



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 online at: [www.fomb.org](http://www.fomb.org)

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## Let There Be Dark

The FOMB Annual Meeting on January 8, 2020 featured an in-depth discussion of light pollution, a growing problem worldwide, in Maine and here on the Bay. The evening's presenter, Robert Burgess of Brunswick, is President of Southern Maine Astronomers, a NASA Solar System Ambassador, and a member of the Brunswick Planning Board, providing him with several vantage points from which to see and analyze this problem.

Burgess addressed the audience of about 30 saying "In a world full of problems this is not the biggest." However, he said "But unlike so many of the larger societal problems we face, this one can be addressed at the local level where we live and is one where each of us can have a positive impact on the natural world around us."

**Protecting the night sky starts with YOU!**

- 1 Light only what you need
- 2 Use energy efficient bulbs and only as bright as you need
- 3 Shield lights and direct them down
- 4 Only use light when you need it
- 5 Choose warm white light bulbs
- 6 Join IDA!  
We need your help to continue the fight against light pollution.  
**DARK SKY. ORG**

Light pollution is typically the result of "misdirected or misused light" generally caused by the improper use of outdoor lighting products and practices involving buildings, parking lots and streets.

Burgess identified many of the impacts light pollution is having on our world including effects on animal habitats and behaviors, disturbing predator/prey conditions and reproductive cycles. Sixty percent of animal life on Earth is nocturnal and this adaptation can be significantly disrupted: everything from migratory bird patterns (deaths from collisions with lit buildings and towers at night), to insects, amphibians, spawning fish and other mammals. Even the blooming of trees and plants can be affected when bombarded by light. We are at risk of destroying night ecosystems with obvious and sometimes not so obvious repercussions to the daylight half.

*Continued on page 2.*

Effects on human health have only recently been recognized in the disruption of our circadian rhythms, reducing the amount of melatonin produced in the brain at night that is essential for our immune system and exacerbated by the increase in “blue-rich” light consequent to the widespread adoption of LED (light emitting diode) lighting. Late night screen time plays a common role in this.

Glare attendant to the improper use of lights can be hazardous to drivers and pedestrians alike, and particularly affects older individuals because of conditions in the eye that develop with aging.

Another major consequence of light pollution is sky glow robbing us of our ability to see the night sky. Burgess noted that 80% of the world’s population live under some impact of sky glow, and that a vast majority of Americans can no longer see the Milky Way, only a few handful of stars and the occasional planet. Burgess said the loss of awe we used to experience under a dark sky extinguishes a cultural and spiritual connection humans have had with their environment for hundreds of thousands of years. He said the loss of this experience denies “the human soul the opportunity to recalibrate.” It is also affecting astronomical research as more and more sky glow creeps into previously dark locations of major observatories. So really, light pollution is psychologically, scientifically, physiologically and of course spatially, one of the world’s biggest problems.

Finally, Burgess reviewed our level of energy consumption. Following estimates of the International Dark Sky Association (IDA) that about 6% of national electricity consumption is for lighting, and 30% of that wasted through poorly aimed lights and over-use, IDA determined that we waste about \$3.3 billion dollars per year on electricity and unnecessarily inject an additional 21 million tons of CO2 into the atmosphere, contributing to global warming. Burgess says such use affects us as taxpayers, causing higher municipal street lighting costs, and as consumers, in higher business operating costs affecting pricing of goods and services.

***According to the International Dark-Sky Association, only 2 of every 10 people on earth can now see the Milky Way and 99% of the U.S .and Europe are considered light polluted. The much treasured plain old delight, inspiration and wondrous awe from star gazing are becoming things of the past.***

