THE CASE AGAINST AMERICAN AQUAFARMS

How a proposal for a massive industrial salmon farm next to Acadia National Park is threatening the Maine coast and forcing a new look at regulations governing net pen aquaculture.

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EXECUTIVE SUMMARY

In October of 2020, a company backed by Norwegian investors announced plans to build one of the world's largest net pen salmon farms on the Maine coast next to Acadia National Park.

The company, with the misleading name American Aquafarms, is proposing to place thirty 150' diameter net pens in Frenchman Bay using a "semi-closed" technology that has never been used on this scale before and will pump 4.1 billion gallons of untreated effluent per day into the bay.

The plans have sparked opposition from an unusually broad and growing coalition of lobstermen, small owner-operated aquaculture farms already in the bay, conservation groups, Acadia advocates, local businesses, town governments and year-round and seasonal residents.

The fate of this project has implications well beyond Maine. American Aquafarms is one of four investor-backed industrial-scale finfish farms currently under consideration along the Maine coast, although the other three are all using land-based aquaculture systems.

As the project starts to work its way through the permitting process with various state and federal regulatory authorities, two things have become abundantly clear:

- Maine's laws and regulations never anticipated projects of this scale and are lax compared to other salmon growing areas, such as Norway, where ironically a project of this size could not be built; and
- If this project is approved, others will surely follow, seeing Maine as an easy mark and taking advantage of the state's cold clean waters, proximity to major East Coast markets, and low permitting costs.

The backdrop to this fight is the larger reality that wild-caught fisheries are under threat and aquaculture is being held out as the panacea to feed the world. But just as Maine is attracting attention from big aquaculture and foreign investors, other regions with much more experience with salmon farming – such as Argentina, British Columbia, and Washington state – are banning the use of net pens because of the environmental and economic harm they cause.

This puts Maine at a crossroad. Instead of learning from these experiences, will Maine repeat the mistakes of others, forever altering its renowned coastline by opening it up to industrial aquaculture? Or will Maine reckon with its inadequate and outdated regulations and acknowledge the vastly different risk profiles between local, small-scale, owner-operated fish farming, and large, foreign investor-owned, highly speculative ventures like American Aquafarms?

With local and national stakeholders watching closely, along with the global aquaculture industry and international ocean conservation groups, the stakes couldn't be higher for Maine. This essay sets the stage for the far-reaching discussion that needs to take place now and offers some observations about the future of fish farming in Maine and beyond.

SOUNDING THE ALARM

One of the things that is increasingly clear is just how much is riding on the fate of the American Aquafarms project in Maine.

The world is waking up to all the reasons why open-net pens for raising salmon are bad news. Argentina, the states of Washington, Oregon, California, and now British Columbia, have banned open-net pens for Atlantic Salmon – not only for their impact on wild salmon populations, but because of their adverse impact on the entire marine environment and surrounding economies. Chile, once the world's second largest salmon producer, is effectively shut down as they wrestle with an outbreak of ISA salmon virus imported from Norway.

Let's not allow Maine waters to become the testing grounds for an industry that's so dirty many regions worldwide have rejected it after confronting hard-earned truths of environmental and economic disaster. Let's learn from best practices and lessons offered worldwide to avoid the mistakes others made.

SETTING THE TABLE

Despite those bitter truths, Maine is beginning to flirt with finfish aquaculture and its perils. Recently, the sole open-net salmon operator in Maine, the multi-national Canadian-based Cooke Aquaculture, suffered a large die-off at one of its Maine farms. The die-off occurred because staff didn't bother, or perhaps weren't available, to clean the pens. Water quality plummeted as the firm watched.

They let more than 116,000 fish die without regard to their welfare or to the adverse impact on the surrounding environment. Concerns about the lobster fishery, other species, and public health, were never addressed.

The regulatory agencies that are supposed to provide oversight, the Maine Department of Marine Resources (DMR) and the Maine Department of Environmental Protection (DEP), were not notified for seven and fourteen days respectively and they only visited the site long after the dead fish were removed, and the pens cleaned. The public was never given a clear understanding of what caused the massive die-off, and the company was not held accountable.

Moreover, Cooke's application to renew its lease for this site for another 20 years is under review by the Maine DMR. Approval is expected.

As Maine dabbles in finfish aquaculture, examples like the Cooke die-off are just the tip of the iceberg when it comes to environmental degradation and economic upheaval. Maine's outdated rules, lax oversight, and comparatively low costs (just $100 per acre per year for a lease) have unfortunately set the table for more industrial aquaculture and the challenges it's proven to bring.

With those conditions as a backdrop, American Aquafarms has come onto the scene with a proposal to build a farm that's six times the size of the Cooke facility that experienced the mass die-off. It would be the largest ocean-based farm in North America. It uses a new, untested technology, what the firm calls "*closed-pens*", or more absurdly, "eco-pens."

As regions around the world take steps to shut down or restrict open net farming - including even Norway - multi-national salmon and equipment producers - including many from Norway - are

desperately and falsely positioning "*closed pens*" as the environmentally friendly alternative to open-net pens. Nothing could be further from the truth.

