The Cold Harvester

NEWFOUNDLAND AQUACULTURE

SUMMER 2023

Aqua Conference Wins Award

Ocean Careers Internship

Mowi NL Trip to Scotland

Member Profile Green Seafoods

Launch of MI Holyrood Facility

NEWFOUNDLAND AND LABRADOR AQUACULTURE INDUSTRY

Cold Harvest 2023

Annual Conference and Trade Show

Delta Hotel, St. John's, NL | September 5-7, 2023

Aquaculture: The Future of Responsible Food Production

On behalf of our members, the Newfoundland Aquaculture Industry Association invites you to join us for our annual Cold Harvest Conference and Trade Show; your best source for information on aquaculture and it's potential for our province. With world-class keynote speakers and presenters, this event should not be missed.

Keynote address by Dr. Halley Froehlich, University of California, Santa Barbara. Insights on climate change knowledge gaps and food sustainability. Learn how impact mapping and adaptive strategies - from genetics to spatial planning – will help aquaculture remain sustainable into the future.

More information contact Roberta Collier

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www.coldharvest.ca

In this Issue

SUMMER 2023

Message from Executive Director Jamie Baker	4
Welcome New Associate Members!	6
Opportunities Placentia Bay	6
Skills Canada NL Annual Skilled Career Day	7
Aquaculture Canada & WAS North America Event Wins Award of Distinction	8
Member Profile: Green Seafoods	9
Students in Central NL Enjoy Presentations from NAIA Staff	10
Internships Immerse Students in Ocean Careers	12
World Oceans Week Events	14
MOWI Newfoundland to Scotland	16
Marine Institute and CAHRC Launching New Aquacuture Training Programs	18
Community Profile: Town of Winterton	19
The Launch: Marine Institute's Holyrood Facility Opens Doors to Ocean Innovation, Education and Collaboration	20
Cooking with Chef Steve Watson	21
Couturier on Culture	23

The Newfoundland and Labrador Aquaculture Industry Association (NAIA) is a member-based organization that represents the interests of seafood farmers and their suppliers in Newfoundland and Labrador. We are passionate advocates on behalf of our members to facilitate and promote the responsible development of the aquaculture industry.

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Message from Executive Director

Jamie Baker

Maybe it's the eternal optimist in me, but I can't help but feel 2023 is going to be a bit of a turning point for the province's aquaculture sector.

It's been a tough slog since 2019, mostly thanks to the pandemic and the supply chain and market fallout that lingered. But we are finally starting to see some signs of the development the sector has aimed for over the past number of years.

On the finfish side of things, we are seeing many promising signs.

At Cooke, we just watched them harvest some of the largest and most robust looking salmon that our waters can produce. The Connaigre Peninsula was alive with activity at the sites and at the plant, and the excitement levels were evident. At the same time Grieg in Marystown is getting closer to it's first ever Newfoundland harvest likely later in the fall, and everyone looks forward to what can potentially be produced in Placentia Bay and hopefully also in Bays West in the future.

Mowi is continuing work on its exciting Indian Head Hatchery Expansion Project in Stephenville, which would represent an important step in both creating a self-sustaining business for the company here in the province, as well as an important environment advancement for hatchery operations.

Ocean Trout Canada is also building towards its goal of producing significant amounts of fresh trout at their south coast farms.

On the shellfish side of the sector, there is no doubt shellfish growers are facing a litany of challenging circumstances including costly and cumbersome regulatory challenges, increased operating costs, and a fairly stagnant price on blue mussels. But for all that, there is still cause for optimism.

Say what you will about the market price, but our producers continue to be very consistent on mussel production, and the quality of the product continues to be game-changing. Our oyster sector, while still in its very early stages, is gaining serious traction in the market for their quality and taste for even the most discerning customer.

There is also reason for optimism in alternative species. Immediately we look at the Marbase project in Marystown with service-supply potential for lumpfish farming, and the commercial opportunities for wolffish which represents a premium whitefish option. It's taken a bit of extra time to get that project moving thanks again to the impacts of the pandemic, which is no doubt frustrating for both the company and the folks in the area – but all signs indicate it will be worth the wait.

We are also seeing some exciting progress on the marine plants file, showing our waters can indeed produce top shelf products. The next step will be ramping up to commercial scale and everyone involved in that effort from the proponents to government to the industry association is poised and prepared to see success achieved in due course.

We know things can change, and the NL marine environment can throw a litany of curveballs at even the most well-laid of plans. But in 2023, we have all the right people and tools in place to begin developing our farm sector towards the potential that many have long hoped for.