Burgess discussed the recent introduction of LED lights that had (and still has) the potential to reduce our energy use in lighting but cautioned about the “correlated color temperature” (CCT) of the lamps. He noted that lamps with too much blue in their spectrum, having CCTs in excess of 3,000 degrees Kelvin, are not recommended because of glare and light scattering effects, yet many businesses and municipalities are unwittingly installing these lamps with CCTs of 4,000 and 5,000 degree Kelvin ratings. Because LEDs are so efficient and durable, the bad decisions being made today will be with us for a generation (20 years) before the lamps will need to be replaced unless proper regulations are in place. It’s important to note many LEDs can be electrically polluting with radiofrequencies causing health or electrical interference issues and have different light distribution characteristics than other lighting. LEDs, can have flicker problems, different lumen outputs and color quality than incandescent bulbs so researching LED models is important when replacing older inefficient lighting

Movements are increasing in Maine and around the country to adopt dark sky-friendly lighting ordinances and to put limits on the correlated color temperature of LED installations. Brunswick is one municipality where the Planning Board is reviewing new standards. Challenges in the adoption of new ordinances include dealing with preexisting installations, and the question of how far we want to go in residential lighting regulation. Burgess noted sometimes this discussion can seem as academic “until it’s your neighbor’s light shining all night into your bedroom window.” The same applies to tower or other industrial lighting destroying local neighborhoods or viewsheds. No matter what local standards are adopted, Burgess stated a robust public education program will need to accompany it. He encouraged the audience to educate themselves about their communities’ lighting ordinances and become involved in changing them if deficient.

There are five simple principals that should guide each of us in our individual use of outdoor lighting: 1) light only what needs to be lit; 2) only when it’s needed; 3) no brighter than necessary; 4) with a lamp CCT of 3,000 degrees Kelvin or less; and with a fully-shielded cut off fixture that directs the light downward.

For more information please feel free to contact the author and speaker at: [rburgess250@comcast.net](mailto:rburgess250@comcast.net).

# 2019 Accomplishments and Preliminary Financials

## Media

- Print: (Over 12), Archaeology, Presumpscot River CWA, BIW, Habitat Assessment Project, Education, Speaker Series, the Bay, Outings, etc.

## Volunteers

- Approximately 3073 volunteer hours (384 days)
- 85 volunteers

## Membership

- 450 households
- Speaker Series – (308 people)
- Outside 2019 (Paddle Series, Walks, etc.) – 130 people.
- Newsletters – 3

## Grants

- \$5,000- Education
- \$3,000-Water Quality Monitoring
- \$25,000-Vegetation Mapping & Habitat Assessment

## Outreach Presentations

- Maine Maritime Museum Cruises (80 participants)

## Education

- One Bay Day (160 students, 3 different schools) (Spring Bay day weathered out)
- School Visits (312 students)
- Non-School Visits (450 people): library, summer series and science night
- Web site updates

## Conservation and Stewardship

- Additional easements in progress
- Continuous landowner outreach
- Ongoing stewardship activities
- Control one phragmites stand in Bowdoinham
- Monitor all easement & fee properties
- Initiate Centers Pt. protection/acquisition efforts

## Research

- Water Quality Monitoring – 17 sites
- Dresden Falls Archaeology Radiocarbon Dating
- 10-year Vegetation and Land Use Update Completed
- Compile Historic Altered River Flow Research

## Advocacy (postings, letters, testimony, etc.)

- Submit/ testify Lower Androscoggin Upgrade
- Lawsuit-GMO Atlantic salmon ongoing
- Healthy Rivers/Healthy Gulf promoting safe fish passage
- Smart Meters-On request: submit amicus brief for PA ratepayers with no opt outs
- Climate Change-Green New Deal
- Various National Efforts-National Environmental Policy Act, Ocean Plastics, ESA, etc.
- Posting Fish Consumption Advisories
- Presumpscot R. CWA-FERC & DEP Comments & Legal
- CMP Chops Tower Lighting
- Union River fish passage

## Primary Partners:

- The Archaeological Conservancy
- Kennebec Reborn
- Avian Haven
- Maine Coalition to Stop Smart Meters
- Quebec Labrador Foundation
- Maine Historic Preservation Commission
- Bowdoin College Environmental Studies
- Department of Inland Fisheries and Wildlife
- Maine Maritime Museum
- Department of Marine Resources
- Bowdoinham Public Library
- Maine Land Trust Network
- Friends of Sebago Lake
- Department of Environmental Protection
- Patagonia Outlet, Freeport
- Chop Point School
- Curtis Memorial Library
- Green Justice Legal
- Downeast Salmon Federation
- Earthjustice
- Center for Food Safety