This project in Maine is ground zero. If it happens here, expect to see open-net pens worldwide replaced with this green-washed, environmental calamity. If we allow it, this technology will propagate in the blink of an eye down the Maine coast and throughout the world. Let's take a closer look at the technology, the way Maine is evaluating it, and why it poses such threats to Maine and to the world.

CALLING OUT FLAWED LOGIC

Last summer, Maine's DEP decided public hearings would not be required to evaluate the impact of the monster fish farm proposed by American Aquafarms. Their rationale: they said the project met none of the three criteria that require public hearings – **novel technology, large scale,** and **regional impact**. Let's examine those decisions individually to see how shortsighted, narrow, and off the mark this decision was.

First, even American Aquafarms claims the project uses **novel "closed-pen" technology** that distinguishes it from, and improves upon, open-net pen aquaculture. Indeed, it's the first time in the world this technology would be used at this scale. And importantly, it's among the first installations to use the technology to try raising salmon to maturity. Almost all the prior use of these pens raise fish only to 1kg, just 1/6th of harvest size. That means there's little or no measured data from actual trials on whether fish can be successfully raised to maturity, or on the amount of waste that would actually be discharged, or on a myriad of other critical parameters and risk factors.

In terms of the pens themselves, their size, stocking density, production volume, the outer plastic membrane, their ability to withstand weather or collisions, the way they're cleaned, monitored, serviced, how they might (or might not) capture solid waste, the volume and exact character of all the discharges (feces, urine, or via respiration), the chemicals and pharmaceuticals required to keep fish healthy, the challenges of managing potentially enormous disease outbreaks, all the pumping and generators that would be required, even the ability to raise fish to harvest size – on all these and many other points this project is premised on entirely novel, untested technology.

The company claims closed-pen technology will make fish healthier. Why? Because a flexible plastic membrane outside the nets supposedly keeps sea lice away from the fish. The same membrane supposedly allows 90% of the unused food and excrement to be collected, although this claim is yet another unsubstantiated by any data or actual measurement.

American Aquafarms says that because their fish would be healthier, they can be raised in far higher densities and volumes than in open net pens – in this case, up to six times the scale of the Cooke open-net pens.

Keep your eye on the ball: while their fish inside the new SCCS pens could potentially be healthier (a claim that would not be hard to satisfy since sea-lice infested fish in traditional open-net pens are notoriously ugly breeding grounds for sick and diseased fish), ***the firm and its pen manufacturer make***

no claims about the impact of these pens on the surrounding environment outside the pens. Because they're much larger, these pens produce much more waste. True, at least some of that waste might be captured as anticipated, but the net-effect, because the installations are far larger, is that these pens would discharge at least as much waste, and far more chemicals, viral load, and pathogens into the bay than their open net predecessors.

They also have new and unprecedented carbon impacts because of the fuel consumed by generators and large ships, to say nothing of the carbon budget associated with production of the correspondingly larger and enormous feed supply and the wild feed stocks it depletes. Perhaps more importantly, because of their scale, these installations have much higher risk factors due to die-offs, spread of disease, oil and chemical spills, all while magnifying the adverse visual and sound impacts, ship traffic and so on. Because of that, the consequences of failure are also much more significant. The DEP, however, ignores these distinctions and says the project is just another aquaculture project and, as such, is not novel technology.

That's flaw number one with the DEP's stance, and one that ignores the salmon industry's own PR around this new kind of pen. The technology is fundamentally different, but hardly without serious flaws that together should amplify our overall concerns.

Finally, **on novel technology**, American Aquafarms says that one of the things that distinguishes their project from traditional open-net pen farming is the way it will collect, process, handle, and transport solid waste. Because of that, the DEP should not regulate the project the same way it regulates conventional open-net aquaculture. In Maine, solid waste processing facilities are defined specifically as facilities that do exactly what American Aquafarms is proposing – to collect, process, handle, and transport solid waste.

This is a key issue since solid waste processing facilities are not permitted in estuarine environments like Frenchman Bay. **We've formally petitioned the DEP to regulate this project as a solid waste processing facility, but so far, they have refused.**

Second, **on scale**, for a project six times larger than other existing aquaculture projects in Maine, one that spans three locations, and where just two of the locations discharge 4.1 billion gallons of *untreated* waste/day – an amount 3x the *treated* sewage discharged by all of Manhattan – the scale decision is hard to fathom.

To describe the huge scale another way, the annual production proposed in Frenchman Bay is 50% of the combined output from all 216 of the salmon farms in eastern Canada. And, once again, the inordinate risk of this scale is worth exploring. For example, after Covid, we all know that large, concentrated populations of animals tend to get sick more than small, dispersed populations. Canada manages its biosecurity risk by spreading it across 216 sites. When inevitable disease outbreaks occur, they're isolated and manageable. The risk of contagion, the challenges of managing it, and the consequences to the local environment and economy are exponentially magnified by the scale of the concentrated feed operation proposed for Frenchman Bay. The proposed scale here would be equal to half of Canada's sites – 108 of them – all rolled into one project here.

