Unprecedented investment in farming technology and practices over the past four years has put BC’s salmon farmers at the top of their game. But public perception of the industry is another story.

Unprecedented investment in farming technology and practices over the past four years has put BC’s salmon farmers at the top of their game. But public perception of the industry is another story. Dialogue is required and that’s going to happen under my leadership with my council,” said Roberts, who was elected by his people as Chief Councillor in April. “Salmon farming is a highly politically contentious issue in my community and being an elected community leader, I want to assure my people that I’ve got their best interests,” he said. He also assured the industry that he has an open mind and is willing to dialogue.

Growing more of seafood locally and growing the jobs and food security that come with it are critical to “chip away” at the United States’ $15-billion seafood trade deficit, according to Chris Oliver, head of NOAA Fisheries.

“It’s the perfect time to highlight NOAA’s larger ‘Blue Economy’ initiative as an important guiding force for our seafood future,” said Oliver. “Despite the historic success of our wild-capture fisheries, we import almost 90 percent of the seafood we consume, at least half of which is farmed. We would like to shift that dynamic and farm more seafood here in the United States.”

He said aquaculture is a growing priority for the agency and for Congress and both are actively promoting and expanding marine aquaculture. He cited a number of actions that support the advancement of seafood farming in the US, including NOAA’s work with US Senator Roger Wicker (R-Miss.) for the introduction of the “AQUAA Act” legislation (short for Advancing the Quality and Understanding of American Aquaculture). The legislation, if passed, is expected to streamline the permitting process in aquaculture and fund industry R&D efforts.

Shellfish growers wage war against norovirus

Orovirus has become a pressing concern in many areas, including in British Columbia where affected oyster farms are shut down during virus outbreaks. Darlene Winterburn, executive director of the BC Shellfish Growers Association (BCSGA), says the association remains firm in addressing the nuisance that caused BC’s shellfish industry over $9 million in lost revenue over six months in 2017.

“We have been working with all levels of government, having intense dialogues with the Department of Fisheries and Oceans, Transport Canada, Environment Canada and others, so that we can better understand what’s happening,” Winterburn tells Aquaculture North America (ANA).
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Mass-produced fully farmed eel forthcoming

Japanese researchers accomplished the complete cycle of culturing eels for the first time in the world in 2010 and now they’re making efforts to make the technology commercially viable.

To put the technology to commercial use, scientists at the Research Center for Self-Sustained Eel Culture in Japan are looking into whether artificially developed young eels, known as elvers, can be raised to adulthood in farming pools just as in ordinary culturing methods where caught juvenile eels are raised in pools, reported The Asahi Shimbun. They distributed a total of 300 elvers to two private farming companies, where they will be raised under different conditions until they grow enough to be shipped.

“Through the commercial farmers’ pool cultivation processes, we will see what kind of challenges remain in connection with eels’ food, the farming environment and other factors,” said the center’s director, Keisuke Yamano.

Report names three drivers of aquaculture growth

Aquaculture can grow by another $100 billion in less than a decade if three key challenges are addressed – genetics, new husbandry technologies, and innovations in aquafeed, says Rabobank.

Switching to more technology-driven and efficient intensive farming technologies were key to boosting production in recent years, says Rabobank.

The Dutch bank believes that another $100 billion can be achieved in less than a decade through modernization and professionalization of aquaculture, while maintaining a strong respect for the environment and local communities. “Switching to more technology-driven and efficient intensive farming technologies has enabled fish farmers to increase production in the last few years. Improved genetics, new husbandry technologies, and innovations in aquafeed will be the three key factors determining aquaculture’s future,” it said.

2019 has been declared the International Year of the Salmon (IYS) to raise awareness and inspire action to protect salmon populations around the world. The IYS is actually a five-year initiative, with 2019 as the focal year. The highlight is a $1.1M research expedition in the Gulf of Alaska, aimed at “filling in the gaps of our understanding of the factors affecting salmon.” The expedition could result in new research that will make the discoveries scientists need to accurately forecast salmon abundance. “We still don’t know the mechanisms that allow us to accurately forecast salmon,” said DFO Emeritus Scientist Dr Dick Beamish. Seventeen other volunteer scientists from China, Japan, South Korea, Russia and the UN will join Beamish. The BC Salmon Farmers Association is a funding partner.
Study: Humane farming could drive US seafood demand

But consumer awareness of such aquaculture practices is crucial

Humans produce practices can play a key role in expanding the market for farmed fish and seafood in the US but it is vital that consumers are aware of them, says a study.

“Adopting humane practices in aquaculture and avoiding the use of antibiotics directly addresses consumer concerns about eating more fish and seafood. Humane slaughter practices may even make farmed fish and seafood more attractive than wild-caught choices,” says Marie Molde of Datassential.

The study, Humane Aquaculture: Opportunities on the Plate, says humane production practices influence the choices of both the US consumer and also individuals responsible for menu and purchasing decisions in the US foodservice industry.

The study found that half of consumers and half of decision makers on what goes on the menu are more likely to purchase fish and seafood that is humanely harvested. More than half of all consumers and decision makers believe that humanely produced fish and seafood is likely to be higher quality, taste better and have better texture.

“Increasing the attractiveness of farmed fish and seafood can create meaningful opportunities over the next several years,” says Wasserman.

In an earlier study, Changing Tastes found that US consumers are on trend to reduce about 20 percent of beef consumption by 2025 because of animal welfare issues and antibiotic use. They plan to replace it with fish and seafood.

“US consumers now have the same concerns about eating fish and seafood, probably because of what they know about meat and poultry,” says Marie Molde of Datassential.

Here are the other findings of the Humane Aquaculture study:

• US consumers and decision makers are more aware and concerned about live slaughter and antibiotic use for both wild capture and farmed fish
• Consumers are much less aware of other production practices, like stunning, transport, and clipping. Consumer and operator concern about humane treatment increases once they become aware of these practices

“While adopting humane practices and eliminating antibiotic use can improve the US market for fish and seafood, not making improvements may pose a risk to the industry’s reputation and the appeal of farmed fish and seafood,” Wasserman added.

— Liza Mayer

Fish farming in Gulf of Mexico delayed further

Aquaculture development in the waters of the Gulf of Mexico will have to wait further after a federal judge in New Orleans ruled that NOAA does not have authority to regulate aquaculture in the area. NOAA said it is considering whether to appeal the ruling.

“While it is important to note that this ruling is not a prohibition on marine aquaculture, either nationally or in the Gulf of Mexico, and we will continue to work with stakeholders through existing policies and legislation to increase aquaculture permitting efficiency and predictability,” said Jennie Lyons, NOAA Public Affairs Deputy Director.

But uncertainty around who’s in charge has kept businesses from applying for permits. It will be three years this January 2019 since NOAA opened the federal waters in the Gulf of Mexico to fish farming. It will allow up to 20 industrial facilities and collectively 64 million lbs of fish to be produced each year in giant net cages in the Gulf of Mexico.

“Given conflicting court decisions and the desire for regulatory certainty, NOAA supports congressional efforts to clarify the agency’s statutory authority to regulate aquaculture,” said Lyons.

Seafood CEOs commit to ocean sustainability

Efforts to put the world’s oceans on a pathway towards sustainability got a major boost in September with the announcement of a major initiative.

CEOs of 10 of the largest seafood companies in the world behind the Seafood Business for Ocean Stewardship (SeaBOS) announced they will increase their efforts to strengthen sustainable practices in the seafood industry following their meeting in Japan.

They agreed to address key topics affecting ocean health and seafood sustainability, including Illegal, Unreported and Unregulated (IUU) fishing and modern slavery. They committed to improving transparency in reporting, substantially reducing their use of antibiotics in aquaculture and the use of plastic materials in their supply chains.

Members of SeaBOS include salmon farmers Marine Harvest ASA and Cermak, aquafeed companies Skretting and Cargill Aqua Nutrition and tuna fishers Thai Union Group PCL, Dongwon Industries and Kyokuyo.

Participants (L to R): Carl Folke (Stockholm Resilience Centre), Knut Nesse (Nutreco), Therese Log Bergjord (Skretting), Thiraphong Chansiri (Thai Union), Geir Molvik (Cermaq), Einar Wathne (Cargill Aqua Nutrition), Alf-Helge Aarskog (Marine Harvest), Henrik Österblom (Stockholm Business for Ocean Stewardship (SeaBOS) announced they will increase their efforts to strengthen sustainable practices in the seafood industry following their meeting in Japan.

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Ocean acidification is making oysters smaller, says study
Credit: Adobe Stock

Climate change making oysters smaller

A new study focused on Sydney rock oysters has found that the oysters are getting smaller due to coastal acidification.

A Natural Environment Research Council (NERC) study carried out by Scottish and Australian scientists at two commercial oyster farms in Wallis Lake and Post Stephens, both in the mid-north coast of New South Wales, confirmed that the oysters’ diminishing size and falling population is due to acidification from land and sea sources.