## Abbreviated Financials

As usual, FOMB members get a huge bang for your financial support. Thanks in large part to active volunteer participation, cautious spending and excellence in leveraging external support, our administrative expenses remain low and accomplishments high. Technically, while we await year-end reporting from the Calvert Social Investment Fund where we have some assets invested, this report remains “preliminary” but we expect no substantive changes to our bottom line when that reporting is received. Thank you all for your continued support!

Respectfully submitted,

Vance Stephenson - Treasurer

Income \$98,600	Expenses \$69,300
Grants 33%	Programs 90%
Membership 21%	Administration 7%
Annual Appeal 15%	Membership & Fundraising 3%
Other 31%	

## *Released Back into the Environment: On the Road to a Blue Future*

Travelling to the Canadian Maritimes and to the nation's capital, interviewing directors of research institutes and retired scientists alike, or plunging into decades-old library archive records, these are just some of the many tasks I carried out in searching for a cohesive picture on the effects of hydropower damming...

But before we delve into this wonderful journey of an experience, a little about me: I graduated with a B.Sc. in Biology from McGill University in the summer of 2018 with a focus on ecology. It was during those years my curiosity to understand the interlinkage between different strata of the natural world blossomed. Throughout my degree and afterwards, as a research assistant, I studied how streams, rivers, and wetlands of Uganda were being affected by climate change. The numerous facets exhibited in these ecosystems that are responding to or will soon respond negatively to global changes are often cascading in nature and truly worrisome, to say the least. In the end, I needed more experience and I wanted that experience to come from a different world, one that I knew. I began perusing my online network looking for opportunities in Montreal that lined up with my interests: the changing landscape of water, climate change, and assessing environmental impacts. This led me to an internship hosted by the [Quebec-Labrador Foundation](#) that partnered with Friends of Merrymeeting Bay and [Friends of Sebago Lake](#) to research and compile information on the effects of unnatural freshwater flows.



*Photo: Hydro Quebec*

I began the internship going through records, documents, and files sent to me as background information. Two names were oft mentioned: Hans Neu and Michael A. Rozengurt. Both men were senior scientists who rallied against a blind eye often turned by government regulators and other scientists, to the negative effects of large hydropower reservoirs including the selective releasing of stored, stagnant water back into the environment. In the case of the former, Neu worked in Canadian federally funded research institutions since emigrating from Germany after World War II due to the rising political divide at home. Hans Neu, an oceanographer proved to be the more prolific of the two (Rozengurt emigrated from the U.S.S.R. to the U.S. as an expatriate fisheries biologist), and the

more outspoken. He would speak to the press, sometimes much to his detriment, and often felt muzzled by higher-ups. His story fascinated me; a man inside the highest-level research organizations who couldn't be less like the bureaucratic dogma perpetuated by these organizations—speaking out for the good of our environmental future. My way through to understanding hydropower became through Dr. Hans Neu, but both distinguished scientists were remarkably prescient on hydro's widespread ecological effects .