Scale matters in yet another big way: nitrogen discharge (think fertilizer). American Aquafarms' DEP applications say each lease site will release 902 kg/day of nitrogen from the Primary Discharge streams, and 161 kg/day from the Secondary Discharge streams together totaling 2,126 kg/day for the project. They say the volume of the bay provides an infinite sink to dilute this waste, so its concentration satisfies DEP criteria.

There are lots of unknowns with these statements that are cause for concern. For example, the applications provide no discussion of how the nitrogen discharge correlates with the waste one would reasonably expect to be metabolized and excreted from the biomass of fish being raised, or whether that waste is produced as solid, liquid, or (dissolved) respiratory waste. There is also no validation for their claim to capture 90% of the solid waste.

Momentarily setting those shortcomings aside, let's temporarily assume that the project would release the stated 2,126 kg/day of nitrogen. How would that discharge compare to a human waste stream? Rose, et al reports that, on average, each human produces a total of ~12.8g/day of nitrogen; 1.8 g/day from feces, and 11 g/day from urine. The Rose paper is credible enough to be cited in over 600 scientific publications. Another reliable source, The Buzzards Bay National Estuary Program (one of 28 National Estuary programs in the US) has become a model for watershed management and planning. It says that after a review of the scientific literature, it recommends using a lower figure of 2.7kg/yr. (just 7.4 g/day).

Therefore, if American Aquafarms' own 2,126 kg/day discharge figure is accurate (that's still questionable), they'll be discharging as least as much nitrogen as the untreated waste from a city of 166,000 people (using the Rose figure), or 287,000 people (using the Buzzards Bay NEP figure).

Assuming the lower of these, and this population data, **that's more nitrogen than the people of Maine's four largest cities combined, or, (said another way) more than the people in Portland, Lewiston, Bangor, Camden, Belfast, Bucksport, Ellsworth, Bar Harbor, Trenton, Lamoine, Sullivan, Sorrento, Gouldsboro, Winter Harbor and Prospect Harbor combined would produce.**

Crucially, it would all be discharged from super-concentrated point sources from the two lease sites just 2.2 miles apart. While American Aquafarms claims they'll capture solid waste, it's worth noting that very little nitrogen is excreted as part of the solid waste. Instead, most of it is excreted in a liquid, dissolved form that gets directly discharged to the bay with no treatment**.**

In 2007, after seeing eutrophication shut down habitats and critical fisheries in waterways in other states, the Maine Legislature became concerned about the hazards and potential for eutrophication due to nitrogen loading in Casco Bay. They passed Resolution LD1297 instructing the DEP to develop "*a plan and timeline leading to approved nutrient criteria for coastal waters*." It says:

> **"Whereas,** as an example of known nutrient conditions in Maine, of 655 water samples collected over 6 years at a site in Casco Bay, 12% collected during the critical summer months exceeded the threshold for medium risk for impairment due to nutrients, as defined in national coastal assessments;"

Casco Bay.org estimates the population of the Casco Bay watershed at 236,483 people and the area at 229 square miles. With that population, Casco Bay would produce an amount of nitrogen in-between the two ranges (166K – 287K) forecast in the analysis above. However, Frenchman Bay (including all the islands) is only 73 acres, less than 1/3 the size of Casco Bay. If the legislature was concerned about the amount of nitrogen being discharged into Casco Bay, the similar discharge into a much smaller waterway proposed by American Aquafarms should be terrifying.

That concern exponentially escalates when combined with the insight from the hydrodynamic modeling done by Dr. Chris Kincaid that concludes that over time, 90-97% of American Aquafarms discharge will be retained in the bay. That modelling also notes two additional significant concerns. First, since most of the proposed discharge is at a 30m depth, the nitrogen will not be immediately bioavailable for consumption at the discharge sites. Secondly, the model predicts that this material will concentrate and eventually be transported to shallower nursery regions higher in the bay where it will be bioavailable to cause just the eutrophication Casco Bay has been witnessing, all in a much smaller area and therefore with concentrations much more likely to drive eutrophication.

Unfortunately, the legislature's hope for a plan for nutrient criteria for coastal waters went nowhere. Now we're seeing just one of the repercussions of that failure to act.

In addition to the nitrogen, (again using American Aquafarms own figures), more than 99 tons/year of uneaten fish food will be discharged into the bay.

Continuing the saga of scale, add to that the need for ten 500kw diesel generators at the lease sites and the concern grows. The generators will run day and night to power the huge pumps needed to get water in and out of the pens and the lights that will illuminate the pens (and the night sky). To put things in perspective, they will generate enough electricity to meet the needs of all 6800 homes around Frenchman Bay.

Compared to other ocean-based aquaculture projects in Maine, this project is far larger in terms of acreage, annual production, biomass in the water, sewage volume discharged, power used, fuel consumed, the amount of fuel stored in vulnerable offshore marine locations, noise and light pollution produced, and most of all, **risk**, which the applications play down and ignore at every opportunity.

To reiterate: the quantification of risk factors and how they might combine and be amplified due to the interaction between multiple, untested, previously uncombined systems and procedures is totally absent from both the DEP and the DMR applications. **Since the physical scale is larger, the risk factors and potential for harm, particularly from untested systems, become much larger.**

In answers to questions posed at American Aquafarms' May 6, 2021, Public Information Meeting, the firm said: "*While the proposed project may not be the first closed pen aquaculture project in North America, it might be the first of this scale."* And yet, DEP says scale is not a concern.

