



The Newsletter of Friends of Merrymeeting Bay • PO Box 233 • Richmond Maine 04357 • 207-666-1118 • [www.fomb.org](http://www.fomb.org)

Friends of Merrymeeting Bay (FOMB) is a 501(c)(3) nonprofit 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)

For more information, contact:

Ed Friedman  
Chair  
207-666-3372  
[edfomb@comcast.net](mailto:edfomb@comcast.net)



## Once in a Lifetime

Cobbosseecontee Stream is a special place to me. I've wiled away many days along its banks in Gardiner, Maine. I first got to know the stream in the summer of 1981. I was living in Farmingdale on Sheldon Street with my father. He worked in Gardiner a mile down the road. I could walk down the railroad tracks and have lunch with him at work. The railroad tracks ran right along the Kennebec down to Gardiner where there was a small trestle spanning Cobbosseecontee Stream. I would stop on that train trestle and stare into the water as it rushed below.

Early in the summer, alewives and blueback herring would ascend Cobbossee. Folks would fish for them with dip-nets under the route 201 bridge and toss the fish into trash barrels. Most were sold as lobster bait. Once my father and I got some alewives to eat the roe. My father rolled the egg skeins in egg and corn meal and then fried them in bacon fat. They were not bad. Especially the bacon. Pair the fried eggs with a mess of fiddle heads and that made for some pretty good eating.

I once asked what Cobbosseecontee meant. My father told me it was the Indian name for the stream, but he didn't know what the word meant. Eleven years later I went to work for the Maine Department of Marine Resources. I've been with the department for the past 30 plus years and have had the pleasure of getting to know this stream ever more intimately. The translation of "Cobbosseecontee" is "The place where sturgeon are found" or "Place of many sturgeon."

We have two kinds of sturgeon in Maine: the Atlantic sturgeon and the shortnose sturgeon. What kind of sturgeon use Cobbosseecontee?

In 40 years of frequenting the stream I'd only ever seen a sturgeon once. I can't tell you what species. The tide was in and the stream was deep. I caught the briefest glimpse from the train trestle. I know it was a sturgeon—I've seen and worked with lots of them. But only that one time. I think it was my first year with the Department.

This spring was a remarkable one. We had rain. Lots of rain. Seemed it rained every week off and on. As the river herring season waned, the rains kept on coming. Cobbossee Stream was as high as I'd ever seen it for late June. Another Department employee was down fishing in Cobbossee for striped bass who come in on high tides to hunt their



Watching sturgeon from the route 201 bridge.  
Photo: Nate Gray

*Continued on next page*

***Androscoggin River Appeal Victory! continued from page 1***

favorite supper; blueback herring. While fishing he noticed some people on the route 201 bridge pointing at something in the stream. Curious, he looked where they were looking and noticed some enormous fish along the bank. He sought the elevation of the bridge for a better vantage point. Once there he saw the massive fish were sturgeon. Atlantic sturgeon, without a doubt. And there were many.

I had a meeting further up Cobbossee two days later. The meeting didn't start until 4:30, so I picked my two boys up from day care and headed for Cobbossee to see if the sturgeon were still there. The crowds of people present when we arrived were a dead giveaway. We joined a throng of 50 people all gasping and staring in disbelief at the stream below. My two sons and I gasped in astonishment, as well. Below were dozens of sturgeon—huge fish, all at least 6 feet long and several well over 7 feet and a few better than 8 feet. I immediately thought of all the time my father and I spent stream fishing. We saw a lot of fish but never an 8-foot-long, 250-million-year-old species with bony armor and a scythe tail. They can grow to more than 14 feet in length, and they don't grow fast. The water in the stream was no more than 5 feet deep. I was speechless. My boys just stared as the huge fish jockeyed for position in the current. It was amazing and, so far, a once in a lifetime event, for me at least.