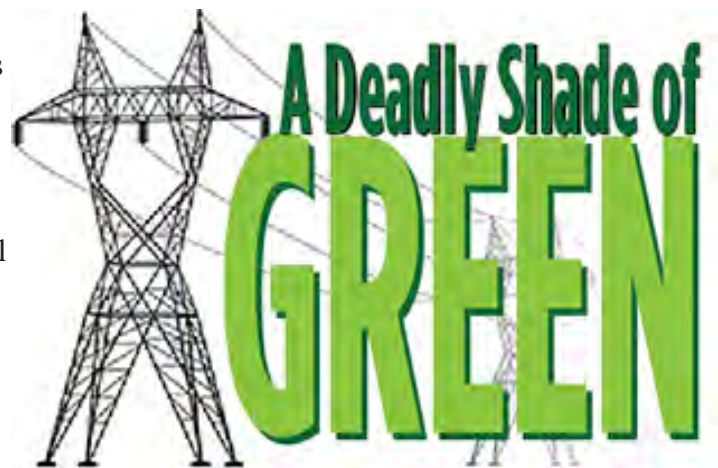
Both long since deceased, I tracked down former colleagues of Neu who reside in Nova Scotia and who might be able to speak to his character and work. Nova Scotia also hosts some of the most cutting-edge marine biology and oceanographic research in the world. I took advantage of this fact to interview anyone willing to speak with me in these fields. It would be in Nova Scotia I would learn about historical obstructions, such as how the oil and gas industry would fund environmental research, or now, having experiences relayed to me about what the cost of government administrations cutting critical scientific research does to generational morale (in part because of the research funding source shift from public to private). It was also there that I gathered a sentiment among researchers, industry professionals, and professors alike, (often funded by oil, gas and electrical interests) that hydropower operations are not significantly thought of to be detrimental to the environment. Even after visiting one of the largest historical research libraries in Ottawa, the NRC National Science Library, and reading about hydropower project research there, the sentiment persists.

Quite often, hydropower and other large corporations attempt to mask the detrimental side of their operations through prolific philanthropy. Big hydro is expert at integrating itself into communities and regional subconscious by providing resources beyond that of just energy. Last year alone, [Hydro-Quebec contributed many millions of dollars](#) to institutions considered pillars of society. Even though corporate philanthropy need not have ulterior motives, one needs to be acutely aware of funding sources and whether explicit or implicit expectations, quid pro quo or research bias are a result.

As with most complex subject matter of this scale, one can find yourself threading a biased narrative because convincing material is present on both sides; therefore, the only solution is a careful and critical education: you can find the historical displacement of indigenous people from their land angering; the diminishing of groundwater tables and land erosion frightening; increasing fragmentation and reduction of fisheries threatening; the disruption of natural nutrient cycling and greenhouse gas emissions from reservoirs dangerous and industry funding of science influencing research outcomes. However, we cannot forget hydropower is sometimes the only energy source powering entire communities, and until truly green alternatives are developed and utilized, may remain the only viable option.

What is the solution, you may ask? In the end, after all the research, the interviews, the internal processing, the solutions are the same as they always have been for environmental issues: meaningful policy, regulation, enforcement awareness, conservation and innovation. Hydropower is a monolithic institution, not going anywhere quickly, but some adverse effects can be mitigated; for instance more ecological flow regimes, minimal cultural and wildlife displacement, mandatory fish passage and limits to the number of dams on rivers. In the course of my internship I spoke with a UNESCO chair on the matter who recently helped pass a global methodology and policy through the International Panel on Climate Change (IPCC) requiring that every country must report how much greenhouse gases are emitted from their reservoirs. What gives me hope, are the scientists like him, Dr. Neu, Dr. Rozengurt and others around the world who fight for our future.

You can read more about the material I have found by visiting FOMB's website [Cybrary](#) and looking up [Unnatural Freshwater Flow Project](#) in the Miscellaneous section.



## *From the Chair*

CMP's new 240' towers at the Chops Kennebec crossing dramatically violate the Merrymeeting Bay night sky viewshed with their excessive and as it turns out, unneeded lighting. TRC, CMP's project consultant, picked an off the shelf "solution" to a problem that doesn't exist, and was initiated and completed with wanton disregard for locals and the environment. Not surprisingly, there is tremendous financial incentive for CMP to "build big", and with as much "gold plate" as possible. This emblematic local project represents in many ways, the recent wholesale dismantling of our national environmental laws whether National Environmental Policy, Clean Water, Clean Air, or Endangered Species Acts.

In recent decades, increasingly severe ecological, astronomical and aesthetic problems from night sky light pollution have spawned an international movement to restore and protect our dark skies (see cover story and <https://www.darksky.org/>). Surface lights and internet satellite lighting and radiofrequencies are hampering worldwide astronomical observations. See an excellent animation of the expected 57,000 new orbiting satellites planned for the next nine years at [www.mainecoalitiontostopsmartmeters.org](http://www.mainecoalitiontostopsmartmeters.org).

