

## Are sprawling fish farms coming to swallow Maine?

As lobsters decline, enormous industrial operations could be on the horizon. “They are gambling with our livelihood, our coastline, and our future.”

**By Ellen Ruppel Shell**

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ON A CHILLY SUNDAY in June, Sarah Redmond steers her pickup outside of an old sardine cannery here in Gouldsboro, Maine, leaps out, and pulls from the truck bed what looks like lobster traps oozing with slimy, withered vegetable matter. “I’m doing research on dulse,” she says, about the tough, purplish seaweed that is higher in protein and lower in iodine than other varieties. Seaweed is popular in Japan, she says, but Americans find it too intense. “We sell it mostly as an ingredient and as seasoning,” she says. “It’s a flavor enhancer, in chips, bread, cereal — you can sprinkle it on as a barbecue rub. It’s got vitamins, minerals, fiber.”

Wearing thick rubber muck boots, jeans, and a camouflage baseball cap pulled low over a loose ponytail, Redmond looks every inch the farmer she is. But unlike most farmers, her crop is seeded on ropes strung through 55 acres of saltwater. Redmond, 40, owns Springtide Seaweed, the nation’s largest organic seaweed farm, based in this onetime cannery on the shores of Frenchman Bay. In addition to dulse, she grows sugar kelp, skinny kelp, and alaria kelp.

Redmond’s farm is part of a state-supported effort to build an edible-seaweed farming industry. Maine is home to the bulk of the country’s kelp farms; the state’s seaweed harvest is expected to grow from 54,000 pounds in 2018 to 3 million pounds in 2035. It’s an audacious experiment in a country that does not traditionally eat much seaweed, but it is seen as essential to bolstering Maine’s fragile economy.

Driving this investment is fear: Last summer, the Gulf of Maine recorded its all-time hottest temperature — 69.85 degrees. The Gulf is one of the fastest-warming bodies of saltwater on the planet, and the locals know full well that as water temperatures continue to rise, lobsters — by far the state’s most lucrative fishery — will abandon Maine for cooler Canadian waters. Lobster brings over \$400 million dollars in direct revenue to Maine each year, and lures visitors from all over the world to restaurants, seafood shacks, and festivals. But perhaps not for long: In 2018, the Gulf of Maine Research Institute and several research partners estimated that by mid-century Maine’s lobster population will plummet by as much as 62 percent.

To fend off economic disaster, Maine is striving to wean itself from its dependence on lobster, and on all wild fisheries. It has little choice. Wild Atlantic salmon all but disappeared from the state decades ago, as have cod and northern shrimp. Sea urchins have been harvested to near extinction, and wild clams and mussels are increasingly scarce. As one wild fishery after another falters, a growing number of ambitious, far-sighted people like Redmond see the future of Maine — and in some sense the future of food — in the cultivation of water-dwelling plants and animals.

Aquafarming can and does pose real threats — biodiversity and habitat loss, pollution, antibiotic overuse, animal welfare and human rights abuses have all been widely documented, most recently in the Netflix blockbuster *Seaspiracy*. These are all pressing and dire concerns. Still, there is a growing consensus that the world's demand for nutrients cannot be sustainably met through land-based farming or commercial fishing. And that consensus brings opportunity. For Redmond and many other Mainers, the question is not whether to farm aquatic plants and animals, but how to do so in a way that sustains both the state's iconic coastline and its fiercely proud and independent way of life. Answering that question has pitted sustainable aquafarmers like Redmond against large industrial-style farms for finfish like salmon that, many Mainers believe, threaten the very core of the state's seafaring heritage.

Redmond directs me into the bow of her creaky Boston Whaler, revs the 60-horsepower motor, and speeds through the chop to her farm. It's easy to miss, marked only with a sprinkling of what appear to be lobster buoys. We're about a mile offshore, the waves lapping and the air so clear Acadia's Cadillac Mountain — at least 5 miles away — seems almost within reach. Redmond grabs a winch, expertly snares a line snarled with kelp just below the surface, and maneuvers it into the boat.

"Tear off a piece and taste it," she says.

I do. It's slick and kind of rubbery. "It's as salty as the ocean," I say as I chew.

"That's potassium and magnesium salts, not just sodium," she says. "Healthier. Everyone should eat seaweed, and this bay is the perfect place to grow it — nutrient rich, temperatures between 32 and 59 degrees." Kelp plants, which reach 15 feet in length, are grown from fall to early summer, when the water temperature remains well below the summer highs.