Here's hoping we can all continue to work together, to plan appropriately, and to continue to feed a hungry world the most sustainable proteins on the planet, while further enhancing the unique and amazing way of life in our rural communities.

COLD HARVEST 2023

I can't let this opportunity go by without promoting our upcoming Cold Harvest 2023, Sept. 5-7 in St. John's NL.

This will be our first NAIA-only show since 2019 and follows on the heels of the tremendous success that was the partnership on the WAS/AAC Conference and Tradeshow event last August. Already (as of this writing) we are 2/3 sold out on this year's trade show, and registrations are officially open and coming in for what promises to be a unique and exciting event.

Our focus this year will be very much on what makes our sector so special: Food production.

There'll be loads of incredible presentations and sessions, along with a wide array of exhibitors from all walks of seafood farming life, great business and networking opportunities, and some truly incredible social events at both the opening reception and the kitchen party events.

Get registered. Get ready. It's going to be a time!

Welcome New Associate Members!

Renita Dominaux, PMP, MBA
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At ASL Energy, we envision a future where we honor and respect the importance of Indigenous involvement and contributions, while fostering a culture of continuous improvement, innovation, and progress. As a leading force in our industry, ASL Energy is dedicated to enhancing efficiency and cultivating meaningful relationships with all stakeholders. Together, we will create a sustainable and thriving ecosystem that benefits our communities, our people, and the world around us.

ASL Energy provides access solutions using composite and wood matting products paired with local knowledge, logistics, and technical expertise. We offer a full suite of project management, and consulting solutions to our clients in the global aerospace & defense sectors, as well as renewable and conventional energy extraction sectors.

ASL Energy is based in St. John's, NL and is proudly Indigenous owned.

Cold Ocean Deep Sea Research Facility (CDRF)
Cassandra Gardner, Manager
cjgardner@mun.ca

https://www.mun.ca/osc/facilities-and-services/cold-ocean-deep-sea-research-facility-cdrf/

The Cold-Ocean Deep-Sea Research Facility (CDRF) at Memorial University's Ocean Sciences Centre provides researchers with access to state of the art infrastructure and equipment for the study of aquatic organisms, especially those from the cold waters of the Arctic and North Atlantic oceans. Aquaculture-relevant pathogens and diseases can be studied in vivo in our CFIA-certified aquatic containment level 3 laboratory. We also have a variety of analytical equipment on-site, including: Nikon A1R confocal microscope, Nikon Eclipse Ti-S microscope, Phenom scanning electron microscope, BD FACSAria flow cytometer, as well as a complete histology suite.

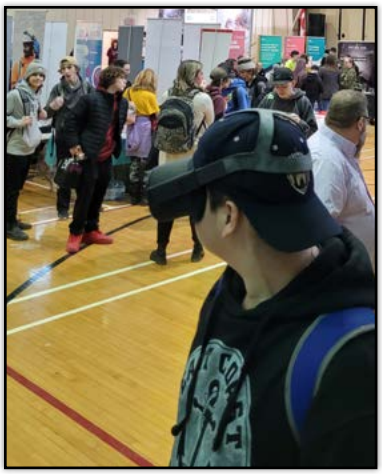
For more information on NAIA Membership Benefits, please contact Roberta Collier roberta@naia.ca visit www.naia.ca

Opportunities Placentia Bay

NAIA staff travelled to Marystown to participate in Opportunities Placentia Bay Conference and Trade Show at Marystown Hotel from April 23rd – 25th. Organized by the Burin Penninsula Chamber of Commerce and Arnolds Cove Chamber of Commerce, the three-day event consisted of a trade show, a large variety of presentations, luncheons and a banquet, followed by a networking event at Smugglers Cove in Burin. The event brought together representatives from aquaculture, oil and gas, the mining and energy sectors, and more.

Jamie Baker, NAIA Executive Director provided greetings and spoke on aquaculture in Placentia Bay and the province. NAIA's Outreach Coordinator Roberta Collier ran a booth at the show offering information on careers in aquaculture and Aquaculture 101. Roberta also enjoyed a visit and tour of Grieg Seafood Newfoundland's salmon hatchery and office while in Marystown.

Skills Canada Newfoundland and Labrador (SCNL) Annual Skilled Career Day



Jamie Baker and Darrell Green of NAIA were happy to be part of the annual Skilled Career Day on Friday, March 24th, put together by Skills Canada Newfoundland and Labrador (SCNL) at the College of the North Atlantic, Prince Philip Drive campus in St. John's. They had an opportunity to answer questions and talk about career aspirations with more than 400 high school students who came through the show, and to share information on careers in the aquaculture sector. The event showcased 25 booths and featured competitions in 30 skill-related areas.