One reason the DEP may be saying this is that so far only two of the many environmental permits that will be required have been applied for. For example, none of the permits for diesel emissions (to air or water), or for the shore-based hatchery and processing plant have been filed.

And the wastewater applications fail to consider fuel spills, or large volumes of the FDA-required chlorine-based wash-down chemicals used in raw fish packing. As a case in point, last summer Grieg Seafood discharged 4000 gallons of chlorine from a Norwegian salmon processing plant that's less than 1/3 the size proposed here.

Despite many appeals to require and consolidate all the necessary applications into one more comprehensive application, the DEP refuses to act, saying they can't consolidate until there are more applications filed – a Catch-22 that allows the company to conceal the true size and impact of their project from the public by filing applications piecemeal.

Scale matters, and this one's a monster.

Third, regarding **regional impact**, it's hard to imagine an aquaculture project with more impact, regionally for the Maine coast, and indeed, for the world. It is located right next to Acadia National Park, a crown jewel in our national park system and the leading driver of Maine's largest industry, tourism. A thriving lobster fishery and many small-scale aquaculture operations, along with tourism and recreational opportunities and world-class research and educational institutions, provide thousands of jobs. All would be adversely affected by the negative environmental impacts of this project.

The DEP stated last summer that discharges from the lease sites would only impact the town of Gouldsboro, an absurd statement that infers that water, air and noise pollution would somehow respect a municipal boundary drawn down the middle of the bay years ago, when in fact the operations at the massive pen sites are closer to Bar Harbor, Hancock, and other communities than they are to most of Gouldsboro.

More importantly, the DEP position is contradicted by research from two respected oceanographers, Lauren Ross at the University of Maine and Dr. Chris Kincaid at the University of Rhode Island. They've developed two independent, state-of-the-art 3D hydrodynamic models to forecast how waste will be transported over time in gyres that move from one lease site to the other, thereby concentrating in the bay and not flushing as the applicant maintains.

Dr. Kincaid's model predicts that 90-97% of the waste will be retained in the upper bay, concentrating continually over time, and thereby impacting all the surrounding communities. The magnitude of the untreated discharge from the project – 3X Manhattan's! – gives this regional impact even more consequence.

TAKING A CLOSER LOOK AT "CLOSED" PENS

Further understanding of the wider impact, both to the rest of Maine, and globally, requires some industry perspective.

The project in Maine hinges on what American Aquafarms calls "closed" pens, a technology that Norway is falsely advertising as the supposedly "eco-friendly" replacement for open-net salmon production worldwide. We can't allow either American Aquafarms or Norway to do a snow job on the world by communicating that this technology is the environmentally sound answer to open-net pens.

That blizzard of deception starts with the name itself because, of course, the pens proposed for Frenchman Bay are anything but closed; they would discharge more than 4 billion gallons per day of untreated effluent. American Aquafarms takes it a step further, falsely purporting in the DMR application that "*each pen is a separate system with its own separate bio habitat*."

This totally ignores the fact that each pen's sea water inlets are just feet from nearby pen's wastewater outlets, so of course waste that is discharged from one pen gets sucked up and contaminates another nearby pen. This therefore concentrates waste and repeatedly spreads disease from pen to pen. Hardly self-contained bio-habitats!

When pressed, the industry more accurately calls these pens semi-closed containment systems, or "SCCS" pens. A more apt name would be semi-open, for not only do the pens discharge enormous volumes of sewage, they also transport 100 tons/yr. of unused food, ~20 tons/year of acetic acid, and a constant and totally foreign viral and pathogenic plume to the bay. It is a complete fiction that these contaminants are somehow isolated and closed off from the bay.

We've heard consistently that while the proposed flexible SCCS pens are new to North America, they're fully tested in other parts of the world. At best, that shades the truth; more realistically, it is an outright deception. This became clear recently when the much-touted Cermaq trial in British Columbia of the only SCCS pen in North America shut down after less than a year because of bad water quality and fish mortality.

A little digging produced this article, this one, and this one where Peter McKenzie, Cermaq's director of fish health, said the B.C. trial was the first test by FiiZK, the pen's manufacturer, to attempt to grow fish to maturity.

> ***"This was our first attempt to grow fish of varying sizes in a semi closed environment and unfortunately, due to water quality issues, fish performance was affected and resulted in fish mortality."***

Importantly, this underwater footage video from Clayoquotaction.org in B.C. documents that the pen used in the trial included no waste collection system, a component that American Aquafarms has trumpeted. Cermaq, the fish farm operator, and Fiizk, the Norwegian manufacturer of the pen, were

testing two things: 1) could they grow fish to maturity? and 2) would the flexible outer membrane eliminate sea lice?