While the Sydney rock oyster research project focused on Australian aquaculture, lead author Dr Susan Fitzer warns that seafood lovers around the world could begin to find smaller and smaller oysters on their plates because of the increasing acidity of seawater.

“The first thing consumers may notice is smaller oysters, mussels and other molluscs on their plates, but if ocean acidification and coastal acidification are exacerbated by future climate change and sea level rise, this could have a huge impact on commercial aquaculture around the world,” said Fitzer, a NERC Independent Research Fellow at the University of Stirling in Scotland.

Increasing amounts of carbon dioxide (CO2) in the atmosphere from fossil fuel combustion, land-use change and other human activities result in increased CO2 being absorbed by the ocean. That combination of CO2 with seawater makes the water more acidic, said another study, The US West Coast Shellfish Industry’s Perception of and Response to Ocean Acidification.

Scourge of fish farms becomes useful

In one of several new initiatives to develop more sustainable live feeds for hatchery fish, a Norwegian company has developed a product that makes use of what is deemed a burden to fish farms and shellfish farms alike: barnacles.

The company, Planktonic AS of Norway, harvests barnacles from the ocean, extracts the eggs from inside the barnacles before they have the opportunity to start feeding, and then cryopreserves them. The cryopreservation process keeps them alive and disinfected. They are then packed into flasks. When this feed is to be used, it is thawed in seawater, and the barnacles then become “alive” again and therefore constitutes a natural feed for the juvenile fish.

Commercial trials earlier this year showed 50-percent larger bream juveniles and 75-percent larger bass, better survival and improved resistance, reported the Global Aquaculture Advocate.

Planktonic will not only rely on wild barnacles, said the report. It has secured three licenses to farm them in Norway.
**Study underway to make raw oysters safer to eat**

The USDA is funding a study that seeks to find out what causes Vibrio levels to rise in farmed oysters. The bacteria causes foodborne illnesses in people who eat raw or undercooked shellfish.

Dr Bill Walton of Auburn University will focus his study on oysters raised using off-bottom farming technique. The technique involves raising the baskets of oysters from the water once a week to air-dry them to prevent barnacles and other invasive species from attaching themselves to the oysters. Walton will find out whether an oyster farm’s geographic location, handling practices, and choice of equipment affect Vibrio levels in these oysters.

“Through his project, Walton should generate valuable data for Gulf Coast oyster farmers, who focus on producing exceptional oysters for high-end markets, such as upscale restaurants that offer the farmed bivalve mollusks on the half shell,” Auburn University said in a press release.

The USDA has given more than $450,000 for the three-year research project.

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**Crustaceans lead aquaculture growth**

Modernization, professionalization, the emergence of intensive and semi-intensive farms drove the growth of the crustacean sector, making it the fastest growing aquaculture segment from 2010 to 2016, according to RaboResearch, citing FAO statistics.

Between 2010 and 2016, the global aquaculture industry nearly doubled its value, increasing by $100 billion. Crustaceans represented 28 percent of the total industry value growth over the period. Beyhan de Jong, Associate Analyst Animal Protein, says that shrimp has been a key driver of that growth.

“Major changes to farm design, nurseries, water processing ponds, using better genetics and many other improvements are done to prevent EMS outbreaks,” she said.

De Jong notes that while other regions have suffered from disease outbreaks, India and Ecuador became the main producers and exporters of shrimp and many farmers in those regions have shifted from extensive farming to intensive farming.

For the growth to continue, de Jong says the industry should look at digitalization, which could help reduce costs, improve real-time business and apply more strategy in supply planning, purchases and sales. It will also improve traceability, which is important to consumers. The application of next-generation genetic enhancements will help. Recirculating aquaculture systems could also become a major player in the future, she said.

Another potential issue, de Jong says, is supply and demand. The supply currently exceeds demand, and with lower prices and tight margins, it may be challenging to attract investment. However, this could be an opportunity for processors to create new products and to work on innovation and value creation.

— Matt Jones

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Aquaculture workforce grows

More than 19 million people around the world are employed in aquaculture, with women accounting for an estimated 14 percent, according to the United Nations Food and Agriculture Organization’s (FAO) biennial report, *The State of World Fisheries and Aquaculture.*

Looking at employment in capture fisheries and aquaculture as a whole, the proportion of those employed in aquaculture increased from 17 percent in 1990 to 32 percent in 2016. The figures reflect aquaculture’s robust growth and crucial role in feeding the world’s population. In contrast, the proportion of those employed in capture fisheries declined from 83 percent in 1990 to 68 percent in 2016.

Employment in aquaculture was concentrated primarily in Asia (96 percent of all aquaculture engagement), followed by Latin America and the Caribbean and Africa. The report defines employment as full-time, part-time or occasional basis.

European farmed salmon genes in Bay of Fundy cause conflict

The Live Gene Bank report’s supplemental text listed aquaculture as a ‘likely’ source but these were speculations; no analysis was done, says DFO official

By Matt Jones

On August 31, Fisheries and Oceans Canada (DFO) released a report on the Live Gene Bank, a program designed to help prevent the extinction of Atlantic salmon in the inner Bay of Fundy. The report confirmed the presence of European farmed salmon genes in the area and touched off a conflict over who to blame for their presence.

Kent Smedbol, manager of the Popular Ecology division of the Bedford Institute of Oceanography with DFO Science, says that the report was based in part on a science advisory meeting held in 2017, which included external and internal experts, geneticists and stakeholder groups. Smedbol himself was chair for the meeting.

“It was very much a science meeting to evaluate a science program,” says Smedbol. “Are we doing the best job that we can? Are there things that have been learned in the interim during that 15-year period that could be brought to bear within our methodologies that we use and overall evaluation of the program?”

Smedbol says that the program examined the genotype of about 180 to 200 fish every year and would generally find evidence of European farmed salmon genes in around 15 of them. The study did not examine potential origins of European salmon in the area.

“It wasn’t an objective of this study,” says Jeff Cline, a DFO senior agriculture management officer in St. George, New Brunswick. “It was, ‘if introgression exists, are we doing a good job at minimizing it?’ The answer is yes.”

However, a comment in the supplemental text of the report listed aquaculture as a ‘likely’ source. Smedbol says that was based on speculation by participants in the 2017 meeting.

“There were some people throughout with this idea that it was likely from farming, but there was no analysis done,” says Smedbol. “There were individuals at the meeting who may have voiced that opinion, but there’s no analysis done to confirm it.”

That addition to the supplemental text led the Atlantic Salmon Federation to release a statement in September, calling the revelations of the report “disturbing.”

Tom Smith, executive director of the Aquaculture Association of Nova Scotia, says he is dismayed that his organization was not invited to take part in the process, and that aquaculture is being blamed without definitive proof.

“There’s nothing in the research that indicates that it is the likely source,” says Smith. “This is a commentary from the writers of the report that we find misleading, to be perfectly frank. The strain of salmon that we farm in Atlantic Canada is exclusively St. John River strain.”

As for other potential sources, Smith notes that European strains have been found in Newfoundland, and if they could make it as far as Newfoundland, why not to the Bay of Fundy?

Smedbol also acknowledges that there are a host of potential explanations.

“It runs the whole gamut from strays all the way over from Europe to previous hybridization or escapes from other locations, like there are from farming,” says Smedbol. “There are a lot of potential options, but we didn’t evaluate any of them.”

Smith encourages DFO to visit hatcheries and farms and test their salmon stock.

Funding to boost NL’s aquaculture labor market

The Provincial Government of Newfoundland and Labrador is investing around $500,000 (C$588,000) to boost employment opportunities in the province’s aquaculture industry.

The fund, which was disbursed to the Newfoundland Aquaculture Industry Association (NAIA), will be used to develop “labor market information tools and products.”

“This initiative with the provincial government we will be positioned to succeed in providing additional year-round employment to dedicated farmers of the sea in rural coastal communities,” said Mark Lane, executive director, NAIA.

The funding comes at a time when the Canadian aquaculture industry is suffering from labor shortage. Latest data available from the Canadian Agriculture Human Resources Council indicate that there is an 11-percent vacancy rate in the industry and millions of dollars in lost revenue because of it.

Northern Harvest spawning team. More than 19 million people around the world are employed in aquaculture Credit: Jennifer Caines

“There were some people throughout with this idea that it was likely from farming, but there was no analysis done.”

— Kent Smedbol, manager of the Popular Ecology division of the Bedford Institute of Oceanography

Credit: NAIA

The grant will support Newfoundland’s aquaculture labor market.