Time was up; the boys and I rushed to the meeting. As we drove, I told them about sturgeon. They had lots of questions. The best one was “Why are the sturgeon in the stream”? That was a really good question. So why were they there?



**Sturgeon on camera.**  
**Photo: Nate Gray**

and stuffed the whole thing in the stream. It was all I could do to hold onto the handle. Flows were just north of 1,000 cubic feet per second. Velocities were very high. Yet here were the sturgeon effortlessly coasting in the current. Groups of them, singles, doubles, and then another group of eight or ten, only a couple of feet from the bank. Again and again, I put the Go-Pro in. I'd film for as long as I could hold the handle steady and then take a break. I had no idea what I was capturing for footage in the water. I had to check what I had for film by using a Go-Pro application on my smart phone. I filmed for more than an hour.

Late that evening, after the boys were in bed, I reviewed the footage. I had 24 “episodes” on film. I watched each one carefully. On the last film clip, I saw it. I had the answer for my boys. There, plain as day, were several massive Atlantic sturgeon spawning! They were there spawning! Making more sturgeon. The literature tells us that sturgeon can be “skip” spawners. They'll go to the spot where they were born and, if conditions are not optimal, they won't spawn. They'll absorb their eggs and come back another year to spawn, usually every 3 years or so. I can tell you that its been significantly longer than 3 years since the stream welcomed its name sake species. Maybe the literature meant to say every 40 years. I hope to see them in the stream again. And I am sure my boys will never forget those fish and maybe, just maybe, 40 years from now they will take their children to “The place where sturgeon are found.”

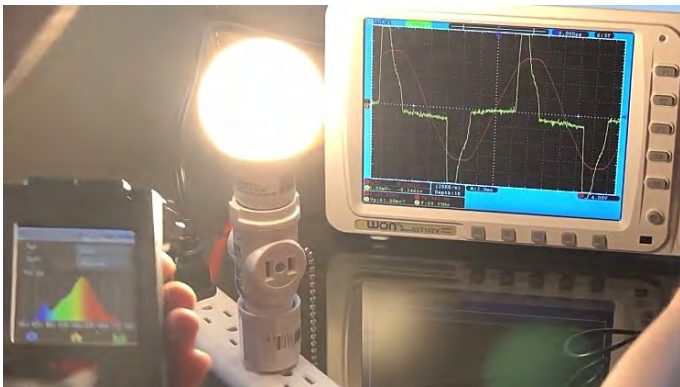
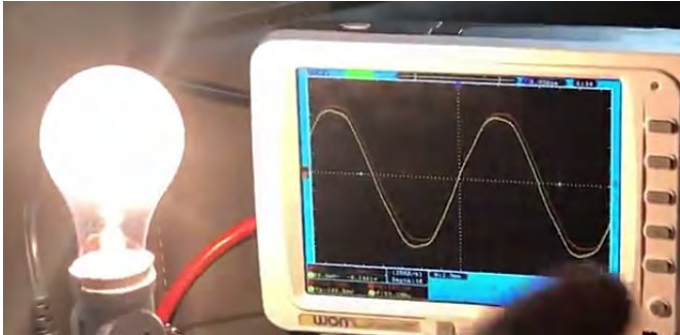
The meeting was tense but uneventful. I told the attendees to head downstream and see those sturgeon before they left. I packed up the boys and we headed home. The crowd of people had grown as we crossed the route 201 bridge. Many folks were scattered along the banks all the way to the mouth at the Kennebec. As soon as I was home, I got out the Go-Pro camera and its waterproof housing. I had a plan.

