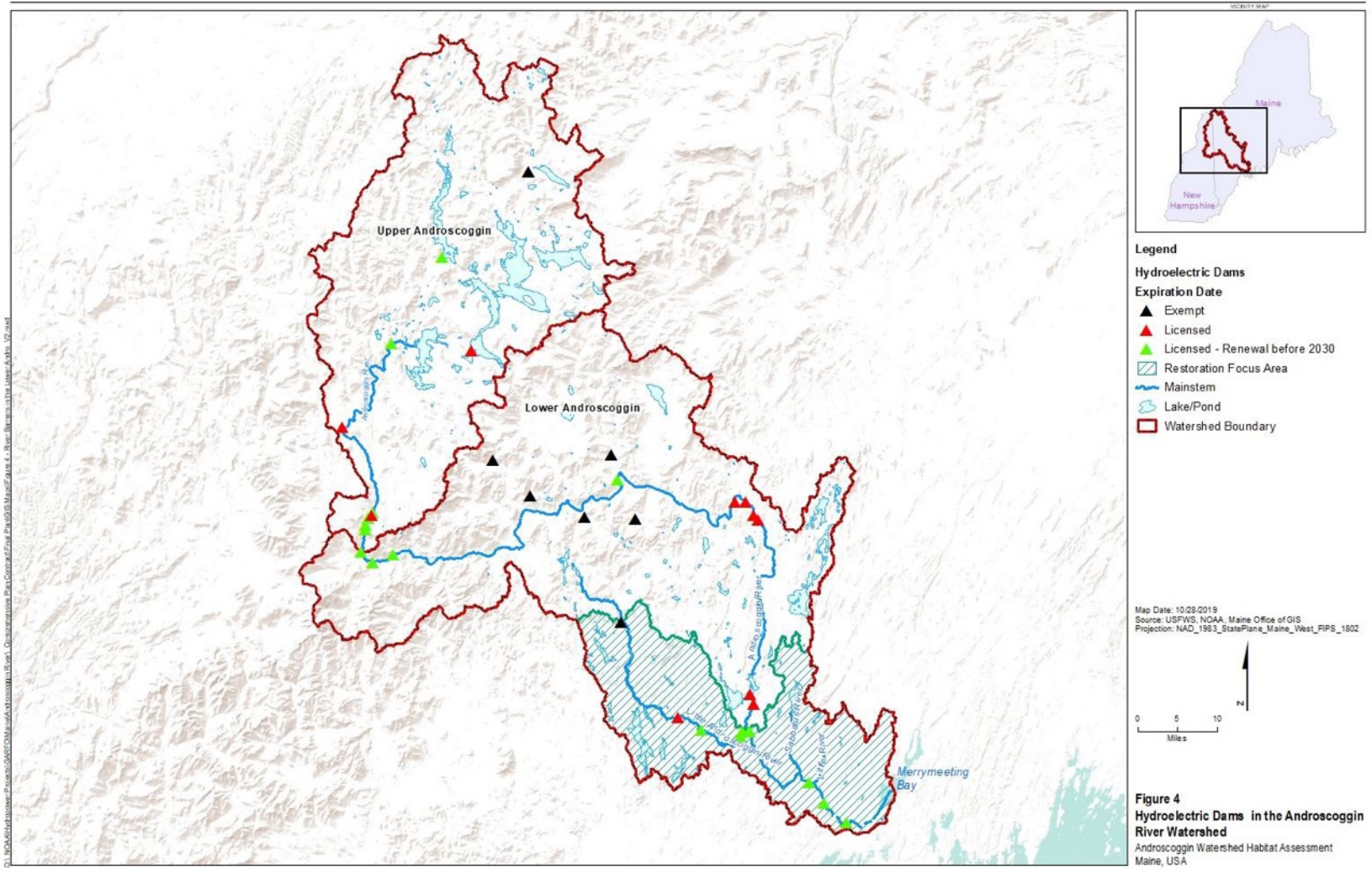


- 2017 Draft Fisheries Management Plan
 - <https://drive.google.com/file/d/17231r2G1KJGmHGIYhBQOqpTwYnpM43hl/view?usp=sharing>
- NOAA fisheries Management Plan
 - <https://drive.google.com/file/d/15K4O87sh5YZqo8XsZSPsLcemChBQiyV1/view?usp=sharing>
- BIOP Brunswick & Lewiston Falls
 - <https://drive.google.com/file/d/1w1JO3hmBQnAGPUvjYKlZ49Lt25bNR7Hm/view?usp=sharing>
- Steve Heinz heinz@maine.rr.com