The Live Gene Bank report’s supplemental text listed aquaculture as a ‘likely’ source but these were speculations; no analysis was done, says DFO official

Tom Smith, executive director of the Aquaculture Association of Nova Scotia, disputes the idea that aquaculture is responsible for traces of European farmed salmon genes in the Bay of Fundy

The grant will support Newfoundland’s aquaculture labor market. Credit: NAIA

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The grant will support Newfoundland’s aquaculture labor market.
Among these are work with the BC Ministry of Agriculture to help farmers impacted by norovirus. The Ministry announced $1.34 million in funding, of which $1 million was allocated to an Oyster Seed Recovery Fund to ensure farmers have product to harvest in two years and another $250,000 focused on research specific to understanding norovirus and working towards early detection tools.

Another project was initiated with Dr Jim Powell, CEO of the BC Center for Aquatic Health Sciences. Powell’s team is working on a molecular tool to detect norovirus prior to harvesting. There is no way to know if oysters have been contaminated by norovirus so early detection would be an invaluable tool. Researchers at the University of British Columbia are also conducting work in this area. If an early detection tool was available, it would minimize human illness associated with consumption of raw oysters and reduce the financial impact on growers if farms are closed due to an outbreak.

“Norovirus is complicated because nobody knows definitively what’s happening in the marine environment,” says Winterburn. “We’re quite pleased that we have assay research underway and that the Ministry of Agriculture and others are supporting broader research into norovirus. The work completed by Dr Powell’s team has been positive, but it is one piece of a much larger puzzle.”

The BCSGA is also working with science partners to better understand other pathogens and environmental stressors. Farmers’ adherence to protocols resulted in a below-average year for outbreaks in BC, but the naturally occurring bacteria remains a worldwide phenomenon that the shellfish industry will have to deal with. According to the CDC, vibriosis causes an estimated 80,000 illnesses and 100 deaths in the United States annually. People become infected with vibriosis by swallowing seawater, consuming raw or undercooked seafood or exposing a wound to seawater.

“We are very excited about the work that is being done by Dr Tim Green at Vancouver Island University, our partners at the Hakai Institute and others around the province,” says Winterburn. We have some amazing scientists and students working on projects that will result, we hope, in more resilient oysters, a better understanding of environmental stressors and solid approaches to address issues the industry has faced with norovirus.”

When asked about this summer’s oyster mortality, Winterburn said it is a worldwide phenomenon that seems to be driven by a spike in temperatures. She said it has prompted the industry and academics to collaborate to better understand the problem locally. Researchers from the Vancouver Island University, DFO, the University of Victoria, the UBC, and the Hakai Institute are involved in the undertaking.
The big switch
Family converts former pig farm into Nebraska’s only shrimp producer

By Matt Jones

The Pretzer family farm goes back to the 1940s, producing crops and livestock in the community of Diller, Nebraska. But a little over a year ago, Scott Pretzer decided a disused pig barn was an ideal site for his Pacific white shrimp project. Today, Rock Creek Shrimp stands as a unique producer in a state better known for corn, beef or wheat.

“IT’s an aboveground tank system in our building,” says Pretzer. “So it’s all indoors, we recirculate all the water, and do it antibiotic-free. It’s environmentally friendly with minimal environmental footprint because we don’t discharge anything into the environment. We can grow them antibiotic-free, and all the water is recycled in this system. We liked that aspect. We love the product we’re raising, but we also really like the way it’s raised.”

Sustainability is a key factor for Pretzer. He says that one must be wise in utilizing land and resources, and he believes aquaculture is a perfect extension of agriculture. But it has been a learning process. While operating under many of the same basic principles as agriculture, aquaculture is an entirely different beast.

“It’s a lot of little things,” says Pretzer. “We learn something every day — whether we learn by doing it right, or we learn it when something doesn’t go as well as we planned. We hear a lot of good feedback about the product.”

Rock Creek Shrimp’s operation takes place in eight vinyl aboveground swimming pools, with a PVC pipe framework holding a tarp in place to contain the shrimp. The shrimp are flown in from a hatchery in Florida in batches of 33,000. They feed a specialized antibiotic-free feed, which includes soybean plant protein. When ready to harvest, the shrimp are humanely killed in ice water, and packed with ice to keep them fresh.

Pretzer’s grandfather started the hog farm after World War II, and his (Scott’s) father, Verne, started working it in the 1970s. While technically retired, Verne still helps out on the farm every day, and was in fact the one to suggest looking into shrimp farming. Today, Pretzer’s children, Reid and Skylar, also work on the farm, becoming the sixth generation of the family to work in farming.

“We’re just a true family operation,” says Pretzer. “We’re on the farm every day, and was in fact the one to suggest looking into shrimp farming. Today, Pretzer’s children, Reid and Skylar, also work on the farm, becoming the sixth generation of the family to work in farming.

“IT’s a lot of little things,” says Pretzer. “We learn something every day — whether we learn by doing it right, or we learn it when something doesn’t go as well as we planned. We heard a lot of people that say, ‘well, it’s really neat that you’re doing this, utilizing an old building, trying something new.’ The people that try the shrimp love the shrimp, and so we hear a lot of good feedback about the product.”

Looking to the future, Pretzer says that he’s interested in using the experience they’ve obtained to expand into different types of aquatic livestock. He is researching other options, as there is more space to expand at their facility.

“We are still in the growing phase of shrimp and we want to get that just right before we move onto something else,” says Pretzer. “But we have the site, and that’s what’s really nice about it. We have the site ready when we want to expand. If we do something like tilapia or yellow perch, that’s the way we plan to do it.”

Pretzer is also interested in exploring the use of other techniques, such as aquaponics, but is emphatic that he doesn’t want to rush into anything until the conditions are just right.

“That’s part of the reason why we’re not doing it right away. I know it involves a substantial cost — aquaponics -- so if we do it, we want to do it right from the start.”

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Study identifies non-toxic antifouling treatments

Antifouling coating on nets provides effective protection against tunicates. The contrast is instantly visible between the treated (bottom) and untreated lantern nets after a month in the waters of Havre-aux-Maisons lagoon in Quebec, Canada. Credit Merinov

A silicon-based non-toxic antifouling coating provides a promising effective protection against biofouling on shellfish farm structures, a study says. Biofouling is a major problem for shellfish farmers because it damages and compromises the buoyancy of structures and could suffocate and increase the stress levels of the shellfish.

“There are two types of treatments that exist for biofouling and both of them could be very expensive, accounting for 15 to 20 percent of total production costs,” said Dr. Nicolas Toupoint, industrial researcher at the Center of Expertise in Mariculture at Merinov.

Preventive measures require frequent monitoring of the structure. Active measures call for mechanical or chemical cleaning.

At Aquaculture Canada 2018, Toupoint presented the study, Innovative Strategies for Biofouling in Shellfish Farming. It looked into non-biocide antifouling treatments for shellfish farms in the Magdalen Islands, located off the province of Quebec, Canada.

Tunicates, which appear in colonial or solitary forms, have been identified as invasive species. The trials, which were conducted a year apart, experimented on using Product A, a silicon-based coating with photoactive action (peroxide); and Product B, a fouling-release coating with physical action. They were deployed on Japanese lantern nets containing oysters (Crassostrea virginica) and giant scallops (Placopecten magellanicus). Complementary assays were also performed on several substrates, such as polyethylene, nylon and Vexar for nets or PVC for plates.

The performance of the products depends on the substrate and season. “The use of non-biocide coating could be interesting,” he said. One formulation of Product A was very promising, particularly for hard substrates, Vexar PVC, in the summer by reducing nearly 80 percent of the biofouling covering. Product B showed positive short-term performance on polyethylene during autumn.

Also, trials performed with biological controllers (cleaners) showed that they could be a potential alternative treatment. “Maybe it will be applicable if there is an easy supply and also if we could valorize them,” he said.

No detrimental effect was observed on bivalves for every tested treatment. Oysters were also observed to achieve better growth during winter. Globally, more research and development is needed to transfer such technologies to the industry, and to limit invasive species propagation.

– Ruby Gonzalez

Antifouling coating on nets provides effective protection against tunicates. The contrast is instantly visible between the treated (bottom) and untreated lantern nets after a month in the waters of Havre-aux-Maisons lagoon in Quebec, Canada. Credit Merinov

Before

After

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– Ruby Gonzalez
**Investing in the world's oceans**

The world’s richest government-owned investment fund has urged companies it invests in to integrate ocean sustainability into their strategy. Norway’s Norges Bank Investment Management, whose fund value reached a record $1-trillion last year, said many companies in its investment portfolio depend on the ocean as part of their business model.

It now requires them to integrate measures that will help to identify and minimize the impact of their activities on the ocean. The fund has investments in the Huon Aquaculture Group of Australia.

“The ocean is a vital part of the biosphere and an important part of the global economy,” Yngve Slyngstad, the fund’s CEO. “We expect companies to manage the challenges and opportunities related to sustainable use of the ocean,” Slyngstad added.