An aircraft detection lighting system able to activate tower lights only when an aircraft approaches within range is being considered as an alternative for the Chops and while essentially eliminating the light issues, could substantially worsen human and wildlife health effects. Using active and powerful Doppler radar (CMP is proposing the Harrier system made by DeTect), likely in the 175 watt range (smart meters and cell phones are 1-2 watts) and able to detect aircraft 24 miles away, these systems blanket the area with microwave radiofrequency radiation, often harmful to people and causing adverse behavioral changes to birds, bats, insects and other wildlife. In fact, radar is sometimes used to deter birds from wind turbines that could kill them or from high use aircraft areas where they might cause an accident. Maybe Merrymeeting Bay needs fewer insects and birds?

A common suite of adverse health conditions including tinnitus, fatigue, loss of cognitive ability, headache and cardiac arrhythmia became known as "microwave sickness" (often now referred to as electromagnetic sensitivity) because of their association with workers involved in the early development of radar and exposed to non-ionizing radiofrequency radiation (RFR). These biological responses became the basis for eastern European exposure guidelines far more (100X) protective than those of western countries, based only on tissue heating. Many current precautionary guidelines suggest limits 1,000 times less than obsolete and irrelevant U.S. FCC guidelines. Just a week before press time, two lawsuits were filed against the FCC for their arbitrary and capricious actions in disregarding thousands of peer reviewed studies to the contrary, when deciding current RFR exposure guidelines promulgated in 1996, based on post WWII data, were still sufficient to provide safety. Filings are posted at [www.mainecoalitiontostopsmartmeters.org](http://www.mainecoalitiontostopsmartmeters.org).

Radiofrequency radiation was classified as a possible human carcinogen by the World Health Organization in 2011. The NIH National Toxicology Program in a 10 year 30 million dollar study recently found *clear evidence* (their most definitive category) of heart tumors from whole body exposure to low level RFR, *some evidence* (next category down) of brain and adrenal gland tumors and DNA damage in multiple organs. For a densely populated area also rich in wildlife, 24/7 radar pollution is a particularly ludicrous idea, particularly when unneeded.

There has been a misperception that structures over 200' above ground level (AGL) require lighting to deter aircraft. Our multiple legal analyses show this is wrong. According to federal regulation (14 CFR § 77.17 a. 2.), structures 200' or more within 3 miles of the center of an airport with runway at least 3,200' are obstructions to air navigation. Obstruction height thresholds increase 100' for each mile further from the airport up to 499' above which every structure is considered an obstacle. Wiscasset at 5 miles being the closest qualifying airport, the Chops towers would need to be 400' AGL to be considered obstacles and subject to FAA lighting and marking recommendations. Contrary to popular opinion, these towers, even unlit, are not obstructions to air navigation.

Fortunately, the simplest and easiest solution, just turning tower lights off, provides the most satisfactory outcome at the least cost and with the most rapid relief. We have requested CMP extinguish the lights and issue a Notice to Airmen (NOTAM) of unlit towers and wire crossing at these coordinates, at least pending resolution of a FAA Marking and Lighting Study which is probably required to back out of their current situation. Understand the old

towers were unlit for 80 years of higher volume air traffic and the wires were unmarked. Now, the larger towers are easier to see and wires marked with FAA approved large colored spheres.

Unfortunately, because utilities receive a guaranteed rate of return (annualized 10-14%) on investment, CMP has an incentive rather than disincentive, for costly solutions. High costs of lighting and radar are recovered with interest, through rate hikes and paid by us all. Follow the money. This alone is probably an excellent reason to support Representative Berry's idea of state owned transmission (and I'd add, considering river health, generation) facilities.

Far more detailed citations and exhibits on this issue can be found in a CMP section near the top of our web home page at [www.fomb.org](http://www.fomb.org) and later probably migrating to our Advocacy section of the Cybrary.

