



Friends of Merrymeeting Bay (FOMB) is a 501(c)(3) non-profit organization. Our mission is to preserve, protect, and improve the unique ecosystems of the Bay through:

## Education

## Conservation & Stewardship

## Research & Advocacy

## Member Events

Support comes from members' tax-deductible donations and gifts.

Merrymeeting News is published seasonally and is sent to FOMB members and other friends of the Bay. Article hyperlinks and color images are available in our [online edition](http://www.fomb.org) at [www.fomb.org](http://www.fomb.org)

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## Hydroelectric dams are destroying the Gulf of Maine fishery

In a [June 10, 2012, Bangor Daily News \(BDN\) article](#), “Study finds potentially disastrous threat to single-celled plants that support all life on Earth,” the late BDN reporter Christopher Cousins asked if the reader is interested in the rapid disintegration of the marine ecosystem. Yes, Chris, and although over 6 years late you have my full attention.

Since he wrote this compelling article, we now are aware that the essential nutrient of the most important single-celled plants is dissolved silicate, and reservoir hydroelectric dams work to [extinguish the annual free transport of this nutrient](#) via the rivers into the ocean currents feeding the Gulf of Maine.

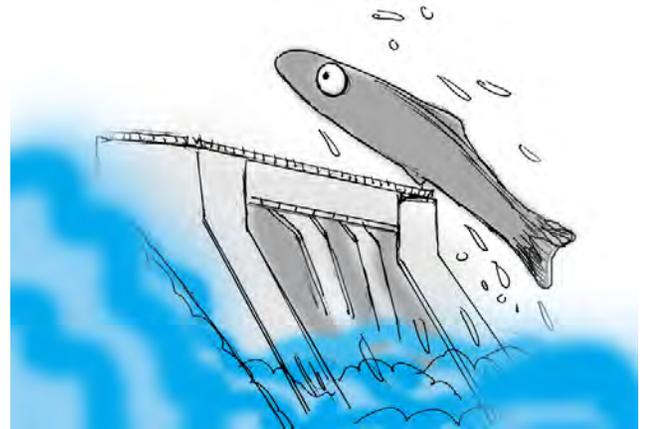
If we could magically engineer a tree that produces 10 times the oxygen of any existing equally sized tree on Earth, we would worship it. If we could engineer a tree that removes 40 percent of the carbon dioxide from the air and water and permanently buried its absorbed carbon in the depths of the soil, we would welcome it. With this special tree, we might have a fighting chance against accelerating global warming.

Here on Earth, there is a plant that is only 2 percent of the Earth's biomass but provides us with 20 percent of the oxygen we breathe. This plant removes a significant percentage of the [carbon dioxide from the ocean](#) and miraculously permanently sequesters the carbon it contains in the deep ocean sediments. This plant is the [diatom](#), a phytoplankton, and it is a miracle “tree.”

Tragically, we are destroying the diatom populations. Worldwide, diatoms, like other beneficial phytoplankton, are [disappearing](#) by about 1 percent per year. In the Gulf of Maine, phytoplankton, including diatoms, have [decreased](#) by a factor of five in just 17 years. Diatoms require adequate dissolved silicate to grow their heavy thick shells. Worldwide, the proliferation of tens of thousands of [mega dams](#) over the last 70 years is [preventing silica and other important nutrients from reaching the oceans](#).

Ground zero for the impacts of dams is the relatively enclosed Gulf of Maine. This area of the earth was the finest fishery because of its huge watershed delivering copious amounts of dissolved silicate annually to the gulf. The rivers of New England, the Canadian Maritime Provinces, Quebec, and Ontario all delivered nutrients like no other place on Earth. The St. Lawrence River, by discharge volume, is the [second largest river](#) in North America. Nothing is more important to estuaries and coastal water ecosystems than the seasonal timing and volumes of freshwater flow.

Now, the regulation of river flow in the US and Canada has moved to follow a highly



Credit: George Danby-BDN

*Continued on next page*

*Hydro electric dams, continued from page 1*

unnatural policy of diminishing, if not eliminating, the nutrient-delivering spring freshet, and maintaining low flows from spring through the fall, while reservoir storage dams release high flows in the winter when flows were naturally at their lowest. In Canada, the size and numbers of dams and reservoirs are staggering.