The next morning after ensuring the camera was working properly, I grabbed the roof rake handle extensions and a roll of Gorilla tape. I drove down to Cobbossee and, sure enough, a huge crowd of people were all along and above the stream. I put all the roof rake handles together, taped the Go-Pro to the end,

## The LED Hype

On July 29, 2005, the Senate passed the Energy Policy Act,<sup>1</sup> and the bill was signed into law on August 8, 2005. Buried on page 266 of the 551-page bill is Section 912 – Next Generation Lighting Initiative, in which members of Congress directed the Department of Energy (DOE) to research and attempt to develop a replacement for the incandescent light bulb using new solid-state technology.<sup>2</sup>

Only 2 years later, Congress passed the Energy Independence and Security Act of 2007, formally declaring, but not defining, the existence of the General Service Light-Emitting Diode Lamp (LED), and directed the DOE to determine if luminous efficacy standards should be increased for General Service Lamps.<sup>3</sup> The law states that, if the DOE didn't approve luminous efficacy rules, then, as of January 21, 2020, a minimum luminous efficacy of 45 lumens per watt would be mandated.



**Incandescent bulbs do not affect the normal and clean AC electricity power quality sine wave form. The LED bulb distorts it, reducing power quality (dirty electricity).**

**Images: Matt Landman**

terbium, and yttrium are used in LED semiconductor technology. Most of the world's supply of these materials is produced as byproducts from the production of aluminum, copper, gold, lead, silver, and zinc, all of which also end up in LEDs. Approximately 75% of rare earths required for LED production come from Asia and 60% from China.<sup>4</sup> Most LED production facilities are located in Asia. According to Lim, et al.<sup>5</sup>, comparing the bulbs on an equivalent quantity basis with respect to the expected lifetimes of the bulbs, LEDs have 200–300% higher resource depletion and toxicity potential impacts than incandescent bulbs.

In the state of euphoria caused by the promise of using LED technology, federal agencies skipped many procedural steps. Not a single person in the federal government made Congress aware that LEDs emit electromagnetic radiation in the visible part of the spectrum and that the Food and Drug Administration is mandated to regulate this radiation to protect public health. Despite this mandate, the FDA has failed to research, vet, approve or publish performance

What members of Congress still do not understand is that by declaring, without defining, the General Service Light-Emitting Diode Lamp, they were doing something horrible and unexpected. An LED does not produce a light equivalent to that of the incandescent light bulb. LEDs use a flat surface to generate light in a directed beam with entirely different physics than traditional light sources. The goal of the 2005 Energy Policy Act was to have the DOE research a solid-state equivalent to the incandescent light bulb, but the DOE was not successful. The LED light is not the same as incandescent light. Even though the DOE had not met Congress' original goal, by 2007 everyone had become so excited about the possibility of creating a significantly more energy-efficient light bulb that Congress directed the DOE to proceed, without waiting for the results of the research that was initiated in 2007.

There are now billions of these LED emitters in our environment, and yet none of these devices has been vetted or approved to ensure the comfort, health, and safety of the public. Despite this lack of vetting, the DOE implemented the 45 Lumen Per Watt Rule, and on August 1, 2023, began full enforcement, effectively banning the sale of the incandescent light bulb.

Elements such as arsenic, gallium, indium, and the rare-earth elements (REEs) cerium, europium, gadolinium, lanthanum,

1 [https://www.senate.gov/legislative/LIS/roll\\_call\\_votes/vote1091/vote\\_109\\_1\\_00213.htm](https://www.senate.gov/legislative/LIS/roll_call_votes/vote1091/vote_109_1_00213.htm)

2 <https://www.congress.gov/109/plaws/publ58/PLAW-109publ58.pdf>

3 <https://www.govinfo.gov/content/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf>

4 <https://natural-resources.canada.ca/our-natural-resources/minerals-mining/minerals-metals-facts/rare-earth-elements-facts/20522>