Jamie and Darrell also had excellent discussions with some of the other companies and organizations in attendance, such as Brilliant Labs, TechNL, Verafin, Canadian Coast Guard and the Newfoundland and Labrador Construction Association.

"We are thrilled with the success of Annual Skilled Career Day and the Skills Canada Newfoundland and Labrador Provincial Competitions. Seeing so many young people engaged and enthusiastic about skilled trade and technology career paths is truly inspiring. This event not only showcases the incredible skills and talents of our youth, but allows young people interested in pursuing these careers to learn about the opportunities available to them. We are proud to support the next generation of skilled trade and technology professionals and can't wait to see what they will achieve in the future," said Christine Greene, Chair of the Board for Skills Canada Newfoundland and Labrador.

NAIA would like to thank Skills Canada Newfoundland and Labrador (SCNL) and the College of the North Atlantic for providing this great opportunity!

AQUACULTURE CANADA AND
WAS NORTH AMERICA 2022

Applause
ST. JOHN'S

Aquaculture Canada & WAS North America Event Wins Award of Distinction

Jamie Baker, NAIA Executive Director, and Darrell Green, NAIA Research and Development Coordinator, were on hand to accept the award on behalf of all three organizations and the organizing committee.

The 2022 Award of Distinction was presented to the host committee of Aquaculture Canada & WAS North America Conference and Trade Show by the City of St. John's/Destination St. John's at their annual Applause Awards on March 28th at the St. John's Convention Centre. The event took place in St. John's and saw more than 1200 visitors from almost fifty countries.

The award criteria is as follows: "Through our partnership with the City, Destination St. John's is delighted to recognize the work of a key local host committee who was instrumental in bringing a noteworthy conference to St. John's with our Award of Distinction. Attracting conferences is very competitive and often takes significant commitment and effort of the local organization to be chosen as the host city. This conference must be regional, national or international and bring substantial economic benefit to the city and region. The profile of St. John's, the region and the province must be heightened by the hosting of this conference."

"This award really recognizes the tireless efforts of the organizing committee and sponsors, and of course demonstrates the amazing partnership between the NL Aquaculture Industry Association, the Aquaculture Association of Canada and the World Aquaculture Society," Jamie said. "Last year's conference in St. John's was the largest seafood related show in Canadian history, and showcased the incredible potential of the aquaculture sector in Newfoundland and Labrador, and also showcased St. John's and the province as an exciting tourist destination to visitors from around the world. We were thrilled to have this event recognized and look forward to continuing to bring the best and brightest in our sector to the province in the years ahead."

MEMBER PROFILE

GREENSEAFOODS

CANADIAN SEAFOOD PRODUCERS

Green Seafoods Ltd.

287 Main Road, Winterton, NL A0B 3M0

Contact: Jennifer Green-Sheppard
Email: jsheppard@greenseafoods.com
Website: www.greenseafoods.com

Green Seafoods Production Plant in Winterton, NL.

Green Seafoods Ltd. has been owned and operated by the Green Family for over 117 years. Four generations of hard work, expertise and professional pride have made Green Seafoods Ltd. one of the most respected and trusted names in the industry. Located in Winterton, Trinity Bay, Newfoundland, Green Seafoods production facility concentrates on shellfish and sea cucumber. Their facility can store approximately 1000 metric tons of frozen products and with a state-of-the-art live steam cooker they can prepare a variety of products. Production ranges from whole frozen seafood to retail ready products.

In 1905, Edgar J Green started EJ Green & Co Ltd. from which Green Seafoods Ltd. was formed, building a successful groundfish business. In 1975, Edgar's son, Calvin Green, continued to build on and develop the salt cod business with his sons Derek and Irvin. Then in 1992, the cod moratorium shocked the industry and company. Derek and Irvin made the active decision to dig deep and continue to grow the business and make a living for themselves and their employees. The period since the moratorium was likely the hardest in the company's history but that period has made the company much stronger. Derek's daughter, Jennifer Green-Sheppard and her husband Mark Sheppard leverage the years of experience behind them to continue developing new products, seeking new markets and new processing techniques to better serve their customers. The newest generation is continually striving to improve the service the company provides to its customers.

Currently Green Seafoods Ltd. has over 100 employees during its production season in this small town of Winterton with a population of approximately 400 people. Production has shifted from cod to snow crab to sea urchins over the years, but as of today Green Seafoods focuses on frozen blue mussels, frozen shell-on whelk and dried sea cucumber.