**‘Cellular aquaculture’ innovator attracts investors**

A US startup pioneering a technique of producing lab-grown seafood products has attracted the attention of investors. BlueNalu of San Diego, California is in the business of cellular agriculture, which is the creation – in the laboratory – of animal products such as meat, milk, and eggs from cell and tissue cultures. In BlueNalu’s case, seafood will be grown directly from fish cells.

The company says its cellular aquaculture process will provide the industry with a more sustainable way of producing seafood. The company has attracted $4.5 million in seed funding.

**Grieg Seafood on track to higher harvest**

Grieg Seafood expects harvest of 75,000 tonnes in 2018, up 20 percent from 2017. The figure is however lower by 5,000 tonnes of the initial guidance for the year because of health and environment issues at its Rogaland and BC sites in June. Grieg said it remains committed to its long-term target to increase production by at least 10 percent annually until 2020; it aims to harvest 100,000 tonnes that year.

It also aims to achieve production cost "at or below the industry average." Increased volumes, improved capacity utilization and shorter production time in sea will contribute to higher efficiency and reduced production costs. The Group also continually undertakes cost-reducing initiatives and has established an internal improvement prog.

**Upgrade project approved**

Northern Harvest Smolt Ltd has received approval to begin its $51-million expansion work at its Indian Head Hatchery in Stephenville in Newfoundland and Labrador.

The Indian Head Hatchery provides smolt to the licensed sea cages of Northern Harvest Sea Farms, which now belongs to Marine Harvest. The $51-million expansion project will boost smolt production capacity to 6.7 million per year.
While on sabbatical leave, I spent time in the Northeast of Brazil with Dr. Janaina Mitsue Kimpara from Embrapa (the Brazilian Agricultural Research Corporation) looking at the compatibility of aquaculture activities within Brazil’s complex network of different categories of conservation units.

What struck me was the fact that Marine Protected Areas (MPAs) in the western world are still largely based on a principle that excludes other activities and are essentially “no touch zones,” with a top-down approach.

Brazil, like some other developing countries, adopts the approach laid out by the organization International Union for Conservation of Nature (IUCN) in which there are seven types of reserves, with types V and VI allowing some sustainable activities. The western world could learn much from this pragmatic approach. Instead, what we see are extremes: conservationists who fiercely oppose development at all costs, and tenants of intensive activities without much concern for sustainability. There is a need to find balance between these two extremes, one that will allow some sustainable activities within the MPAs framework. This also means that the bottom-up and top-down approaches need to meet in the middle.

In 2010, under the United Nation Convention on Biological Diversity, 168 parties (including Canada) agreed to safeguard 10 percent of their coastal and marine areas by 2020 to improve the status of biodiversity (the so-called Aichi biodiversity target 11). In 2015, a number of signatories set an intermediate domestic target of 5 percent for 2017. In 2016, the IUCN World Conservation Congress passed a motion to protect 30 percent of oceans by 2030. As of June 2018, the conserved areas contributing to marine conservation targets in Canada represent 7.9 percent and all are fisheries area closures.

The debate over what MPAs should become, especially in tropical regions, has seen an evolution during recent editions of the Monaco Blue Initiative (MBI), under the auspices of HSH Prince Albert II of Monaco. Exclusion zones are often not the solution for local human populations, who end up losing their traditional occupations, are displaced and resent the MPA concept. Maintaining some activities along the coast, aquaculture and fisheries for

Swedish first seaweed farm is located in its first marine national park, Kosterhavet National Park. Reconciling nature conservation and sustainable development is possible.

– Thierry Chopin
Marine Protected Areas and sustainable aquaculture are not incompatible; they could, in fact, work together

BY THIERRY CHOPIN

example, should be allowed, as long as they are conducted in a responsible and sustainable manner, are compatible with MPA targets, and provide food and nutrition security, poverty alleviation and socio-economic resilience to the local communities. Local eco-tourism could significantly help the aquaculture sector gain societal trust and license to operate.

Finding the first 7.9 percent of coast to dedicate to MPAs was relatively simple. Finding the next 2.1 percent (or 22.1 percent) will be more difficult, as it involves more areas with human populations and activities. A mosaic of small MPAs (points of least resistance by human communities) will not be the solution. In Canada, it is becoming clearer that the wonderful, land-based, National Parks of the nineteenth and twentieth centuries are sometimes not large enough, and are especially lacking buffer and transition zones, corridors for migratory populations and an understanding of seasonality in the visitation by wild species. We need to transfer this management knowledge to the marine environment.

During the MBI 9th edition, in Edinburgh in April 2018, a consensus emerged that farming of seaweeds and invertebrates had much greater potential for integration with MPAs than finfish. Organisms like seaweeds, sea cucumbers, shellfish, sea urchins, crustaceans and sponges can provide alternative livelihoods while advancing conservation objectives. Models of community co-management need to be developed. It is important to remember that finfish represent only 11.2 percent of the world’s mariculture production. Consequently, aquaculture is not necessarily synonymous with fish aquaculture, or salmon aquaculture; there are other models in the world and we need to learn from them.

Integrated Multi-Trophic Aquaculture (IMTA), combining fed and extractive species of fish, seaweeds and invertebrates, was also seen as sustainable and compatible with MPAs. The appropriate and complementary species can be selected at the appropriate scale to suit the particular MPA and its proper management.

The ecosystem services provided by such systems (e.g. nutrient biomitigation, irrigation-less/deforestation-less food production, oxygen provision, habitat/biodiversity restoration, carbon sequestration, coastal acidification reduction, etc.) need to be understood and valued to realize how well they are in line with MPAs governance and management goals within a circular economy approach. They could be used as financial and regulatory incentive tools (e.g. nutrient trading credits). The IMTA multi-crop diversification approach could be an economic risk mitigation and management option to address pending climate change and coastal acidification impacts.

The time has come to realize that there is conceptual convergence between MPAs and sustainable aquaculture, to identify the potential opportunities and to implement the synergies that can enable aquaculture and conservation to work together more effectively and benefit each other. If top-down decisions on MPAs are made without bottom-up buy-in, we could end up with beautiful tools theoretically, but not functional or implementable in reality, thereby missing their raison d’être.

Interestingly, the first seaweed farm in Sweden is located in the first marine national park of that country, Kosterhavet National Park, established in 2009. The park came into existence after many discussions between the local community bottom and the regulatory top, who were able to meet in the middle for a fruitful dialogue that led to a combination of protective measures while allowing a number of seasonal and well geo-referenced activities such as fishing (mainly northern prawn, Norwegian and European lobsters and mackerel), recreational boating and, since 2015, a sustainable form of aquaculture. It is remarkable to see how consultation, common sense and pragmatism allowed the development of a park that can integrate nature preservation objectives with viable economic and societal goals for the local human communities.

Thierry Chopin is the Director of the Seaweed and Integrated Multi-Trophic Aquaculture Research Laboratory at the University of New Brunswick, Saint John, Canada.
Because of warming water temperatures, it is still uncertain whether regulators will open it in 2019. “We are certainly seeing some environmental changes. People are concerned about what the future’s going to hold. We’ve seen water temperatures that are higher than normal but we don’t know whether that’s a short-term or long-term trend so we’re tracking that very closely,” Sebastian Belle, executive director of the Maine Aquaculture Association, tells Aquaculture North America (ANA).

Tighter limits on herring fishery, the number one bait to catch lobster, is expected to have further dramatic impact on the lobster industry. Maine-based Barton Seaver, renowned chef, author and advocate for sustainable seafood, is worried the state’s lobster industry might cease to exist. “Our lobster industry is booming but it is facing unprecedented crisis due to the bait shortage,” he told participants at the Seafood West Summit in Campbell River, British Columbia in September.

Ironically, what’s triggering the decline of fisheries in the state is also driving the expansion of its aquaculture industry. “Certainly there’s a recognition that if working waterfront communities are going to survive they have to use some new tools to diversify their economic base and aquaculture is one of those. There’s interest in those coastal communities in aquaculture because it is a way for those communities to maintain their maritime heritage,” says Belle.

He recalled how Maine Aquaculture Association’s membership was largely comprised of biologists and graduate students when it was founded 40 years ago. “Now I could say that roughly 70 percent of our members, or

Maine ticks all the boxes as an ideal incubator of aquaculture enterprises: it has a culture around marine food production, a working waterfront, and a world-renowned reputation for premium quality seafood. Why it is just a bit player in the aquaculture industry is perhaps understandable. Its lobster fishery contributes $1 billion to the state’s economy annually and generates 4,000 jobs.