Around the world and in Canada [more hydro dam projects are planned](#). Not only do these dams change nutrient delivery in northern seas but they release vast quantities of warm reservoir water in the winter and eliminate the natural cold spring freshet waters. It is not surprising the Gulf of Maine is warming faster than any other ocean body. The numbers and sizes of the diatoms have been reduced as more and more reservoir dams have been discharging silica-depleted water into the ocean currents that feed it. Unnatural freshwater flow regulation is a climate and marine ecological train wreck for the microscopic diatom to the noble right whale. Dams have weakened the natural function of diatoms to feed bountiful fisheries and reduce carbon dioxide levels.

We will not forget Chris Cousins' 2012 article, and we will continue to sound this alarm.

*Roger Wheeler, president, Friends of Sebago Lake*

*This op-ed was originally published in the Bangor Daily News on January 8, 2019.*

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## *Gateway - Merrymeeting Bay 2021*

### *Notes from the Field*

River herring (alewives and blueback herring) showed up early this year. They entered the mouth of the Kennebec River, cycling back and forth on the tide until the light grew long and waters warmed. Then they ratcheted their way upstream. With each successive tide, climbing higher in the system as spring advanced, through the Chops into Merrymeeting Bay, up the Androscoggin, the Eastern, and the main stem. As the spring freshet flows ebbed, the waters warmed more rapidly, and fish pushed harder to make it to their spawning grounds in time. Rivers, ponds, lakes, and streams are all connected, critical to a healthy run of our native diadromous species.

On April 13, river herring were detected below Box Mill fishway on Outlet Stream, draining China Lake in Vassalboro, Maine. The previous week, they were detected in Dresden on the Eastern River. Water temps were high and flows were abnormally low throughout the basin. Things were happening fast. The run at Benton Falls (seven miles upstream from Winslow) on the Sebasticook roared to life in late April. We scrambled to keep up with all the studies and field work: A fish count at the new Togus Pond fishway, fish counts at Benton Falls, fish counts at Brunswick, stocking trucks readied, river herring stocking out of both Brunswick and Lockwood, fish counts at Webber Pond and counts at Three Mile Pond. Atlantic Salmon smolt traps were installed on the lower Sandy River in Farmington. In short, we could barely keep up, and I know I've missed a few things. Clearly there is no good substitute for a river unimpaired by dams but we try our best with what we have.



**Sebasticook River**  
**Photo: Point of View Helicopter Services**

We began to hear reports from south of Maine that those river herring runs were poor in 2021. From the Carolinas on up through Connecticut, Rhode Island, Massachusetts, and New Hampshire river herring numbers were down. There is a lot of speculation as to why runs south of us were down. Theories ran the usual gamut from over fishing and habitat loss to drought conditions throughout the mid-Atlantic states. We just don't know, but we're watching closely. Most of us think it is a combination, with habitat loss being the biggest contributor.

Even before this spring, river herring numbers were at a mere 5 percent of their historical highs. Ninety-five percent of the species were extirpated across their historical range. In Maine we've come a long way in our restoration efforts.

*Continued on next page*

*Gateway - Merrymeeting Bay, continued from page 2*

Although we have the largest extant runs remaining, there is still much to do. But we know what to do and how to do it. In theory, restoration is a simple act. In practice, river and fish restoration is very complex. Most projects take years to accomplish. Many partners are required: Federal agencies, state agencies, non-governmental organizations, corporations, communities, municipalities, biologists, engineers, grant writers, lake or pond associations, businesses, surveyors, citizens, and volunteers.