5 <https://pubs.acs.org/doi/abs/10.1021/es302886m>

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Photo: Logan Route



Photo: Lauren diBiccari



Photo: Logan Route



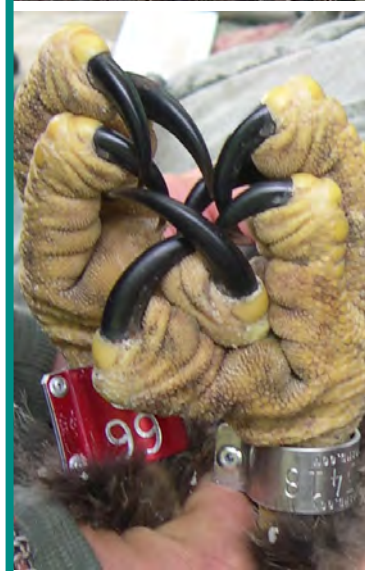
## *What's Up with the Eaglets?*

During the summer of 2023, Friends of Merrymeeting Bay (FOMB) helped researchers at the Biodiversity Research Institute (BRI) include the Bay in a pilot effort to investigate patterns of environmental contaminants in Maine and New Hampshire using bald eagle nestlings. BRI has been studying patterns of environmental contaminants and risk in Maine and worldwide using bioindicator species such as common loons, bald eagles and many others for decades. FOMB worked with us years ago investigating mercury levels in kingfishers.

FOMB supported this current effort by sharing their ongoing helicopter survey data for eagle nests in the Bay region, obtaining landowner permission for accessing a subset of target nests, and by supporting field crews on visits to bald eagle nests. BRI crews climbed to bald eagle nests and lowered nestlings to the ground where a skilled ground crew banded and measured chicks and collected biological samples (blood and feathers). Birds were immediately returned to nests after the work was completed. It's important to note that over many years and many hundreds of sampling events we have never seen

*Continued on next page*





***What's Up with the Eaglets? continued from page 4***

any ill effects on nestlings or parents from our briefly lowering, handling, and working up the chicks. BRI researchers are particularly interested in analyzing for “forever chemicals,” or PFAS (per-and polyfluoroalkyl substances), in samples collected. Samples will also be analyzed for mercury (Hg) and possibly other heavy metals and contaminants at the BRI Toxicology Laboratory in Portland. Additional samples were collected for analysis of highly pathogenic avian influenza (HPAI), as well as other diseases and parasites. Uniquely coded red bands placed on the legs of bald eagle nestlings are used to better understand the movements of the species throughout the region. More information on past studies of bald eagle movements, use of fish runs such as the Sebasticook (where FOMB aerial survey counts are yielding aggregations of over 300 bald eagles), mercury contamination, and other research can be found at <https://briwildlife.org/raptor-program/>. Bald eagle nestlings are one of the most widely used bioindicators of ecosystem contaminants. The species played a key role in the 1973 banning of DDT, a pesticide causing widespread environmental devastation and that precipitated catastrophic population declines in several top avian predators, including the bald eagle and peregrine falcon. BRI and FOMB plan to continue our cooperative efforts moving forward; expanding our knowledge of environmental contaminants and risk in the Merrymeeting Bay region and throughout Maine.

*Chris DeSorbo*

*Director-BRI Raptor Program; Senior Research Biologist*

Photos: Ed Friedman unless otherwise noted

Photo: Lauren diBiccari

# What's That Smell?

## Why Local Waters May Smell Like Rotten Eggs

As fall sets in and the leaves begin to change, so does the water chemistry in local lakes and reservoirs. Water and air get colder and sometimes smelly—and not only from [decaying fish carcasses](#). The foul, rotten-egg odor that many notice near lakes, reservoirs, and rivers during the fall is the result of a natural cycle of decay, a process dubbed “lake turnover.” In the summer, less dense warm water creates a surface layer referred to as the epilimnion. Cold water is dense and sinks to the bottom, forming a layer known as the hypolimnion. The thermocline, a thin transition layer of water, separates the epilimnion and hypolimnion and prevents the mixing of these two layers.