FRENCHMAN BAY IS a treasure, part of a larger system of waterways that includes Flanders Bay, Sullivan Harbor, Youngs Bay, Taunton Bay and Eastern Bay. It offers both prime fishing and ideal habitat for birds and seagrass. But because it is served by no large rivers, the bay's ability to flush out waste is limited, making its ecosystem highly vulnerable. "Anything that happens anywhere in this bay affects everything that's in it or depends upon it," Redmond says, as she sweeps her arm across the pristine water toward Acadia National Park. "Can you imagine what an enormous salmon farm would do to all this? They are gambling with our livelihood, our coastline, and our future."

"They" are the Norwegian investors behind American Aquafarms, who have proposed building the world's largest "closed cage" ocean-based salmon farm — 30 circular pens, each 150 feet in diameter — on two sites covering 120 acres in the heart of Frenchman Bay. At full capacity, the annual yield of the farm is projected to be 66 million pounds, three times the total production of the state's only other large salmon farming operation, run by Canada's Cooke Aquaculture.

“Unlike kelp farms, which exist in harmony with the local environment, the salmon farm will require substantial inputs — enormous quantities of food to feed the fish, pharmaceuticals to treat them, and energy to power the pumps and run the barges that service the farms. The very prospect of this “industrial” farm horrifies Redmond, who says it will certainly degrade water quality in the bay, jeopardizing her kelp’s organic status. Fishermen, environmentalists, and home owners throughout the state are actively — and loudly — protesting the proposal to the Maine Department of Marine Resources, the agency considering it. In a three-and-a-half hour “scoping session” via Zoom in June, Aquafarms executives defended the plan to a cadre of outraged locals whose comments ranged from “this project is not welcome in this bay,” to “I disagree with this project a hundred and fifty thousand million percent.”

“Rock Alley, president of the Maine Lobstering Union, lives and lobsters in Jonesport, 66 miles from Frenchman Bay. A near 50-year veteran of the sea, he says ocean-based finfish farms threaten not just his business, but his and the state’s very identity, by hastening the decline of the lobster industry already put at risk by sea warming. “There is no good in any of this,” he says. “The DMR says they’ll protect the water, but there is no enforcement, it’s just pitiful. We want to see generations of lobstermen survive, but if we hand out aquaculture leases to anyone who asks for one, the only place you’ll see a lobsterman is in the movies.”

Jon Lewis worked under Keliher and recently retired after 23 years at the department as a scientist, diver, and most recently director of the Division of Aquaculture under the Bureau of Policy and Management. He believes Rock Alley is basically correct: with only five full-time equivalent employees, the department’s ability to fully enforce regulations or comprehensively inspect most aquaculture installations is limited.

From Norway, American Aquafarms vice president Eirik Jors tells me that the company’s “cutting-edge” closed-pen technology — built around a cavernous fabric bag tucked around the pen to collect debris and ward off pests — will prioritize fish health and “on average” capture 90 percent of solid waste, minimizing ocean pollution and deadly algae blooms. But Lewis notes that the technologies have not been tested under Maine conditions, making their potential for harm unknown.

In late 2019, Maine Governor Janet Mills announced a 10-year strategic economic development plan that included aquaculture as a target industry. Lewis agrees that under the right conditions, aquaculture is an essential industry for Maine, which has the oldest population of any state in the nation, and is near the middle economically, with a per capita income of less than \$33,000 a year. “Society is going to have to accommodate aquaculture,” Lewis says. “There may be some losses, but science has really advanced our ability to grow things in the ocean.” At stake here, he says, is what Maine will look like in 20 years. “Do we want to be the salmon capital of the world, or do we want to be something else, something truer to our heritage? The people of Maine aren’t getting much of a voice in addressing that question.”

Norway is the world standard setter in commercial fish farming, says Henry Sharpe, a former instructor of ocean engineering at the University of Rhode Island, and an environmental advocate who owns waterfront property on Frenchman Bay.

But Norway has strict environmental regulations that include — among other things — limiting the size and density of aquafarming operations. Sharpe says the salmon farm that American Aquafarms has proposed for Maine will have 20 percent to 60 percent higher density of fish than is permitted in its home country. Sharpe is also concerned about the Department of Marine Resources, saying the state's desire for economic development means "the DMR permitting process is biased toward the applicant." He says lack of staffing has led the agency to become "a rubber stamp for developers."

Sharpe foresees the potential for some short-term job growth, but at an existential cost. "Dumping gargantuan amounts of sewage into pristine water is not going to repair the local economy, it's going to destroy it," Sharpe says.