The run on Outlet Stream in Vassalboro is still under restoration. Each spring we stock China Lake with up to 25,000 adult prespaw river herring. The restoration on Outlet Stream is nearing completion with three technical fish passages installed (at Box Mill dam, Ladd dam, Outlet dam [underway]) and three dam removals. We removed Masse dam, Lombard dam, and lastly Morneau (underway). A total of six projects implemented over seven years. China Lake is big. At 4,000 acres we anticipate an annual run somewhere around the million mark. Marine Resources partnered with Maine Rivers, U.S. Fish and Wildlife Service (USFWS), Kennebec Water District, United States Department of Agriculture Natural Resources Conservation Service (USDA/NRCS), Patagonia, China Regional Lakes Alliance (CRLA), the Sebasticook Regional Land Trust (SRLT), the China Lake Association, the towns of Vassalboro and China, multiple private foundations, and multiple private individual land owners. As the lowest tributary to the Sebasticook River, Outlet Stream will add upwards of 30 percent to the total run on the Sebasticook. This year the minimum herring escapement at Benton Falls was 3.5 million. Getting 4,000 acres of historical spawning habitat online after 264 years is a rare bird.

All these fish pass through Merrymeeting Bay. Millions in the spring, millions in the summer, and in the fall a hundred million juvenile river herring cycle into and out of Merrymeeting Bay. On the way, the millions upon millions of herring will feed cormorants, heron, osprey, eagle, king fisher, merganser, seals, mink, stripers, and eels. Between Benton Falls and Outlet dam in mid-May I saw an oak tree filled with 38 bald eagles. All sated. All sleepy. None eager to leave. Beneath the eagles, Outlet Stream thronged with river herring. Best guess: 180,000 river herring. Those eagles would not leave until the river herring were gone.

On June 2, a FOMB helicopter flush count of aggregated eagles on the lower Sebasticook and Outlet Stream counted 328 birds. When a healthy and plentiful sea-run supper is served, the bush telegraph lights up, and hungry customers come from miles and miles. This is what river restoration looks like.

A final (and fun) field observation. I have my hand dangling in a bucket of young American eels, all between 5 and 10 inches long, 3- to 5-year-olds. Just kids, really, in the lifespan of eels. There are 60 of them. I'm watching them recover from anesthesia. I hate doing it to them, but measuring them otherwise is about impossible. Once we measure them all to the nearest millimeter, they go into the recovery bucket. A small battery-powered bubbler keeps the few gallons of water well oxygenated. Recovery takes about half an hour. Once all the eels are measured, we get a weight for the batch and then an average weight. From that we can extrapolate how many eels we had in total. I relax my fingers an inch below the surface. An eel approaches and swims through my fingers, then another and another. Within a minute most of the eels are on my hand. Dozens of them. I slowly remove my hand and the eels drop off one by one. Placing my hand back in the bucket, the eels come back. I repeat the exercise a dozen times. Each time the eels seek out my hand and climb on. It's hard not to anthropomorphize the eels. What are they thinking? Their behavior is remarkable. Why do the eels climb onto my hand? I just messed with them pretty hard. I'm going to experiment with eels preanesthesia to see if those eels climb on my hand. My guess is they do. Eels, like humans, are curious.



**Chops passage, gateway to the middle Bay**  
**Photo: Jesse Miller, Point of View Helicopter Services**

*Nate Gray*

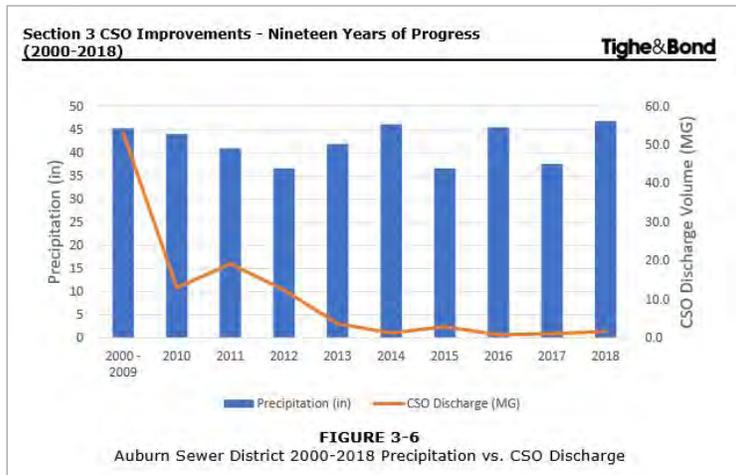
*(Nate, a long-time FOMB Board member, is a fisheries biologist with the Maine Department of Marine Resources)*