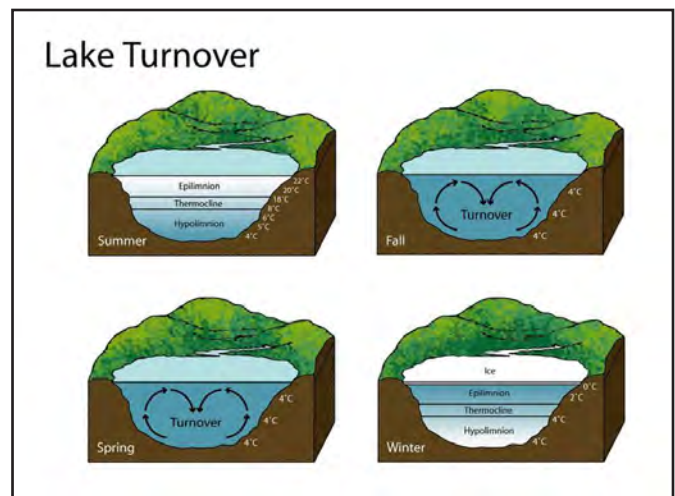
This process of [lake separation](#), known as stratification, typically only occurs in lakes greater than 20 feet deep and over the course of the summer months. In autumn, when cool weather lowers the temperature of the epilimnion, the thermocline begins to break down, and the epilimnion and the hypolimnion layers mix, a process that is often assisted by increasing winds and rain. In winter, the layers may separate again. In lakes where temperatures drop below freezing, the separation of layers is profound, with warmer water near the bottom and colder water on top.

Once the surface water temperature drops to 4°C, the temperature at which fresh water is most dense, the top layer sinks to the bottom of the lake. As water above this layer continues to cool, the lake may begin to freeze, leaving a remaining layer of ice on the surface, because ice is less dense than water. Lakes that rarely ever freeze over usually remain stratified most of the year and only experience turnover during the winter months.

The phenomenon of lake turnover is essential for aquatic life, as it replenishes oxygen and nutrients throughout a body of water, but how is it connected to that rotten egg smell? Throughout the year, dead plants and other natural materials accumulate in the deep parts of a lake, where they decompose with assistance from bacteria that thrive in low-oxygen environments. As the bacteria break down these natural compounds, hydrogen sulfide gas (H<sub>2</sub>S) is released into the water. When the lake's layers mix, the formerly deep water that contains more of this gas is brought to the surface, allowing the hydrogen sulfide to be released into the atmosphere. The same principle is responsible for the odor that sometimes occurs just downstream of dams, where water from the bottom of the reservoir is released. However, this odor usually disappears as the water is filled with oxygen by river turbulence as it flows downstream.

Lake turnover can occasionally lead to [fish kills](#) due to low oxygen levels in the hypolimnion layer. This may occur when a sudden thunderstorm or high wind rapidly mixes lake water, bringing oxygen-depleted water from the bottom to the surface, where most aquatic life is found. However, fish and other aquatic wildlife are typically able to avoid low oxygen zones by finding [streams or springs](#) that feed into the lake or by moving to [shallow areas](#) where oxygen can dissolve easily. In extreme cases, however, lake turnover may happen too rapidly for fish to escape, especially in smaller lakes and ponds. In 2018, thousands of fish died in Lake Iroquois, a relatively small lake (less than one square mile in area) in central Illinois. The sudden deaths were likely due to a lake turnover event caused by an unexpected drop in temperature.

The odors that lake turnover often generates are not usually a cause for human health concerns. Hydrogen sulfide gas is quickly broken down in the environment and easily dispersed by wind. However, prolonged exposure can lead to [nausea, headache, and fatigue](#). Although the human body can quickly process hydrogen sulfide, it is not recommended to drink out of bodies of water that have a rotten egg odor due to the possible presence of harmful bacteria. So if you encounter a stinky lake this fall, just know that it's all part of nature's nutrient recycling system.



Seasonal lake mixing, turnover, and stratification  
Source: National Geographic Society.