Mussels are Canada's top shellfish aquaculture product. Green Seafoods Ltd. mussels are farmed in Newfoundland and Labrador, from mussel seeds growing on collector ropes suspended in the ocean. The mussels feed on natural food particles which are present in the water, so they get all their nourishment naturally, from the pristine ocean waters that surround them while they grow. Green Seafoods Ltd. takes pride in having eco-certifications including Best Aquaculture Practices (BAP), organically certified to the Canadian Organic Aquaculture Standards, and an OceanWise partnership, which means they are committed to sourcing and offering sustainable seafood options.

Green Seafoods Ltd. have invested heavily in technology and training to bring quality products to the market, from virtual inspections to online training sessions, marketing masterclasses and export webinars from the US to Europe to China. The company is innovative and grounded in a long history. They have rock solid roots and do not forget where they came from. A lot of young blood to balance the wisdom of experienced staff. Green Seafoods Ltd. are successfully striving to remain globally competitive in the niche markets.

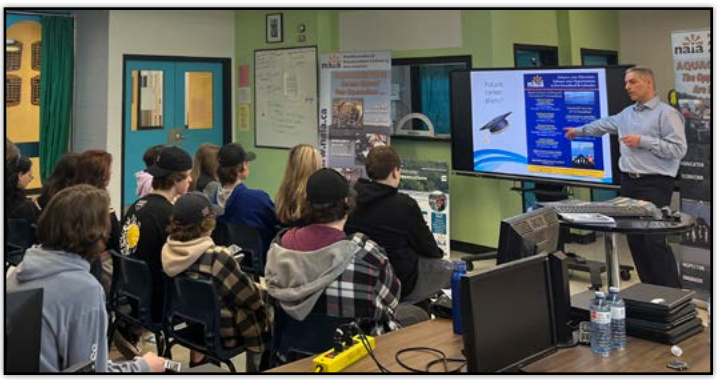


Students in Central Newfoundland Enjoy Presentations from NAIA Staff

In May, Darrell Green, NAIA Research and Development Coordinator, along with Roberta Collier, NAIA Community Outreach Coordinator travelled to Central Newfoundland to do presentations on aquaculture and careers in aquaculture to the science and career classes in 3 high schools: Dorset Collegiate in Pilley's Island (Grades 9-12), Botwood Collegiate (Grades 11-12) and Leo Burke Academy in Bishop's Falls (Grades 7-12). Almost 170 students participated in the presentations overall.

The students were impressed with the level of aquaculture taking place in the province and were very interested in learning about Aquaculture101.





Internships Immerse Students in Ocean Careers

NL High-School Students Explore Ocean Careers During Hands-On Summer Internships

Author: David Tipton, Program Manager Youth Outreach and Mentoring, OceansAdvance Inc.

Newfoundland and Labrador has an internationally recognized expertise in cold water ocean research in sectors including aquaculture, fisheries, marine transport, environmental monitoring, and energy. Many of our thriving ocean industries share common needs and require a growing talent pool to research, develop, operate, and commercialise new innovative processes and technologies. It is essential that students are exposed to careers in these fields and the Ocean Careers Immersion Program (OCIP) engages them through project-based internships and online mentoring.

The paid summer internships help students get a head start on ocean careers. During the immersive six-week placements, students get the chance to work on exciting real-world projects with host company teams. They gain experience with the latest technologies, build their work portfolios, and explore their potential career interests. Company mentors grow their coaching skills, get unique insights into their projects, and just possibly a future team member.

During the Summer of 2022, five OCIP interns were hosted at Barry Group in Benoit's Cove, Genoa Design International in Mount Pearl, Ocean Choice International in St. John's, and PAL Aerospace in St. John's. Interns appreciated the opportunity to work on projects matched specifically to their interests. They connected as a team each Friday and took part in professional development and post-secondary pathway sessions led by Marine Institute, Memorial University, CNA, WRDC, COVE, and Futurpreneur. Here's what they had to say about their experience and their futures.

Trinity, from Corner Brook, wasn't too sure what opportunities she would discover during her internship working at the processing plant with Barry Group.

"I had a negative outlook of what working at a processing plant would be but found quite the opposite. My father had

Trinity, a 2022 OCIP intern with Barry Group, worked on quality assurace perparing samples for laboratory testing.

worked at the fish plant during summers as a youth, and suggested I do the same. I always refused, thinking it would be a terrible, smelly job. When I started with the Barry Group my mind quickly changed. I like that there are many different kinds of roles and the people are fantastic."