## Bugs!

For many years FOMB has been attempting to upgrade the water quality classification of the lower Androscoggin River. Our efforts are based on over 20 years of volunteer monitoring data collected under EPA and or DEP quality assurance plans. We upgrade to codify improved ambient river conditions because the Clean Water Act and state statute contain antidegradation language prohibiting backsliding without a major analysis and approval from EPA. In the case of the lower Androscoggin, actual conditions based on dissolved oxygen (DO) and *E. coli* bacteria have for years met Class B standards, but the river is still classified as Class C by the legislature, based on recommendations from the Maine Department of Environmental Protection (DEP).

The DO minimum for Class B is 7 parts per million (ppm) and for Class C, 5 ppm. What this means is that although the ambient DO conditions are 7 ppm or above, because the classification is lower, conditions could degrade substantially to 5 ppm and still meet the current classification. A similar situation exists for bacteria. Besides the numeric standards mentioned, DEP also considers aquatic life standards as indicated by benthic invertebrates, commonly referred to as “bugs.” Different invertebrates are typical of different water quality conditions, Class AA, A, B, or the lowest, C.

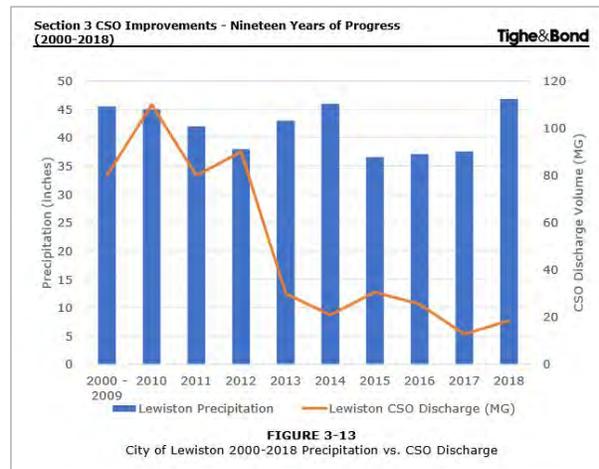
On this section of the Androscoggin, DEP last sampled for bugs in 2010, and since then Lewiston and Auburn have dramatically improved how they deal with Combined Sewage Overflows (CSO) or the extra untreated runoff occurring following rain events.



### Auburn CSO summary

In an effort to bolster our [current upgrade proposal](#) (third plus sign down on Cybrary Chemical page), submitted in conjunction with [Grow L+A](#) and with [broad support](#), FOMB has hired aquatic biologist Paul Leeper of Moody Mountain Environmental Services to conduct widespread invertebrate sampling over a more representative stretch of the river. Bug sampling is done by setting out replicate baskets—bags or cones filled with standardized amounts of stones—for 30-60 days depending on the site and then seeing which species of bugs colonize them.

In 2010, DEP deployed rock containers in the Brunswick and Pejepscot dam silty impoundments yielding Class C bugs and a sample below Pejepscot dam yielding Class B bugs. In 2018, Gomez & Sullivan Engineering [sampled below Pejepscot](#) as part of the upcoming dam relicensing and recovered Class A bugs from this site. Despite our request to DEP to retest its three sites this year in conjunction with the upgrade proposal, they initially refused and, only after repeated pressure, partially relented, agreeing to sample above and below Pejepscot dam.



### Lewiston CSO summary



**Rock bags and baskets**  
Photo: Ed Friedman

**Bugs! Continued from page 4**

FOMB did a site reconnaissance by helicopter on June 17 with Paul and ultimately decided to sample at six locations from not far below the I-95 crossing to halfway down the Brunswick impoundment, near our water quality site not far above I-295. Three of the sites are shallow and rock bags could be deployed by wading, and three were deeper sites that required SCUBA diving to properly align rock baskets and ascertain substrates. As usual, FOMB research is informing our advocacy. We deployed on August 4 and 5, and will retrieve bags and baskets in early September.