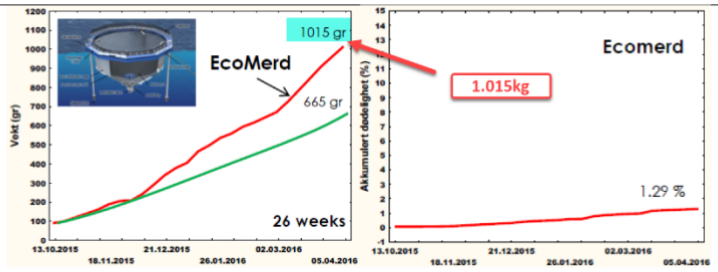
They were not studying how much waste was captured, or the reduction of waste discharge, or reduction of viral or pathogenic load on the surrounding environment, or reducing the carbon footprint of food production.

Even if they had been studying those things, the data would still be of questionable applicability to Maine because at 15,000m^3 the B.C. pen was only half the size of the pens proposed for Maine. Bottom line: the B.C. test proved two things: 1) **it's not yet possible to use these pens to raise fish to maturity, and 2) there is no data about the amount of waste these pens would produce or actually capture**.

You therefore can't call the "*closed" pens* "*eco-friendly*." The trial showed that they are anything but – dead fish, lots of untreated waste, a huge carbon footprint from water pumping and waste, viral and pathogenic load, and contamination of the environment from rotting fish, as well as significant noise above and below the water.

Keep in mind also that according to this report published by the Scottish Aquaculture Research Forum, the FiiZK pen used in B.C. is the closest in design to the Ecomerden 'Eco-Cage' pens proposed for use by American Aquafarms in Maine. The report's page 118 shows performance trial data for the Ecomerden pens suggesting that as of 2017, the Ecomerden pens had only been used to raise smolt to ~1kg size, far smaller than mature 5-6kg harvest-size fish.

Performance data



Growth and mortality data from Sigurd Handeland PowerpointPresentation (Eco1)

Performance data from Ecomerden 2017		
	Control, open cage	Ecomerden Ecocage
Harvested after week	79	62
No of fish harvested (from 1,000,000 input)	814,336	979,980

Next, Ecomerden's brochure for their Eco-cages also suggests that, to date, their pens are tested for smolt only, not for harvest-size salmon. They do indicate that similar pens have been used to grow harvest-size, "broodstock" trout, although not salmon. Page 5 of the brochure says: "***the strategy of Ecomerden is to deliver postsmolt [1 to 1.5kg, not 6kg harvest-size] cages to existing locations with open pens.***"

This suggests **American Aquafarms may be using the Ecomerden pens for a purpose not intended by the manufacturer.**

Next, on page 11 of the Ecomerden product brochure the manufacturer acknowledges that in one of the few, limited tests on smolt-sized fish, the intake pipes broke to introduce sea lice from water outside the pen to the fish inside the pens. This failure amplifies concern around American Aquafarms statements that sea lice will not occur, and therefore that they don't intend to use veterinary pharmaceuticals.

Of course, there will be disease, because, as even the pen manufacturer acknowledges, accidents happen with new, untested technology. Further, while American Aquafarms says any pharmaceuticals would be administered as prescribed by the drug manufacturers, those doses are calibrated for the health of the treated fish inside the pens without concern for their impact outside the pens on the surrounding habitat or fishery.

If the Ecomerden pens have therefore not been used to raise fish to full harvest size as the company's own literature suggests, concern escalates for Maine regarding the risks inherent in the new technology:

- Measured data on the discharge of contaminants, if it even exists (increasingly doubtful), would be based solely on the very different discharge profile from small fish, not mature fish.
- Failures in the pens do happen, but their impact is never acknowledged and is never systematically addressed by the American Aquafarms permit applications.
- The one and only North American trial of an SCCS pen was a failure that resulted in fouled waters and dead fish.

Maine cannot afford to take on such a huge and unquantified risk by issuing a permit in the absence of demonstrated proof of compliance with state environmental regulations. Such action would not only be unacceptable, but illegal.

WILD WEST, DOWN EAST

Coming back to why the American Aquafarms' project has broader significance to the whole Maine coast, and for salmon production globally, consider the following: **Here in Maine, there's huge pressure from Norwegian capital to move here** and, unlike most salmon producing regions, **there are no salmon-specific regulations in Maine**.

Additionally, Maine's aquaculture lease fees are one-size-fits-all at just $100 per acre per year, regardless of the scale of the operation or its economic or environmental impact – nothing like the huge fees other countries impose on industrial-scale aquaculture. Norway, for instance, requires a one-time, up-front license, along with a separate permit from local government.

The Norwegian license fees are set by auction and are based on the desired maximum biomass in the water. In Maine, the American Aquafarms lease fees would be just $12,000/year. By comparison, using data from the auction of 30 Norwegian licenses in August 2020, the Norwegian license for the same

biomass as the American Aquafarms project would cost between $500 million and ~$1 billion depending on technicalities of how biomass is calculated.

The money raised from permits and lease fees in Maine doesn't even begin to support the oversight needed, and that leaves regulatory agencies ill-equipped to manage the challenges of industrial aquaculture. And because Maine has no salmon-specific regulations, the American Aquafarm project is ~20x larger than Norway would permit.

The following figure illustrates three sets of Norwegian salmon aquaculture regulations that work together to preserve water quality, working waterfronts, and biosecurity related to salmon aquaculture practices.