*Credit: Fishbio 12/12/22 (slightly edited)*

<https://fishbio.com/whats-that-smell-why-local-waters-may-smell-like-rotten-eggs/>

*LED Hype, continued from page 3*

*Using complicated electronic circuits with toxic substances sourced from foreign lands to generate a low-quality, hazardous light is no way to solve our climate problems. Turning off incandescent light bulbs when not in use continues to be an efficient and legitimate way to reduce energy consumption.*

standards for any LED product. 21 U.S.C. 360ii also requires that the FDA liaise with all other federal agencies to publish performance standards for LED products. For example, the National Highway Traffic Safety Administration would publish regulations for LED headlights, and the DOE regulations for LED light bulbs. The Occupational Safety and Health Administration would publish standards to protect workers. Despite billions of LED emitters already placed into our environment, there have been no efforts to ensure that this radiation is safe for human health or the environment.

The switch to LED lighting has been as catastrophic as it was predictable. LED vehicle headlights cause eye pain and extreme glare. LED streetlights (and CMP tower lights) are causing individuals to suffer migraines and life-threatening seizures. LED office lights cause brain fog, preventing people from using their office. Light pollution has increased from a rate of 2% increase per year to 10% increase per year due to the use of LED lighting.

The Soft Lights Foundation is working to fix this tragic LED mistake. To learn more, visit [www.softlights.org](http://www.softlights.org).

*Mark Baker*

## 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!

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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.



Friends of Merrymeeting Bay  
P.O. Box 233  
Richmond, ME 04357

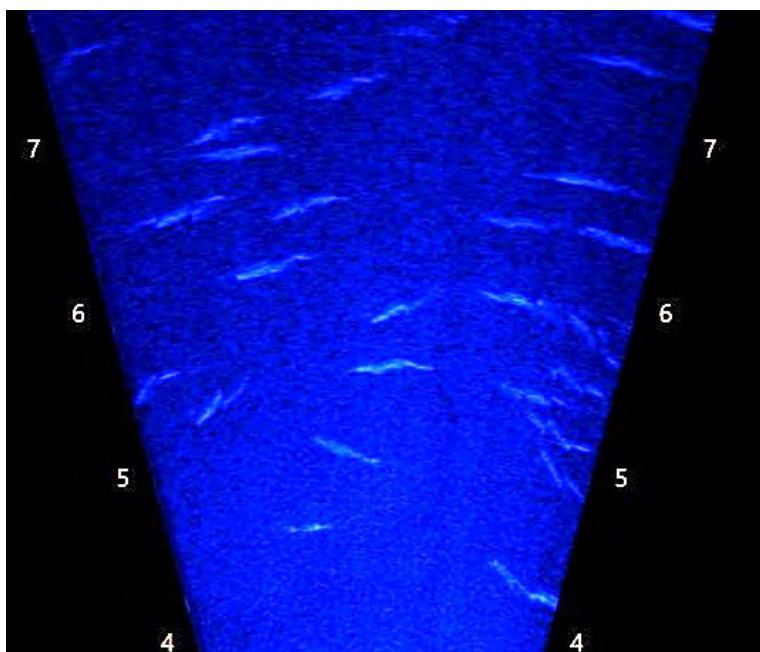
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Shad on ARIS sonar (L). Not a shad!!! (R).  
Photos: John Lichter

The ARIS sonar image of shad at left is a photograph of sound-wave reflections. The image quality of sound moving through water does not compare well with light moving through air. On one incoming tide below the Brunswick/Topsham Frank J. Wood Bridge, we counted 10,000–16,000 shad attempting to pass Brookfield's first dam on the Androscoggin River.

For the entire 2023 spring fish run, the ineffective dam fishway passed only 13 shad and only 70,000 alewives. In contrast, the tiny Damariscotta Mills fishway passes over 1 million alewives.

At right, sometimes we enlist sturgeon to help with aerial shad surveys.