Backup Slides

The Androscoggin Watershed



Watershed

Androscoggin River

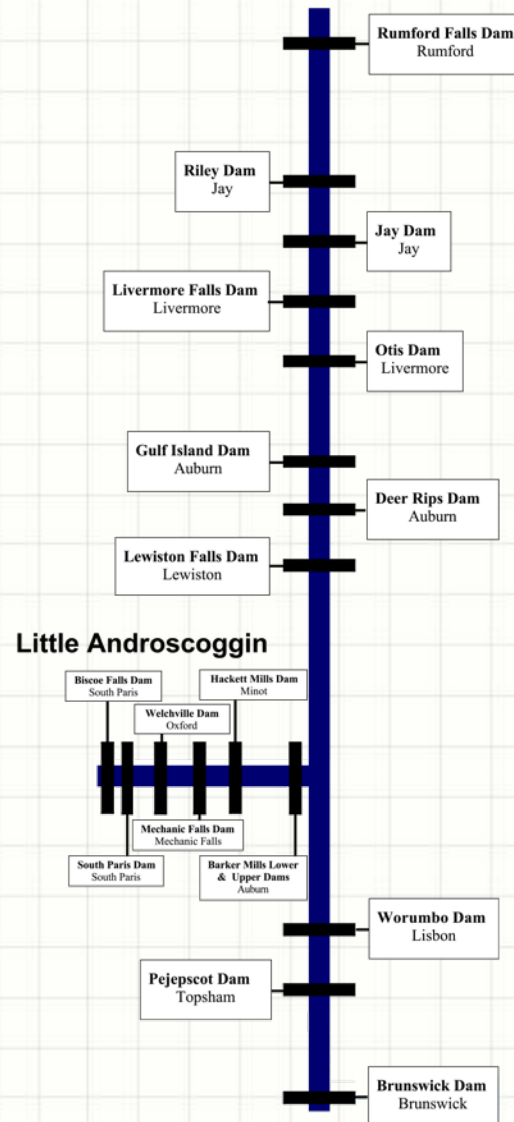


Table 3. Alewife production potential for historically accessible spawning habitat within the Androscoggin River watershed.

| Reach | Surface acres | Alewife production at 235/acre |
|------------------------------|---------------|--------------------------------|
| Sabattus Pond | 1,787 | 419,945 |
| Little Sabattus Pond | 25 | 5,875 |
| Sabattus River | 110 | 25,850 |
| Loon Pond | 70 | 16,450 |
| Sutherland Pond | 53 | 12,455 |
| No Name Pond | 123 | 28,905 |
| Sabattus subtotal | 2,168 | 509,480 |
| Taylor Pond | 625 | 146,875 |
| Marshall Pond | 102 | 23,970 |
| Lower Range Pond | 290 | 68,150 |
| Worthley Pond | 42 | 9,870 |
| Middle Range Pond | 366 | 86,010 |
| Upper Range Pond | 391 | 91,885 |
| Hogan Pond | 177 | 41,595 |
| Whitney Pond | 170 | 39,950 |
| Tripp Pond | 768 | 180,480 |
| Thompson Lake | 4,426 | 1,040,110 |
| Little Androscoggin subtotal | 7,357 | 1,728,895 |

Table 3. Alewife production potential for historically accessible spawning habitat within the Androscoggin River watershed. Continued...

| Reach | Surface acres | Alewife production at 235/acre |
|----------------------------|------------------|--------------------------------------|
| Brunswick impoundment | 313 | 73,626 |
| Pejepscot impoundment | 213 | 50,035 |
| Worumbo impoundment | 1,124 | 264,209 |
| Lower Barker impoundment | 11 | 2,672 |
| Upper Barker impoundment | 142 | 33,270 |
| Hackett's Mill impoundment | 93 | 21,955 |
| Marcacal impoundment | 95 | 22,303 |
| Impoundment subtotal | 1,992 | 468,070 |
| Lake/pond total | 9,525 | 2,238,375 |
| Watershed total | 11,517 | 2,706,445 |