In 2019 we continued our outstanding education efforts with children and adults, received radiocarbon dates of 6-8,000 years before present from pine and oak charcoal recovered in our Dresden Falls archaeology work, built more partnerships towards our goal to lock in as minimum, current water quality on the Lower Androscoggin through reclassification and initiated efforts to protect the single largest parcel of unprotected and undeveloped land on the Bay, Centers Pt. in Bowdoinham.

Just as CMP's actions at the Chops (and many would add statewide) are a metaphor for national environmental assaults, so too is FOMB's advocacy on this issue; saving our night sky, protecting our health and wildlife and saving ratepayer money; representative of essential work thousands of local, regional and national groups of concerned citizens are actively engaged in. More often than not, we are standing up as in this case, and speaking out against false choices. Without a great Steering Committee and fantastic membership, we would be nothing. Thank you all so much.

Respectfully submitted, Ed Friedman, Chair

## 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 (Bowdoinham)  
 Becky Bowes (Brunswick)  
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Chair Vacancy

#### Membership and Fundraising Committee

Nate Gray, Chair, 446-8870

#### Research and Advocacy Committee

Ed Friedman, Chair, 666-3372

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#### Membership Levels

- |   |   |                                     |
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| <input type="checkbox"/> \$750 American Eel | <input type="checkbox"/> \$100 Shad         | <input type="checkbox"/> Other      |
| <input type="checkbox"/> \$500 Wild Salmon  | <input type="checkbox"/> \$50 Alewife       |                                     |

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| <input type="checkbox"/> New Member | <input type="checkbox"/> I would like a sticker                         |

\$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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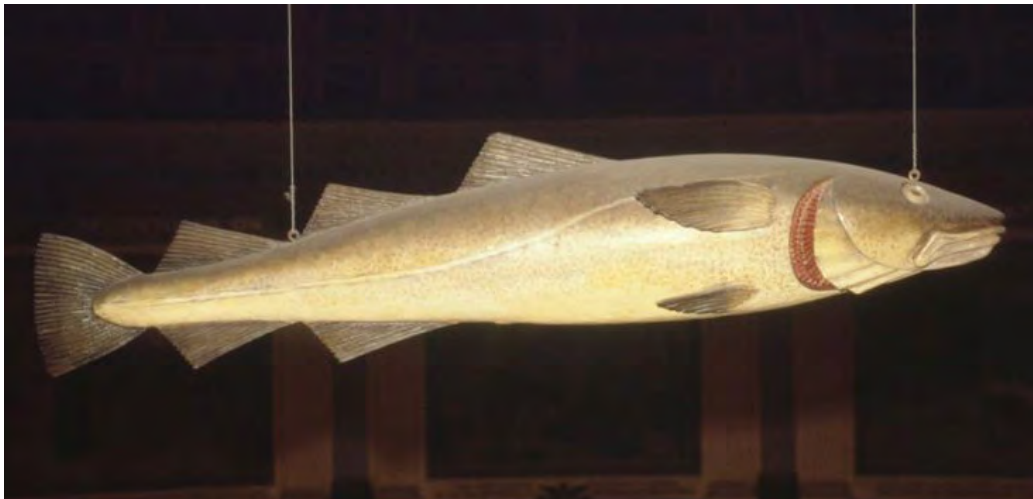
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## The “Sacred” Cod Moves to the New State House



On January 11, 1798, the Massachusetts (including, until 1820, today’s Maine) legislature paraded solemnly from the Old State House to its quarters in a new building at the top of Beacon Hill. Designed by Boston-born architect Charles Bulfinch, the elegant new State House was tangible evidence of the Commonwealth’s growing prosperity. The men who governed Massachusetts were thinking of the state’s promising future, but they brought with them a symbol of the past. They carried a four-foot, eleven-inch wooden fish wrapped in an American flag. This “Sacred” Cod had hung in the Old State House, and it hangs in the new one to this very day. There is no better symbol of how much Massachusetts owes both its survival and its success to the humble cod fish.

The Massachusetts Senate has a “Holy” mackerel incorporated in its chandelier to compete with the “Sacred” Cod in the House of Representatives. ([masshumanities.org](http://masshumanities.org)).