Something’s stirring in Maine

Aquaculture comes to the rescue as the economic engine that has provided livelihoods for coastal communities for generations faces setbacks

BY LIZA MAYER

Maine seafood fetch 10-20 premium over others, says the Maine Aquaculture Association

By comparison, aquaculture (includes farmed salmon, shellfish and seaweed) has a direct economic impact of $73.4 million in output, 371 in employment, and $35.7 million in labor income, according to a January 2017 Aquaculture Economic Impact report from the University of Maine. Anecdotal evidence suggests warmer temperatures to be the major culprit in the decline of fisheries in the state. Lobster landings in 2017 have fallen by roughly 20 percent to $434 million from the record $540 million in 2016. Maine’s shrimp fishery has been closed since 2013 also because of warming water temperatures. It is still uncertain whether regulators will open it in 2019.

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Maine is an important part of Cooke’s business,” says Joel Richardson, vice president of public relations at Cooke Aquaculture Inc. “We operate three freshwater hatcheries, a hatchery, sea site, and processing capacity. We currently hold 25 saltwater marine farm leases and have one new site in the approval process for Beal’s Island,” he says.

Atlantic salmon farming in Maine has been around since the 1970s. Over 25 million pounds of farmed salmon was harvested in 2010, or 11.3 million kilos, with a value of $74 million. The Maine Department of Marine Resources explained the 10-year-old data: State laws require three or more entities reporting to release harvest numbers publicly, since Cooke is the only entity reporting since their consolidation into a single company in 2011, public reporting has not been required.

“We have 25 ocean sites and we are getting new ones over the next couple years,” says Belle. “We are getting some growth in our traditional salmon farming community but we don’t have the kinds of sites available to us that other parts of the world might have.”

The arrival of two massive land-based aquaculture projects in the state – Nordic Aquafarms and Whole Oceans – has certainly “hyped” Maine’s profile as farmed salmon producer, says Belle. “But it’s too early to know how these RAS projects will impact the US role as a farmed salmon producer. We have to wait and see how successful the land-based operations will be. Their success will determine whether or not we will become a bigger producer than we are now.”

Belle’s immediate concern is educating the public about aquaculture and protecting the environment. Maine, he says, has been attracting a lot of retirees, second only to Florida. “Many of those people are not used to a working waterfront. They have questions about what aquaculture is and what a working waterfront is.

“So we have a lot of public education to do to try to explain to people what we do and how, and why, in particular, the environment is so important to us. We are concerned that coastal residential development in particular has the potential to hurt the environment and we don’t want that to happen,” says Belle. Part of that goal is to help new farmers help adhere to the best management practices, he adds.

It is through public education and constant vigilance about environmental protection and sustainability that Maine will maintain its reputation as producer of quality seafood. “The Maine brand is viewed very positively. For our aquaculture products in the state, we typically get paid 10 to 20 percent higher prices than our competitors,” says Belle. And that is something he certainly wants to remain unchanged.
**FARmed Salmon Review**

**continued from cover**

The politics of farmed fish

“It should come as no surprise but elected governments tend to do things that they think are popular and they shy away from things they think are not. And I know, because I've been there. I've been on the inside. Doing this work to get our message and our commitment clear is critical to building up our social licence and also critical to building a path for good policy decisions,” Fraser told the audience.

It is unfortunate, he acknowledged, that science is often ignored by anti-salmon-farm activists, whom he called “opinion opponents,” borrowing a phrase from Marine Harvest chairman Ole-Eirik Leroy.

“If you spend significant time with the research, literature, and the science and you look at the progress and the processes that are in place right now on the coast, here in British Columbia, you might actually conclude that we're doing it really well. In fact, we're doing it so well that people come to us, and look at us, and learn from us,” Fraser told Aquatecure North America (ANA) in an interview.

More than one study has shown that farmed salmon has the lowest carbon footprint (9.8) than any commercially raised food, such as chicken (43.2), pork (56.7) and beef (337.2). BC farm-raised salmon, specifically, has the lowest overall environmental cost ($0.59/kg) of any of the major protein options available to consumers today, than chicken (0.73/kg) pork ($1.04/kg) and beef ($3.45/kg).

But those whose minds are made up often ignore such data. It is a frustration shared by Mark Lane, executive director of the Newfoundland Aquaculture Industry Association: “Twelve percent of Newfoundlander’s either disagree or strongly disagree with the industry. They’re enabled by some media, unfortunately, who do not understand what we do or ignore the truth. The 12 percent will never change their mind about aquaculture no matter how much time we spend on educating them,” Lane told ANA.

The controversial salmon escape incident at a salmon farm in Washington State over a year ago and the subsequent banning of net pen aquaculture in the state has elevated the toxic rhetoric. Emotions are easy to inflame when pictures of salmon with sea lice are published, and republished. Feelings also get roused when newspapers trumpet “new proof” that fish farm escapes interbreed with wild salmon, no matter if the study being quoted is at least two years old and has been published by the same news outlet before.

“We need to have more dialogue with the public because there's lots of work to do in terms of earning public trust,” Fraser said. “There's no question the public and their concerns, of wild salmon are important, and that's good, and the industry is very aware of that.”

This past winter, BCSFA conducted a series of dialogues where community members voiced their support, their concerns and vision for the industry. Through the exercise, the association discovered that the communities’ top three values or concerns were ecological sustainability and ocean stewardship; Science and academic research; and way of life continuity for future generations.

The dialogues also revealed that people recognize that the salmon aquaculture industry offers opportunities for advancing the cause of wild salmon. “We discovered that as we asked people if they will be part of our salmon protectors' program they were more than willing, but this is not what the public is hearing,” said Stewart Muir of Headwaters Strategy Group, the consultancy that helped BCSFA conduct the dialogues. Results of those conversations are captured in the newly launched website, www.sharingwildsalmon.com.

Despite the challenges, Fraser thinks he arrived at an exciting time. Aquaculture is now the fastest growing food-production sector, and BC is an industry leader. Progress is not just confined among producers themselves, but the entire industry ecosystem.

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John Paul Fraser

**Staff process Chinook salmon harvest at Creative Salmon in Tofino, BC, the only organic salmon producer in North America. Farm-raised salmon is BC’s highest valued seafood product and the province’s top agricultural export, contributing over $1.5 billion and 6,600 jobs to the province. Photos: Lisa Mayer**

Campbell River accounts for almost one quarter of aquaculture employment in the province. Three of the world’s leading aquaculture companies – Cermaq, Marine Harvest and Grieg Seafood – have their North American head offices in this town. Roberts’ non-commitment is a telling moment in the battle the farmed salmon industry now faces in the region. If salmon farming has difficulty securing social license in communities that seem to clearly benefit from the industry, one can just imagine how much tougher it will be to win over communities far removed from it.

Such is the environment that John Paul Fraser found himself in when he took over the role of executive director of the BC Salmon Farmers Association (BCSFA) in August. But having spent years as a communicator working in the federal government, the native British Columbian wasn’t surprised. He knew that Atlantic salmon farming, like so many other industries on the coast, has broad economic and political implications. It can spark fiery rhetoric on both sides of an issue.

“In the late 80s working with the Minister of Fisheries as his press secretary, I saw firsthand at that point really how supercharged West Coast fish politics is,” Fraser said at the same summit.

Just days earlier, two motions were presented at the convention of the Union of BC Municipalities (UBCM) held in Whistler BC: one from the City of Victoria calling on the province to mandate salmon farming to move on land; another from Campbell River calling for the province to ensure a science and evidence-based approach when deciding on fisheries management and environment protection. The second resolution passed. It’s a victory, but Fraser is likely to see many more such duels in the future.
NOVA SCOTIA: Open for business

Tom Smith of the Aquaculture Association of Nova Scotia looks back on a year of growth and looks forward to a robust 2019

BY MATT JONES

2018 saw continued and substantial growth for the aquaculture industry in Nova Scotia. Aquaculture Association of Nova Scotia (AANS) executive director Tom Smith says that after several challenging years, including adapting to a new regulatory framework in 2015, the province’s aquaculture industry has grown steadily.

“Now we’re up to $120 million in aquaculture exports out of the province with substantial growth in salmon farming, trout farming and oyster farming,” says Smith. “The industry last year more than doubled and really paved the way for a new chapter in aquaculture development for the province.”

The 2015 regulatory framework instituted ushered in the modernization of the province’s aquaculture industry; a key aspect of these reforms has been the development of a new aquaculture licence and lease application process. Smith says key to that growth is the industry’s proactive approach in the intervening years when the framework was being developed — the AANS spent a tremendous amount of time in communities in the province building public trust.

“We’ve been and are active in community engagement. We’re active in municipal government engagement, not just at the provincial level, illustrating to and informing consumers in those communities how seafood farmers can be responsible stewards of our oceans, but also be economic generators and wealth generators for communities around the province.”

Smith notes that rural and coastal communities have faced significant challenges with high unemployment rates and a decline in economic development. But since the new framework was implemented, the industry has seen new aquaculture development projects being proposed across the province.

Smith says outreach to First Nations and indigenous communities have been successful, and many are developing new business opportunities, including oyster farms, trout farms and trout processing plants.

“These are communities that are taking charge of their own future and finding opportunities through aquaculture development,” says Smith.