In theory, every three years the DEP solicits river classification proposals. They review these and make recommendations to their governing body, the Board of Environmental Protection (BEP). The BEP holds a public hearing and, in turn, makes recommendations (which nearly always echo those of the DEP) to the legislature, the only body that can classify water bodies. The BEP is holding their public hearing on October 7. **The BEP has a nondiscretionary duty to recommend an upgrade based on ambient water quality conditions.** So far, they never have. We will consider a legal challenge should this occur again. Comments should be addressed to Board Chair Mark Draper and can be submitted electronically to the DEP [linked here](#). We will send out an electronic alert with talking points.

Fifty years ago Maine Senator Ed Muskie introduced the Clean Water Act in large part because of the **horribly polluted Androscoggin River**. It is long past time to recognize how the river has improved and lock in those improvements.



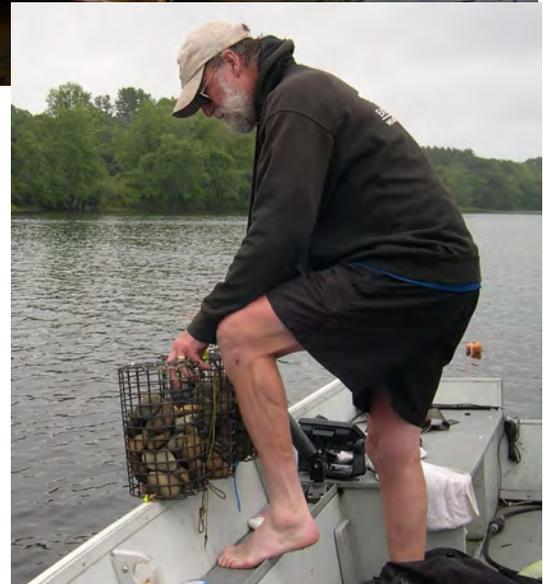
**Common stonefly  
(*Paragnetina immarginata*)  
Photo: Bob Henricks**



**Helicopter site reconnaissance.  
Photo: Point of View Helicopter Services**



**Above and right: Deploying and marking  
rock bags at shallow and deep sites  
Photos: Ed Friedman**



**Left: Deeper sites required  
SCUBA diving.  
Photos: Ed Friedman**

## Androscoggin Shad Passage

The Androscoggin River contains 100.5 river kilometers of potential American shad habitat. Of this, 48.3 river kilometers are accessible (though accessibility to habitat above dams with fish passage is limited), while the remaining habitat is inaccessible due to obstructed fish passage.



Brookfield's 18" downstream fish passage pipe adjacent to several turbines.  
Photo: Ed Friedman

first vertical slot fishways designed to pass American shad on the east coast, and was a scaled-down version of a fishway located on the Columbia River. Redevelopment of the Brunswick Project and construction of the fishway was completed in 1983.

The completed fishway was 570 feet long, and consisted of 42 individual pools with a one-foot drop between each.

Downstream passage consisted of a 12-inch (now 18-inch) pipe located between two turbine intakes. When the Federal Energy Regulatory Commission issued a license for the Brunswick Project in 1979, it did not require efficiency studies for the upstream and downstream passage facilities. (From: [Maine Department of Marine Resources American Shad Habitat Plan, 1983.](#)) Unfortunately, after USFWS approval of Brunswick's upstream fishway design, Central Maine Power, dam owner at the time, shifted positioning of the turbines so turbines #1 and #2 bracket the fishway entrance. There were no subsequent design revisions and a major problem with the site is that attraction flows for the fishway entrance are obscured by flows from Turbine #1 confusing the already skittish shad.

With Brunswick due for relicensing in 2029 our goal is to document the thousands of shad below the dam unable to go further in any significant numbers and to use this information in the relicensing proceeding to support improved passage or dam removal. This year's effort (tentatively counting over 3,000 fish) builds on earlier work by John Lichter and his Bowdoin students who pioneered use of the Arris sonar video unit for counting and identifying fish at this site.

Thanks to Dave Mention for use of his skiff!

While passage above the Brunswick Dam is considered possible because the vertical-slot fishway allows some shad passage, actual passage by American shad has been documented to be very low, and the majority of habitat use has been documented in the small portion of river below the dam.