MARSDEN BREWER REPRESENTS the transition Maine is hoping to see. The 64-year-old has spent most of his adult life as a fisherman, but a few years ago turned his hand to scallop farming with his son Robert. I visited Brewer at his home in Stonington, an eminently Instagrammable lobstering town of roughly 1,000 residents on the southern coast of Deer Isle. Brewer is sympathetic to the 26 Bar Harbor-area fishermen who signed a statement of opposition to American Aquafarms's salmon farm. That statement prompted the Bar Harbor Town Council to ask the Department of Marine Resources for intervenor status, allowing the town to participate at public hearings about the Frenchman Bay decision. Their shared concern is that massive farms will erase prime fishing ground for lobster, scallops, shrimp, and other sea life due to pollution and other problems.

"For someone growing scallops, this is a very scary proposition," Brewer says. "When they say they are building 'closed pens,' I don't trust it, not even close. When you get an accumulation of feed and other waste in the water, you can get big algae blooms in the summer, and those can be toxic. Scallops hold onto those biotoxins, so that would spell the end of my business. Not so bad for me, I'm getting on, but I think of my son and his kids."

Brewer himself has spoken out against a proposed land-based finfish farm, one of three in the proposal stage in Maine. Scientists say these land-based farms, one slated for the former paper mill town of Bucksport, one for the rapidly gentrifying coastal town of Belfast, and the third for Jonesport, would be less threatening to open waters than that of American Aquafarms. Still, as proposed, these would be enormous, industrial-style farms that would require huge energy inputs and generate significant amounts of waste. Even if treated assiduously, they could damage adjacent waterways. And unlike the oyster, clam, scallop, and kelp farms developing along the coast, the finfish farms, though they promise "good jobs," are largely foreign owned and offer no guarantee of sustainable employment or long-term economic benefit to the state.

Martin Smith, a Duke University seafood economist, questions whether there will be many high-wage jobs produced by these farms. Salmon farming "is a very capital-intensive industry," he says. "Norway pays its workers well, but it also shifts most jobs to lower wage countries, like Poland." This is also true for wild-caught fish, Smith says: Wild salmon caught in Alaska is shipped to China to be fileted, then shipped back to the United States. The shipping costs are trivial compared with the labor costs. "If the Maine fish farms get really big, there's a chance the fish will be shipped [to countries with existing facilities] for processing, and most jobs will leave the [US]," Smith says.

Most fish farming in Maine is done by private companies, and while regulators have access to data the farms collect or generate, Maine makes data public only when at least three commercial entities exist. Salmon farming currently has just one. So while the companies insist they will sell their fish regionally, reducing the “carbon footprint” produced by fish that is currently imported, the public has to rely on the state to verify that claim.

There has not yet been a public discussion of the sort Lewis and others are calling for, and Keliher, the DMR commissioner, says there can’t be one until American Aquafarms submits a final application. He expects he’s at least a year away from holding one. Avuncular and well spoken, Keliher is a native Mainer who spent his childhood on the water, his adolescence lobstering with his uncle, and his young adulthood as a game and fishing guide.

While Keliher can’t speak directly to the American Aquafarms draft application, which is still under review, he tells me that ultimately his decision depends on data. “We have a very precise process to see whether it fits our standards,” he says, including whether it will interfere with current fishing or navigation interests, or have a significant impact on marine habitat and wildlife. When I ask whether the economic lure of giant fish farms might trump the environmental costs, Keliher is firm. “Absolutely not,” he says.

Joshua Stoll, assistant professor of marine policy at the University of Maine, is not so sure. Stoll, who owns a small oyster farm, is interested in what he calls the “human side” of aquaculture, including its impact on and benefits for coastal communities. “Maine is a fisheries-dependent state, and we’re suffering from collective anxiety about our future,” he says. “The rules and regulations around wild capture fisheries have enabled small-scale community fisheries — scallops, halibut, lobsters.”

But coastal communities won’t necessarily adapt well to industrial commercial farms, Stoll says, adding that the farms have the potential to violate the well-established status of ocean spaces as a public good. “We need a more rigorous dialogue about who benefits [from aquaculture generally], and about serving the well-being of people who live in our coastal communities,” Stoll says.

The fight over a salmon farm in Frenchman Bay is really a battle over the future of Maine, says Sarah Redmond, as she powers us back to shore from her kelp farm. “If you can put something like that [salmon farm] in the shadow of Acadia National Park, you can put it anywhere you want in the state,” she says. She understands the economic argument for it — “My grandfather worked in a paper mill, I get it,” she says. But, she adds, “My dad stayed [in Maine] to work his own land. What gets me is the state believing salvation comes in the form of huge corporations. Yes, you may get a few jobs, but young people won’t come or return to Maine for a job in a polluting, industrial fish farm.”

The Maine tradition, she says, is people working with natural resources in a community with others who are doing the same. “That’s what kept my family here, and that’s what keeps me here. I can’t imagine living my life any other way.”

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