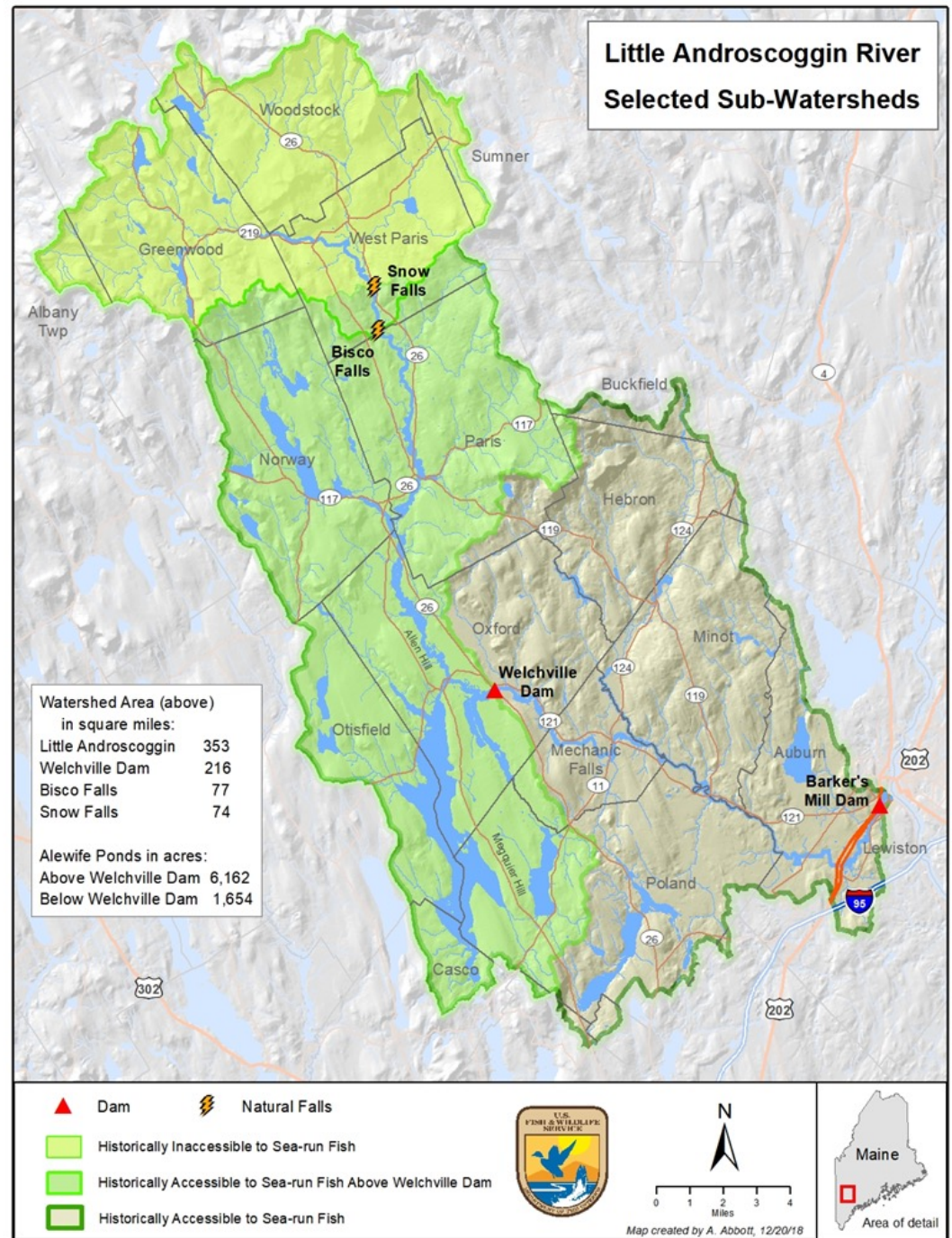
2021 Returns

| River | Trap Location | Am.Shad | At.Salmon (MSW) | At.Salmon (grilse) | River Herring | Striped Bass | Sea Lamprey |
|--------------|---------------------------------|---------|-----------------|--------------------|---------------|--------------|-------------|
| Androscoggin | Brunswick | 550 | 1 | 3 | 54906 | 2 | 345 |
| Aroostook | Tinker Dam | NC | 1 | 0 | NC | NC | NC |
| Kennebec | Benton Falls | 7 | 0 | 0 | 3537557 | 2 | 17 |
| Kennebec | Lockwood Dam | 92 | 15 | 8 | 66009 | 64 | 18 |
| Narraguagus | Cherryfield | 508 | 16 | 5 | NC | 0 | 0 |
| Penobscot | Milford fish lift | 11581 | 577 | | 1731496 | 54 | 5776 |
| Penobscot | Orono | 2 | 8 | 0 | 221657 | 0 | 793 |
| Penobscot | Weldon Dam | NC | NC | NC | NC | NC | NC |
| Saco | Cataract (East + West Channels) | 2582 | 0 | 0 | 135198 | 76 | 0 |
| Saco | Skelton | 130 | 0 | 0 | 118566 | 0 | 0 |
| St. Croix | Milltown Dam | 40 | 0 | 0 | 549847 | 0 | 1 |
| Union | Ellsworth | 2 | 0 | 0 | 768015 | 0 | 0 |