At the same time, many existing operations in the province are expanding. On the eastern shore of the province, the population has declined and unemployment has risen dramatically but several new oyster farms have developed. Salmon farming numbers also reached an all-time high in the past year.

“We had more product in the water, more product that was harvested and exported and we’re creating more jobs and more opportunities in rural and coastal communities.”

Smith says the biggest trends he’s seen in 2018 were based around technology and innovation in farming procedures and farming practices. Cooke Aquaculture, for example, has invested a lot of energy and money into new remote feeding systems, and water quality and temperature monitoring. But the salmon farmer is not alone in looking at new quality-control mechanisms; shellfish growers and trout farmers are as well.

“We’ve spent a lot of time doing water-quality monitoring tests to ensure that oysters are harvested in a safe and sustainable manner,” says Smith. “We’ve got new seed production that’s being developed that will ensure the growth of that industry. On the trout side, it really is new farms that are going into the waters and, with that, two processing plants that have been opened to support that increased volume.”

Looking forward to 2019, Smith says that, while the association’s efforts have built new partnerships, building public trust will remain a major challenge, along with ensuring that best practices are followed in farm operations.

With new trout farms and expansion of both marine and land-based salmon operations, he sees the current momentum continuing.

As to the AANS’s role in the coming year, Smith says they will continue to advocate for the development of the industry and for best management practices. They will also continue to aggressively pursue research and development initiatives — he notes that the AANS is managing 16 different research projects, ranging from Vibrio monitoring systems to a new trout brood stock program. And they will continue to reach out to communities and build public trust.

“Nova Scotia is open for business,” says Smith. “We’re looking for aggressive, progressive, forward thinking organizations that want to come to Nova Scotia and build a future for aquaculture development.”

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Increased demand for seafood globally and the decline of the wild harvest fishery made 2018 an especially busy year for the aquaculture industry in New Brunswick.

“With demand for seafood growing annually, and more than 75 percent of the region’s farmed salmon exported to the United States, Atlantic Canada’s aquaculture industry is well positioned to grow as one of this region’s biggest economic drivers,” says Susan Farquharson, Executive Director for the Atlantic Canada Fish Farmers Association.

Despite the bright outlook, the industry could still see some challenges. Sea lice continue to be a problem for the farmed salmon industry globally, but a newer challenge is climate change, says Farquharson.

“Climate change is not helping with record-setting ocean temperatures this year in Canada,” she says. “But our salmon farmers have always seen challenges as opportunities and this year was no different. We’re continuing to see advancements in fish farming technology, especially to deal with sea lice.”

Farquharson says that technology investment has been a major trend for the industry in 2018. The industry invested millions of dollars into research, including broodstock development, improved environmental performance, interactions with other species, understanding genomics and the development of new farm technologies, including alternative treatments for sea lice.

“The technological investments are amazing,” says Farquharson. “It’s all happening so fast it’s even hard for industry professionals like me to keep up. This industry is just getting started. The R&D as a result of this sector continues to not only inform our industry but all food sectors in the areas of animal health and processing, to name just two.”

Farquharson notes that protein demand is rising while arable land and water and capture fisheries have declined to the point of not being able to meet the demand. But sustainable fish farming can fill that need.

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“Land-based technologies are advancing thanks to the tremendous investment of the industry. We’re seeing fish spending more time in hatcheries before they go to ocean farms and more systems being developed for full-grow out, although none at commercial levels yet. It’s going to be interesting to see that technology continue to develop.”

Farquharson is also pleased to be working with the Fundy Salmon Recovery program. The program is a partnership between a variety of government agencies, academics and industry partners to increase the number of spawning salmon in the inner Bay of Fundy. The World’s First Wild Salmon Marine Conservation Farm raises endangered wild salmon in the ocean, to better their chances of survival. “We are so thrilled to be part of this leading-edge program in the Bay of Fundy that is seeing amazing wild salmon returns,” she says.
In 2019, he plans to “talk a bit more about who we are and what we do, and what we care about.”

He knew from the start his priority when he was named to this role. “I pledged to speak collaboration and to reduce the conflict. This industry is too important to allow people to take shots at it with information that is completely inaccurate. There’s too many jobs, too many opportunities at stake, not least of which are First Nations, some of whom have taken very important leadership roles in this industry as true partners and leaders,” he says.

“Our technology providers are looking at and thinking about new kinds of technology, of different kinds of feeds. There’s energy and a cluster and expertise that’s growing here in BC that actually makes us world-leading salmon producers in the ocean environment, where we are fully in step with the law. We’re completely transparent, we’re subjected to the highest local regulations than pretty much any sector in the agrifood economy, and receiving third party-certification,” Fraser pointed out.

For 2019, Farquharson sees the ACFFA continuing its work to advocate for sustainable and responsible aquaculture growth in New Brunswick and Atlantic Canada. She says they will continue to be a strong voice on behalf of the industry that advocates for a responsible, effective regulatory framework. And they will continue to operate the ACFFA Limekiln Wharf Service Centre, which provides priority admission to salmon farmers who pay for access through annual fees.

“We’re proud of the work we do on behalf of the industry, which ranges from communications, to research, to government relations,” says Farquharson. “And, of course, we can’t forget that we operate a Marine Facility with over 50 members. Plus, our additional 30 members representing farmers, feed producers and numerous SMEs that provide support.”

ACFFA says advocating for the sustainable and responsible growth of the industry will continue to be its priority in 2019.
Aquaculture Technician

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- Environmental and plankton monitoring
- Other duties as assigned

Qualifications and Skills:

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Aquaculture’s point man

Meet the man who has been tasked with leading the modernization of the industry

Canada’s new federal minister responsible for regulating the aquaculture industry, Jonathan Wilkinson, has spent the last 30 years working in both politics and business (see side bar). With his appointment in July as federal Minister of Fisheries, Oceans, and the Canadian Coast Guard, he heads the federal agency that oversees the aquaculture industry throughout Canada, among a host of other roles.

Canadian Prime Minister Justin Trudeau’s mandate letter directed Wilkinson to “develop new and innovative approaches to modernize fisheries and aquaculture and responsible economic development on all three coasts.” He was also ordered to “ensure effective use of research resulting from restored federal funding for freshwater research, federal ocean science and monitoring programs, protection of fish stocks, monitoring contaminants and pollution in the ocean, support for responsible and sustainable aquaculture industries on Canada’s coasts, and investments in Canada’s Experimental Lakes Area.”

With the current political squabbling over aquaculture (that is, farmed salmon vs. wild salmon) growing more intense recently, his experience in the energy and environmental technology sector should prepare him well for the challenges of his current post.

“We recognize that aquaculture is a significant economic driver in British Columbia, and a source of jobs in many remote and indigenous communities,” Wilkinson replied in an email interview with Aquaculture North America (ANA). “But as a British Columbian, I particularly understand and appreciate the importance of wild Pacific salmon as well.”

“Keeping our oceans healthy is a priority for our Government,” he says. “We have a responsibility to ensure that fish and their habitat are protected for future generations, and we take this responsibility very seriously. That’s why DFO (Fisheries and Oceans Canada) is committed to a strong, science-based approach to ensure the sector develops in a sustainable manner that minimizes the impact on wild salmon,” Wilkinson elaborated.

He put this commitment into action in September by creating a “Departmental Science Advisor” position under DFO. The new hire’s first task is to create an External Advisory Committee on Aquaculture, which will provide advice on longer-term science priorities and mechanisms to better inform decision-making,” according to the government press release.

‘Sea change’ in Canadian aquaculture

Canadian fisheries minister Jonathan Wilkinson indicated radical change is coming in the way Canada manages Atlantic salmon farming.

In 2010, management of aquaculture became the responsibility of the federal government as per a Supreme Court decision (Morton v. British Columbia) in 2009. The significance of that decision was that it declared that fish (and shellfish) farming was in fact a “fishery” and gave exclusive authority to the Government of Canada for the management of that “fishery.” Prior to that ruling, provinces were responsible for managing most aspects of the industry, including licensing and regulating the industry, around production, animal health, compliance and enforcement.

At the launch of the International Year of the Salmon in Vancouver, BC in October, Minister Jonathan Wilkinson said that is about to change. He said the government is looking at area-based management of the industry, which will include “tenuring decisions” on farm sites.

“This is a new departure with respect to how we are actually addressing aquaculture going forward. It is also an area where expect to work collaboratively with our partners in the province and with First Nations communities because it is obviously a critical issue for many of them,” Wilkinson said.

BC Premier John Horgan said the area-based tenuring that Minister Wilkinson is advocating is a “sea change in how we look at issuing tenures in our oceans.”

“From the provincial perspective we have a modest responsibility for anchoring tenures. About 10 percent of the activity is the responsibility of the province, (but) the remainder of what happens in the water column, the fish, the animals, what they eat, what medicines they require, are a federal responsibility.”