This Page compares American Aquafarms' proposal with regulations in Norway that limit:

1) Maximum Allowable Biomass per lease
2) Maximum Allowable Biomass per region per firm
3) Maximum Stocking Denssity

These comparisons suggest THREE ways that the American Aquafarms project would NOT be allowed in Norway

Data from: Pg 81-82 of the 2021 MOWI Salmon Farming Industry Handbook
DEP - FB01 Long Porcupine Net Pen Aquaculture Supplemental Application Form with Attachments.pdf
DEP - FB02 Bald Rock Net Pen Aquaculture Supplemental Application Form with Attachments.pdf

		NORWAY REGS per LICENSE				AMERICAM AQUAFARMS PROPOSAL per LICENSE						American Aquafarms is larger
REGULATION	Applies to:	MAB (metric)		MAB (imperial)		MAB per pen (metric)		MAB per pen (imperial)		MAB per LICENSE (15 pens)		than Norway MAB/License by:
MAB PER LICENSE	max allowable biomass per license in most Norwegian counties.	780	tonnes	1,719,606	lb	1,200,000	kg	2,645,547	lb	39,683,207	lb	23 X
	Max allowable biomass per license in 2 northern counties	945	tonnes	2,083,368	lb	1,200,000	kg	2,645,547	lb	39,683,207	lb	19 X

		NORWAY REGS per LICENSE				AMERICAM AQUAFARMS PROPOSAL per REGION per FIRM						American Aquafarms is larger
REGULATION	Applies to:	MAB (metric)		MAB (imperial)		MAB per pen (metric)		MAB per pen (imperial)		MAB per REGION (30 pens)		than Norway MAB/Region by:
MAB PER REGION PER FIRM	max allowable biomass per license in most Norwegian counties.	2,340	tonnes	5,158,817	lb	1,200,000	kg	2,645,547	lb	79,366,414	lb	15 X
	Max allowable biomass per license in 2 northern counties	4,680	tonnes	10,317,634	lb	1,200,000	kg	2,645,547	lb	79,366,414	lb	8 X

REGULATION	Applies to:	NORWEGIAN STOCKING DENSITY		AMERICAN AQUAFARMS STOCKING DENSITY		American Aquafarms stocking density larger than Norway by:
STOCKING DENSITY	Stocking Density - all Norway	25	kg/m3	40	kg/m3	1.6X
	Organic Stocking Density - all Norway	10	kg/m3		kg/m3	

Maine – without Norway's 50-year base of experience – has no similar regulatory framework. Consequently, all three areas – water quality, working waterfronts, and biosecurity – are at risk as Maine moves blindly ahead without actively heeding lessons learned elsewhere.

In summary, because this project is ~20 times larger than Norway would permit, and almost free compared to Norway's license fees, there's huge worldwide interest in whether this project gets permitted.

Adding to that pressure, this project's scale and the greenwashing associated with false claims of supposedly "eco-friendly" pens make it an industry poster child for reinvigorating ocean-based salmon farming to counter years of bad press and the adverse environmental impact of traditional open-net pens.

With the financial pressure to operate at unprecedented scale and at the incredibly reduced cost that Maine offers, rest assured that if the American Aquafarms project happens others will follow fast on its heels and sprawl down the entire Maine coast. This iconic coastline, with its working waterfront, owner-operated boats, small-scale aquaculture, and pristine environment, will be long gone. Too many other communities worldwide have come to this realization too late. We can't allow that to happen here.

INCREASING THE PRESSURE

To win this battle, we need to put pressure on Maine's political leadership. The Oceana Foundation, after reviewing projects from across the world, decided the implications of the Frenchman Bay project demanded immediate attention. One of their first moves was production of this short video imploring Maine's Governor to "*do everything in her power to stop the Frenchman Bay monster fish farm.*"

At Frenchman Bay United we've done some great work with mostly volunteer help. Check out this hydrodynamic flow model video of discharge from the proposed lease site off Bald Rock or this one from the Long Porcupine site. With frightening clarity, they show that waste discharged from the pens will circulate around the bay in ever-increasing concentrations and never flush from this well-documented "low-flow" body of water.

The videos just show two weeks of discharge. Imagine what 20 years would look like!

We've also had some great success building opposition throughout Maine and beyond and across the political landscape. Respected groups like the Maine Coast Heritage Trust, Friends of Acadia, Bar Harbor Chamber of Commerce, National Parks Conservations Association, and Oceana have joined countless residents, fishermen, businesses, environmental and civic groups, and communities around the bay in creating a broad and deep coalition of opponents.

We need everyone's help to ensure Maine's business and political leadership use their clout to stop this destructive project.

TAKING A NEW APPROACH

No one likes to shut down business opportunity without offering suggestions. To do that, we should take stock of history. Let's start by recognizing that for far too long, Maine's economy has been a resource extraction economy that relies on an unsustainable business model.

Consider sardines, cod, shrimp – all largely overfished and gone. Lobster, while fished much more sustainably, may be at risk due to climate change. Just look at the water in the Gulf of Maine that is warming faster than almost any waterbody worldwide and the recent, near-total collapse of Rhode Island's lobster fishery, to see where things could go. That's why Maine puts such high hopes on aquaculture, and yet the industry has outgrown the regulatory framework and state education programs that spawned it.