Historical Brunswick Returns

| River | | Atlantic Salmon | American Shad | River Herring |
|--------------------|---------------|-----------------|---------------|---------------|
| Androscoggin River | Brunswick Dam | | | |
| | 2010 | 9 | 22 | 39,689 |
| | 2011 | 44 | 0 | 54,886 |
| | 2012 | 0 | 0 | 170,191 |
| | 2013 | 2 | 16 | 69,104 |
| | 2014 | 3 | 0 | 55,678 |
| | 2015 | 1 | 53 | 71,887 |
| | 2016 | 6 | 1,096 | 114,874 |
| | 2017 | 0 | 1 | 49,923 |
| | 2018 | 1 | 32 | 179,040 |
| | 2019 | 1 | 63 | 81,025 |
| | 2020 | 5 | 23 | 67 |

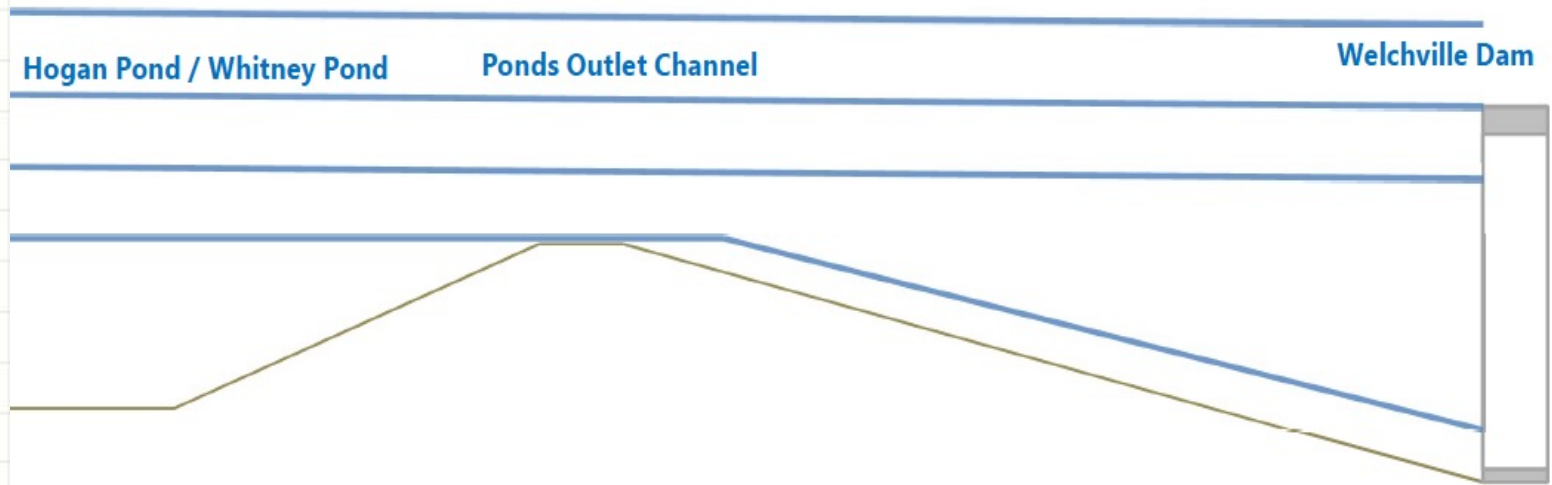
What's Above the Welchville Dam



Welchville Waterlevel Study

- RFP Specified:
 - Open the floodgate of the Welchville Dam early this year (after Labor Day). Normally, it is opened before freezing temperatures
 - Install five surveyed, water level loggers at the following locations to measure water levels
 - Record water level data every 15 minutes and download data every two weeks until threat of ice over requires logger removal
 - Analyze data to determine the potential effects on infrastructure including: bridges, wells, docks, and properties on Hogan and Whitney Ponds
- Town awarded contract to VHB Engineering
- Study commenced September 19 and ran through late October

Water Level Results – Simplified Diagram



Water Level Study – Conclusions

- Gates open: Greater fluctuation in Little Androscoggin River water levels
- Pond levels controlled by outlet channel
 - Little Androscoggin River drop ~2.7 feet at dam
 - Upstream River levels follow levels at dam
 - Hogan Pond: drop ~1.1 feet lower than normal low dam range
 - Whitney Pond: drop ~0.6 foot lower than normal low dam range
- Ponds impacted by river only during larger flood events
- Opening dam gates not a full simulation of dam removal