“Minister Wilkinson and I are working cooperatively on two orders of government to ensure that when we’re talking to communities and our partners we are talking to communities, when we’re working face to face, nation to nation with indigenous peoples...
Also in late September, DFO launched a science review to examine the risk of piscine reovirus (PRV) transfer from farmed Atlantic salmon aquaculture to wild Fraser River sockeye. The results of the PRV assessment would guide the decisions on sustainable aquaculture in Canada.

“Our government is committed to using best available science to protect wild Pacific salmon, including Fraser River sockeye. This scientific assessment will be undertaken by a diverse group of independent experts, and will inform thoughtful, science-based decisions on sustainable aquaculture,” Wilkinson said in the media release. The final report will be publicly available in early 2019.

When asked about the Commissioner of the Environment and Sustainable Development report that states DFO has no national standard for nets and other equipment to prevent escapes, nor has it set limits on the amount of drugs and pesticides fish farms can use to treat diseases, Wilkinson said: “Extensive federal regulations for the management of aquaculture are in place to protect the environment—but we know that better is always possible.”

“Canada’s Chief Science Advisor, Dr. Mona Nemer together with an independent expert panel are already looking at how we can use science to protect our waters as we make decisions on aquaculture,” he added.

Still, some of Canada’s seafood farmers are pushing for an agency focused on overseeing and advocating for the $1-billion industry (see related report The national salmon picture, page 22). They are openly clamoring for immediate action specifically establishing a federal Aquaculture Act, a single government body that will be focused on overseeing the aquaculture industry.

“The Government of Canada is committed to continue improving Canada’s already strong regulatory system to ensure that the aquaculture industry is safe, healthy and ensures the sustainable use of marine resources,” Wilkinson pointed out.

“Should the decision be made to develop the new act, DFO will work in close collaboration with its provincial and federal partners and indigenous groups, as well as other stakeholders.”

A possible federal Aquaculture Act will be discussed among the federal and provincial and territorial ministers of fisheries and aquaculture is due to take place in Winter 2019.

“We look forward to continuing to act on these recommendations so that Canadians know that aquaculture is regulated in a way that protects the environment,” Wilkinson said.

-- Emmy Bucat

Who is Jonathan Wilkinson?

Jonathan Wilkinson was born in Sault Ste. Marie, Ontario but grew up in Saskatchewan, one of Canada’s prairie provinces. He earned a Political Science degree at the University of Saskatchewan, where he led the leftist Saskatchewan New Democratic Party youth wing and met Roy Romanow, a man who would eventually become premier of the province.

Brilliant and promising, he received a Rhodes Scholarship and pursued a master’s degree in politics, philosophy and economics at Oxford University. He returned to Canada to do more graduate study at McGill University in Montreal. While there, Romanow asked him to work for him during the 1991 provincial election campaign. That catapulted Romanow to the role of premier of Saskatchewan. After the election, Wilkinson worked as a constitutional officer, special advisor to the Premier and an intergovernmental affairs officer responsible for federal-provincial relations.

Wilkinson next tested his prowess in the business community in Toronto in 1995, where he joined the consultancy Bain & Co. In 1999, he and his family moved to Vancouver. He established his reputation as a business leader in the clean technology sector from 2002 and then jumped back into politics in 2015 and was voted as member of parliament for North Vancouver. He was named parliamentary secretary to the Minister of Environment and Climate Change, Catherine McKenna. In July 2018, he was appointed federal Minister of Fisheries, Oceans, and the Canadian Coast Guard.

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Wilkinson has not indicated how the new management approach will look like as discussions are still in progress.

Salmon farming is a contentious issue in some First Nation communities in BC. Beginning June 2022, applications for new or renewal of fish farm licences in the province will have to meet two new criteria before the province approves them: consent from local First Nations that own the territories, and a stipulation from the federal Fisheries Department that the farm won’t endanger BC wild salmon.

BC premier John Horgan (at right) and Fisheries Minister Wilkinson telling media they are ‘harmonizing the tenures between federal and provincial governments’

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BC Wild Salmon Protection Act

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Bob Chamberlain, the elected chief councillor of Kwikwasut'inuxw Haxw'mis First Nation in the Broughton archipelago said his council “is now getting closer to finalizing a set of recommendations” for a transition plan for the industry in their traditional territory.

The transition plan being explored for the industry is one “that’s not going to further impact the wild salmon, but at the same time is respectful of the overall operations,” Chamberlain said. “We feel confident that with the support of the provincial government and the federal government that we’ll be able to arrive at a set of recommendations for an agreed-upon transition plan for the industry.”

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-- Emmy Bucat
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The national salmon picture
National fish farmers group highlights need to streamline Canada’s legal framework for the aquaculture industry

Farmed salmon is by far the most important finfish species grown in Canadian aquaculture, accounting for about 90 percent of volume and value of total finfish produced. There is a strong need to modernize the legal framework for the entire industry, says Tim Kennedy, executive director of the Canadian Aquaculture Industry Alliance (CAIA). He describes it as currently operating within a “web of complicated rules and regulations” that restrict growth, limit investment and frustrate the integration of already-existing and emerging sustainable practices and innovations.

“Our industry has been subjected to provisions under the Fisheries Act and its regulations that were designed for managing the wild fishery and are completely inappropriate for governing aquaculture in the twenty-first century. Canada is the only major farmed seafood producing jurisdiction without modern national legislation designed to govern and enable its aquaculture industry,” he says.

Many external experts and internal advisors to government have recommended a federal Aquaculture Act, which Kennedy says would accomplish a wide range of necessities. These include increasing legislative and regulatory coherence, creating a more effective framework for managing risks, enabling more efficient and effective regulations, reducing undue compliance costs, and providing a vision for development that will stimulate economic growth, investment and jobs.

In addition, Kennedy says aquaculture needs a federal champion to increase investment certainty and to stimulate innovation and growth. On the topic of growth, he believes strongly that Canada needs to set growth targets for aquaculture and salmon, as other major competitor nations have already done. He points to Norway for example, which has a population of 5.2 million and many years ago set its sights on being the most sustainable and innovative producer of Atlantic salmon in the world. “Currently, the country produces approximately 10 times what Canada produces,” he reports, “even though Canada’s viable marine area is almost three times larger.”

Canadian salmon farmers also need better access to fish health products, and urgently need improved access to new in-feed therapeutants and feed ingredients. Access to new production sites is also required, in Kennedy’s view, because timely access to these sites has reduced the confidence of the investment community. This is mainly due, he says, to overly burdensome data and information requirements, a review process that includes multiple government departments and agencies, and a loose and inconsistent framework of guiding principles and decision-support tools. It’s also due to the requirement to conduct the type of public consultations which generally draw those strongly opposed to development in the aquatic zone, and the need for “work-safe zones” around marine farms to ensure worker safety.

In terms of current salmon industry trends, Kennedy says health issues continue to be a major driver in innovation. “As with the rest of the world, we are seeing greater use of new non-medicinal sea lice treatments, such as the thermolicer technologies,” he reports. “With all the work going on around the world on closed containment and semi-closed containment – in particular in Norway – there is no question the Canadian government is interested in seeing how we can bring some of that here. There may be more clarity on that in 2019.”

Kennedy believes that next year and beyond, there will be “great new opportunities” in Newfoundland & Labrador for salmon, where the provincial government has committed to double growth by 2025. He also predicts some growth in other provinces.

For its part, the CAIA is very focused on seeing the federal government introduce Canada’s first Aquaculture Act. In addition to that, industry growth targets and much more general government support, Kennedy adds that “we also believe that it’s important for our farming sector to be able to access farm support programs offered to the broader farming community in Canada.”

As he has stated in many forums, Kennedy believes Canada has the greatest bio-physical capacity in the world for aquaculture development, but “we really need to focus our energy in this country, and need leadership and vision from our federal government.” Whether we will see that in 2019 and beyond remains to be seen.

— Treena Hein
In what could be described as “Aquaculture 2.0,” the Canadian province of Newfoundland and Labrador is seeing new dynamics driven by innovations, investments and support from the local government and community rarely seen in other salmon farming jurisdictions. Atlantic salmon is the major commercial salmonid species farmed in the province. While 2018 is expected to see harvest numbers below 2016’s banner crop of 25,411 tonnes of farmed salmon, a wave of change is playing out.

“We’ve got the largest salmon farming company now in Newfoundland and Labrador, Marine Harvest. Cooke Aquaculture is looking at sustainable expansion in the province as well. Then we’ve got the approval in September of Grieg NL Sea Farms Ltd’s $250-million aquaculture project. On the same day Grieg got environmental approval, Marine Harvest also got the approval to facilitate a $50-million expansion of their Northern Harvest Smolt Ltd hatchery in Stephenville, on the west coast of Newfoundland. These companies are very determined to produce product in the province and we’re seeing the private investment happening. This all happened this year,” says Mark Lane, executive director of the Newfoundland Aquaculture Industry Association (NAIA).