Once again, in a pell-mell sprint towards the next new thing, we're not thinking sustainably. To do that we need to recognize that all aquaculture is not the same.

Small-scale shellfish and kelp aquaculture generally improve water quality and have a low impact, while ocean-based finfish aquaculture requires massive infrastructure and adds huge amounts of nutrient to a marine environment that is incapable of handling it, particularly when the regulatory process fails to consider combined and cumulative impacts of nearby, increasingly crowded aquaculture operations.

However, even small-scale shellfish aquaculture is not without costs to those already working on the ocean. The unbridled proliferation of aquaculture leases translates to loss of ground to other fisheries. In fact, the recent changes at DMR that allow issuing aggregated aquaculture leases of up to 1000 acres per entity (100 acres per site), combined with rules that (unlike any other Maine fisheries) allow leases to be transferred without any evaluation of the new recipients by the DMR, mean that Maine's vision of an owner-operated, sustainably managed waterfront is under threat.

Why? Because the large-acreage, transferable leases invite speculative investment capital from "away" in projects specifically designed to extract the very resources the DMR is chartered to manage sustainably in the Public Trust.

We are already witnessing the consolidation of shellfish leases on the Damariscotta River. And it shouldn't be lost on anyone that literally all the finfish operators in Maine (land and ocean-based) are foreign-owned enterprises spinning our resources into offshore profits for foreigners. These industrial-scale endeavors are not what Maine envisioned when it embarked on aquaculture years ago.

There's a world of difference between small-scale local, owner-operated businesses who understand sustainable, balanced coexistence with other interests on the bay, and huge, industrial-scale operators driven by foreign-owned investors demanding only short-term profit without regard for local economies or the environment whether in finfish or shellfish.

These large operators are here specifically because the profitability of farms is tied directly to our past resistance to doing thoughtful resource planning, and to lease criteria that ignore water quality, biosecurity, and the working waterfront – criteria that all rely on the very ecosystems the leases exploit. Without planning that gives standing to all stakeholders, our coastal waters will no longer support the environment and economies so many depend on.

While that resource planning will absolutely be tough to do, if we persist in ignoring the need by perpetuating a first-come, first-serve, grab-it-while-you-can free-for-all, we shouldn't be surprised by the depletion, if not the extinction, of our Public Trust. Again, look at the fate of cod, sardines, and shrimp: the writing is on the wall.

To unwind all this, let's start by acknowledging that scale matters: regulations that apply for huge industrial concerns are untenable for small-scale owner operators and vice-versa. Next, finfish, shellfish, and kelp farms are different and require different fishery-specific regulations. Further, regulations for each need to encompass four critical factors: water-quality, biosecurity, the sustenance of owner-operated working waterfronts, and finally, and perhaps most controversially, the impact on views, noise, and night skies.

Like it or not, Maine's largest industry – tourism – depends on preserving those views and unique experiences. Honestly, so too do the underlying habitats themselves. Bottom line, these marine resources are finite, and with climate change, increasingly under threat. Maine needs to be asking itself: what's the best possible use for a given marine resource, one that sustains itself perpetually versus one that extracts it to extinction?

For finfish particularly (where the impacts and capital resources are so large), Maine should start by looking at best practices worldwide. When regions with long experience with ocean-based net pen salmon farming are banning the practice, why would we not take note as we consider the pros and cons?

Second, we should ask what matters to all of us? Is a sustainable, owner-operated working waterfront coastline important? If so, we should limit the scale of aquaculture farms just as Norway did to protect water quality, owner operated fisheries, and to ensure biosecurity in the face of the inevitable disease outbreaks that are handmaidens of all domesticated large-scale feeding operations.

Third, we should reconsider why most fishing licenses are not transferrable to other parties, yet aquaculture leases are, opening the door to industry consolidation and more large-scale, investor-driven operations. Again, what makes the best sense for the sustainability of our finite natural resources that already are under severe pressure?

Fourth, we should ask how we can ensure the regulatory agencies are funded and staffed to provide the oversight necessary to enforce the laws and uphold the Public Trust. Once again, Norway's hefty license fees provide a hint. This doesn't mean all fees should be high, but that there could be some reasonably tiered fee structures and bonding requirements that are correlated to a project's risk and potential for adverse impact.

Fifth, we need to recognize that all aquaculture is not created equal: shellfish and kelp may improve water quality, while finfish add nutrients that cannot be assimilated. The ocean is not an infinite sink for pollution, and we must stop pretending that it is. Further, when it comes to wastewater discharge, a single operation (particularly a foreign owned one) should not have the right to use all the remaining assimilative capacity of a water body, thereby depriving local communities the ability to manage their own regulated discharges, which are certain to grow in the future. Regulations should reflect this reality.

Finally, we need to recognize the enormous carbon impact from salmon farming. This comes from the perpetual C02 emissions from generators used to pump water, from large service vessels, and from a gigantic demand for trucks to deliver food and fuel and take away harvested fish and waste. This is the elephant in the room. While transport is an issue for any farmed, agricultural product, it's totally avoidable and unnecessary for salmon farming.