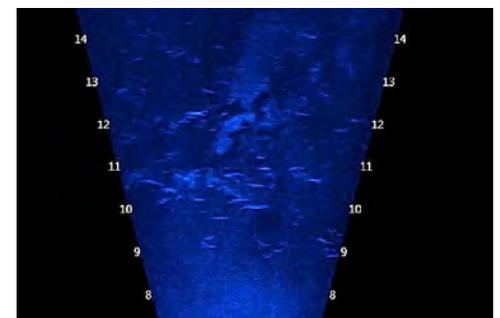
American shad historically spawned in the Androscoggin River from Merrymeeting Bay to Lewiston Falls, and in the Little Androscoggin River from its confluence with the Androscoggin to Biscoe Falls. However, construction in 1807 of a low-head dam at the head-of-tide on the Androscoggin River caused the abundant American shad run to decline sharply.

In 1980 the U.S. Fish and Wildlife Service developed conceptual drawings for a vertical slot fishway for the Brunswick Project, which is located at the head-of-tide on the river. The fishway was designed to pass 85,000 American shad and 1,000,000 alewives annually.

The upstream passage facility was one of the



Above: Shad computer in anti-glare box  
Below: Sonar video of shad moving by  
Photo: Ed Friedman



## Education Update

You may have noticed FOMB did not run our usual Summer Outside Series this year. We did not want to put anyone in harm's way with COVID. Fortunately, our members have many recreational land- and water-based opportunities easily available in the area. On our website's home page in the right column under Education you can find [A Self-Guided Nature Tour of Merrymeeting Bay](#) by member Terry Porter, completed as part of her Maine Master Naturalist program, and in the Education section you can view and download [Fifty Environmental Activities Kids Can Do at Home](#).

FOMB was awarded a grant from the New England Foundation for the Arts to host several showings (in person and virtual) of the Theater's production [To Bee or Not To Bee](#) this fall in area schools and as a Speaker Series event. Our [Speaker Series](#) will continue into its 25th year on October 13th with a presentation by Roger Wheeler on the widespread, deeply important effects of [megadams](#). Watch your mailbox for a postcard with the entire Speaker Series, which again will be presented via Zoom.

## CMP Tower Lawsuit Update

Maine Business Court Justice Murphy ruled in favor of CMP's motion to dismiss our nuisance suit based on federal preemption. We don't believe an FAA lighting recommendation can preempt state law and so appealed the decision to the Maine Supreme Judicial Court. In fact the FAA used the excuse that these guidelines were only recommendations to avoid any environmental review! The case has been [fully briefed](#) and oral arguments will be heard in early October.



# WE NEED YOU! PLEASE SUPPORT OUR IMPORTANT WORK

### FOMB Leadership

Our accomplishments are due to the hard work of dedicated volunteers, especially those who serve on our committees. If you want to get involved and serve, please contact the committee chair or Ed Friedman. We always welcome member input and we'd love for you to join us!

#### Steering Committee

Ed Friedman, Chair (Bowdoinham)  
 Vance Stephenson, Treasurer (Kettering, OH)  
 Tom Walling, Secretary (Bowdoinham)  
 Simon Beirne (Gardiner)  
 Becky Bowes (Brunswick)  
 Phil Brzozowski (Brunswick)  
 Nate Gray (Vassalboro)

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 Tom Walling, Co-Chair, 666-5837

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**Membership and Fundraising Committee**  
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#### Membership Levels

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| <input type="checkbox"/> \$1,000+ Sturgeon  | <input type="checkbox"/> \$250 Striped Bass | <input type="checkbox"/> \$20 Smelt |
| <input type="checkbox"/> \$750 American Eel | <input type="checkbox"/> \$100 Shad         | <input type="checkbox"/> Other      |
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\$7 Enclosed (optional) for a copy of Conservation Options: A Guide for Maine Land Owners [\$5 for book, \$2 for postage].



Thanks to Rebecca Bowes for newsletter layout.



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## *Counting Shad*



**Left: Looking for shad at the base of the Brunswick dam**

**Photo: John Lichter**

**Above: John Lichter monitors shad**

**Photo: Ed Friedman**