The accumulation of micro-stories and an array of different trends bode well for the province. At the 25th Cold Harvest Conference in September in St John’s, a raft of announcements revealed enthusiastic industry players keen to grow the industry and benefit from its growth. Technology provider AKVA Group inked a deal with Grieg NL Sea Farms to supply it with feed systems and locally-built feed barges until 2026. The delivery is estimated to commence with the first three barges in Q2 2020. The council of Marystown, in Newfoundland and Labrador’s Burin Peninsula, announced it is moving closer to acquiring a former shipyard to convert it into an aquaculture service hub that will provide comprehensive services to fish farms in the Atlantic region; and Scotland-headquartered Gael Force Group, a manufacturer of equipment, technology and services, revealed plans to expand its business to Atlantic Canada’s aquaculture market.

“There is a huge amount of interest from around the world. Their supply chains in other jurisdictions -- Marine Harvest is in British Columbia and Scotland -- are following them here. Companies are going to establish their operations in our province to service the rest of Atlantic Canada and the north east of the US. NAIA’s office has been tremendously busy. We’re facilitating meetings and we’re going to hear more good news in the future on the service supply side of things,” says Lane.

He believes “unwavering support” from provincial officials to grow the industry sustainably is instrumental in attracting these investments.
Gael Force Group’s marketing manager Marc Wilson attested to this warm reception. “Our visits to Atlantic Canada have revealed a commitment to aquaculture with a real appetite to grow the industry substantially. Every person we have spoken to has welcomed the prospect of Gael Force making an inward investment in Newfoundland,” he said in announcing the company’s plans in the province.

The provincial government also put some skin in the game. It invested $30 million in the form of repayable loans in Grieg NL SeaFarms’ aquaculture project in the province, as well as roughly $500,000 (C$588,000) to boost employment opportunities in the aquaculture industry.

“Unlike other jurisdictions in Canada and around the world, we’re very much like Norway in that our government supports the industry and does it publicly,” says Lane.

He said a survey conducted in June showed 56 percent of Newfoundlanders and Labradorians either support or strongly support the industry, 12 percent either disagree or strongly disagree with the industry, and roughly 30 percent are undecided.

Communications and advocacy are Lane’s priority for 2019 to get those undecided to understand the industry. He acknowledged that the “10-12 percent will never change their mind about aquaculture no matter how much time we spend on educating them.”

“We need to continue to get our message out to the general population about how responsible we are and how sustainable our industry actually is, because there are a lot of questions out there, and about our ability to provide a premium product that is in high demand around the world. We also need to get out there the industry’s economic importance to Newfoundlanders and Labradorians who live in towns like Triton or Gaultois. I’ve heard their mayors say this, and they’ve said it publicly, that without aquaculture, their town simply would not exist today. Plain and simple,” he said.

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Hiring quota will hurt industry, says NAIA

Measures proposed to boost employment in the aquaculture industry in Newfoundland and Labrador by requiring employers to set hiring quotas are counterproductive and unfair, according to the Newfoundland Aquaculture Industry Association (NAIA).

Mark Lane, NAIA executive director, is reacting to the call by workers union FFAW-Unifor last summer for the government to mandate aquaculture companies to employ a minimum number of workers and set a minimum number of weeks of employment.

“If implemented, it will likely result in less investment and production in the industry that would keep people employed,” Lane told Aquaculture North America (ANA).

The union, which represents workers in the fisheries, fish farming and processing industries, says the aquaculture industry “struggles to provide meaningful work” for its 150 processing workers in the community of Connaigre Peninsula in NL. In a CBC News report the union proposes that aquaculture companies in the province be required to process their fish at local plants instead of New Brunswick, where it says much of the processing work is now being done.

Lane says the closure of two facilities owned by the Barry Group in Harbour Breton on the Connaigre Peninsula was due to the downturn in the wild fishery. “The recent downturn in processing in the province is no different than any other industry such as oil and gas, agriculture or traditional wild fisheries,” Lane tells ANA. He noted that the aquaculture industry has re-opened both facilities.

But he acknowledged that lack of technology and equipment required for certain types of processing in NL facilities means these need to be done outside the province. “To my knowledge none of these plants can perform value-added processing such as portions or smoking. The plant in St. Alban’s cannot do filleting.”

“As well, for salmon in particular, current levels of technology do not allow for removal of pin bone pre-rigor in NL. Thus, to avoid unnecessary delays in transport and reduction in shelf life en route to market we process pre-rigor in NL, transport closer to the market and remove pin bones in New Brunswick. Having said that, every fish grown in NL is processed in NL,” he says.

He adds that the aquaculture industry has been “quite successful in keeping people employed in rural coastal NL year-round.” About 450 people are directly employed on farms in NL, he says, including aquaculture technicians, veterinarians, managers, and divers. There are also more than 200 people employed in processing.

“For every job created on the farm there are three indirect employment opportunities created as a result, among them in retail, service, supply and transport. We are very proud of these accomplishments and the socio-economic contribution that we are making to rural communities.”
Key staff movements at Nordic Aquafarms

The founder of Nordic Aquafarms, Erik Heim, is taking the helm at Nordic Aquafarms’ US operations. Heim vacated the role of CEO of Nordic Aquafarms AS in Norway and assumed the role of president at Nordic Aquafarms Inc in October.

The US company, a wholly owned subsidiary of Nordic Aquafarms AS, is building a major land-based farm project in Belfast, Maine.

Replacing Heim as CEO in Norway is Bernt Olav Røttingsnes, the former CEO of marine ingredients supplier Seagarden Group AS. Nordic Aquafarms is starting Norway’s first commercial land-based salmon farm, Fredrikstad Seafoods, at the end of this year.

“We have been through an amazing journey in building up Nordic Aquafarms in the Nordics. Now we must ensure good execution of our corporate plans and our large undertaking in the US. I am looking forward to dedicating my time to establishing Nordic Aquafarms in the US and working with Bernt Olav,” says Heim.

Marine Harvest Canada names new MD

Marine Harvest Canada (MHC) has appointed Dr Diane Morrison as managing director.

Morrison is a Doctor of Veterinary Medicine and has 25 years’ experience in salmon production. She has led Marine Harvest Canada’s Fish Health and Food Safety Department in Western Canada for 18 years.

“I am very passionate about our business, the health of both wild and farm-raised fish, and about the great team we have at Marine Harvest Canada. I am excited to share my experience and build a sustainable future together for our local communities,” said Morrison, who took over the role from Vincent Erenst in October.

Morrison has been a resident of Campbell River, BC for the past 25 years. She earned her Doctor of Veterinary Medicine degree at Ontario Veterinary College and has served on multiple research teams publishing on aquaculture and wild salmon in British Columbia, said MHC.

Demand for aquaculture technicians prompts new certificate program

North Island College (NIC) in British Columbia is launching a new Aquaculture Technician certificate in January 2019. The program is designed to equip students with technical skills to work with a variety of species in BC’s growing aquaculture industry.

The four-month certificate is the first of two new aquaculture offerings at NIC, developed in response to an industry call for workers with broader field skills.

“We heard from industry about the need for more advanced technician training and education to fill current and projected vacancies,” said Cheryl O’Connell, NIC’s dean of trades and technical programs. “This new certificate prepares students for entry-level positions and provides an excellent foundation for further studies.”

NIC aquatic culture graduate Krystyna Podlasy now works at Marine Harvest Canada. Aquaculture growth around the world is creating a need for technical training and education says NIC.

NIC has offered Level 1 Aquaculture Technician Training since 2014. The new certificate includes Technician Level 1 training, with an updated curriculum, more occupational health and safety training and the ability to ladder into BC’s first advanced production-training program, the Aquaculture Technician diploma, scheduled to begin in Fall 2019.

Renowned aquaculture researcher and educator, Dr Jesse Ronquillo, developed the programs’ curriculum in consultation with the BC Shellfish Growers Association and the BC Salmon Farmers Association.

“The growing interest in aquaculture around the world is creating a need for technical training and education,” said Ronquillo. “These programs prepare students for a range of industry jobs, from hatchery to farm-site work. The certificate trains students in a variety of aquaculture species including finfish, shellfish and algal production techniques.”

Both programs will take place at NIC’s Campbell River campus, now undergoing a $17.6-million expansion and renovation.
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January

Northeast Aquaculture 2019

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Conference Information:
Registration
Ms. Margaret Anderson
(208) 378-5299 margaret_m_anderson@fws.gov

Presentations
Dr. Donald Larsen
(208) 860-3462 don.larsen@noaa.gov

Vendors
Mr. Bret Farman
(503) 281-6111 bret.farman@noaa.gov

Hotel Information:

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Contact Jeremy:
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