As Maine considers how to develop aquaculture, it needs to recognize this and act accordingly. Consider the combined annual 66-million-pound production proposed for the American Aquafarms project, 73 million pounds from Nordic Aquafarms Belfast, 44 million pounds from Whole Ocean Bucksport, and 13 million pounds of yellowtail kingfish from the Kingfish Zeeland in Jonesport (to cite the industrial scale projects currently undergoing permitting in Maine).

All of these will need to transport not only all that fish, but an equal weight of fish feed, and huge quantities of liquid oxygen, diesel fuel, and sludge – you get the picture. Has Maine really considered the carbon footprint, pollution, and the associated health risks and costs associated with these projects? Shouldn't we?

All of these large land-based projects in Maine use hybrid technology that combine so-called Flow-Through Systems (FTS) and Recirculating Aquaculture Systems (RAS), allowing them to raise fish on land, not in open or semi-open pens on the water. These systems cost more than either open-net, or semi-closed "SCCS" pens because they pay for at least some of the eco-system services that all ocean pens exploit but don't pay for.

For example, unlike all ocean pens, the Nordic Belfast facility includes (and therefore pays for) a full sewage treatment plant to remove the majority of fecal, urine, and dissolved nitrogen waste from the discharge stream. In contrast, open-net pens rely on the ocean to absorb these wastes, and in doing so, companies like Cooke avoid costs that the ecosystem pays in the form of reduced water quality along with all the attendant, well-documented adverse environmental impacts.

American Aquafarms claims (without any evidence) that their SCCS pens will remove 90% of the solid waste, but even if that were true (and it's highly questionable) they would still discharge all of the urine, and all the dissolved liquid contaminants including most of the nitrogen produced by raising salmon, since nitrogen is largely produced in dissolved liquid form delivered as a product of respiration. Once again, as in all ocean pens, we see that since American Aquafarms avoids paying for the removal of these wastes (as Nordic does), the buck gets passed to the ocean, and to all the ecosystems and economies that depend on or enjoy its resources.

The land-based facilities currently under development in Maine offer a significant improvement over all ocean-based farming operations in that there are no wild escapes to impact native populations, and their wastewater is treated by modern sewage treatment facilities. Nevertheless, viruses and veterinary pharmaceuticals may still be released into the environment from these plants. They will also have a huge carbon footprint because of their unprecedented power, water pumping, and transportation requirements. And finally, they deplete an enormous volume of ground water, for example an estimated 700,000 gal/day at the Nordic facility.

Increasingly, we are seeing the emergence of truly innovative (but fully proven and tested), zero-discharge, fully RAS systems that reuse all the water used to grow finfish. These systems allow salmon to be grown anywhere, wherever consumers are, far from the ocean, thereby eliminating the huge cost and climate impact of transportation. Because water is recirculated, they therefore produce no contaminated wastewater discharge, no pathogens, viral load, or veterinary pharmaceuticals to foul local waterways.

In these facilities, water can be pumped by energy produced from renewable sources. Waste is fermented and digested to produce power. The annual production volume can be scaled to meet the demand of nearby, local consumers, so there is little, or no transportation cost. These factors combine to produce really significant environmental improvements, including a huge reduction in carbon impact, albeit at higher initial cost because they pay upfront for the ecosystem service costs that open-net pens unsustainably exploit and defer until the resources are extracted and gone for good.

In the end, as Maine has seen over and over, those hidden future costs are much more expensive. Yes, the world needs protein, but increasingly, consumers are demanding and willing to pay a premium for sustainability and a minimal carbon footprint in the food they consume and products they use.

If aquaculture is going to play an ever-larger role in Maine's economy, as a state we should be taking a leadership role in exploring and promoting such low-impact systems. Let's focus on developing a truly sustainable aquaculture economy where we export not just finfish and shellfish, but the technology and skills to raise high quality, locally produced fish anywhere.

Instead of repeating the same mistakes that other mature aquaculture-dependent economies are now reckoning with, we have the opportunity to develop a high-margin economy based on selling leading edge technology based on skilled workers, not just resource extraction and environmental degradation.

Let's keep our coastal waters open and clean to sustain the livelihoods that so many have depended on for so long and to accelerate the exciting opportunities that a new generation of local, waterfront entrepreneurs are creating. That would be finfish aquaculture worth doing, one that does not pit industrial aquaculture against heritage fisheries like Maine's iconic lobsters, small-scale aquaculture, tourism, and recreation.

Why would we sell ourselves short when these highly sought-after, sustainable opportunities are there for the taking?

MAKING A CHOICE

The American Aquafarms proposal is so wrong for Maine on so many levels. The choice is clear; approving the project will lead us down a road that we will deeply regret taking, to a place from which we can never return.

Stopping the project maintains the harmony with the natural environment that now exists and the balance among multiple uses that has served us well.

Stopping this project allows us to focus our energies and resources on developing the new technologies and skillsets that the rest of the world needs and wants.

Stopping this ill-conceived and destructive project gives us the opportunity to create a sustainable future on our terms, not the profit motives of foreign investors who can't even begin to understand the importance of Frenchman Bay in our lives.

For more information, please visit frenchmanbayunited.org.

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