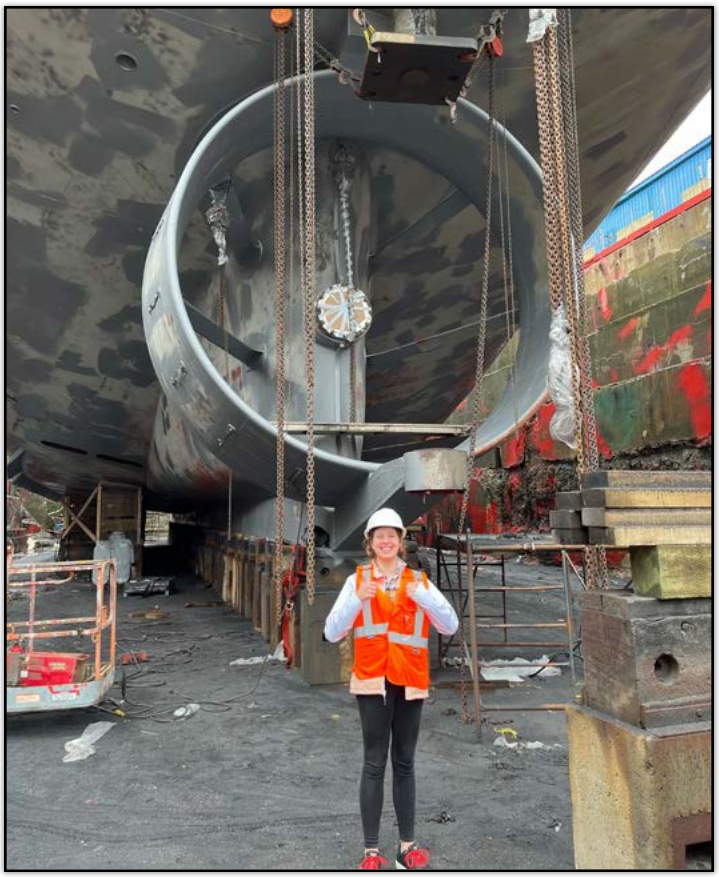
Tara lives in St. John's and plans on attending MUN or Marine Institute. She was able to explore her interest in photography, marketing, and communications, as well as get hands-on with vessel operations and management during her placement with Ocean Choice International.

"I had the opportunity to experience different aspects of the Ocean Industry. I interviewed employees about their experiences. I went on two of the company's vessels and had a tour. I was able to talk to people who are/were captains and engineers on vessels. I saw behind the scenes what goes on to keep the vessels in tip top shape and to make sure it is on time and that the crew is prepared."

This summer, the program is expanding with fifteen NL high-school interns at eleven ocean sector companies including our returning partners and NEW placements with ACAP Humber Arm, C-CORE, Cold Ocean Salmon, Fishing for Success, Grieg Seafood Newfoundland, Oceanex, and Petty Harbour Mini-Aquarium. Interns will engage in field work and projects including 3D ship modelling, environmental and ice monitoring, data analysis, public education, heritage fishing, business marketing and communications, fleet logistics, quality assurance, fish health laboratory testing, and more… Stay tuned to our social media @oceancareersnl throughout the summer to hear their stories.

The Ocean Careers Immersion Program (OCIP) is a cross-sectoral youth outreach initiative of OceansAdvance, COMPASS, econext, and NAIA. Made possible with the generous support of the Newfoundland and Labrador Department of Immigration, Population Growth, and Skills under the Government of Canada Labour Market Partnership Agreement.

OCIP Intern Trinity Brown doing quality inspection on live Merasheen Bay farmed oysters at the Barry Group plant in Benoit's Cove.



Tara, a 2022 OCIP Summer Intern with Ocean Choice International getting behind the scenes of vessel maintenance.

World Oceans Day

World Oce

Career Fair In Harbour Breton

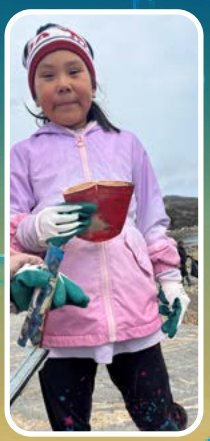
The United Nations celebrated World Oceans Day on Thursday, June 8th. The theme for this year is "Planet Ocean: Tides are Changing". To help celebrate, NAIA organized a World Oceans Day Career Fair at King Academy in Harbour Breton on Monday, June 5th which was a great success!!!

NAIA would like to thank those who helped make it happen: Teachers, staff and students of Conrad Fitzgerald Academy (English Harbour West) and John Watkins Academy (Hermitage-Sandyville), and to the host school, King Academy for joining us in the afternoon.

NAIA would also like to acknowledge the efforts of the staff of supporting companies and organizations in exhibiting and interacting with youth: Department of Fisheries, Forestry and Agriculture (including Fish Health), Fisheries & Oceans Canada – Conservation and Protection, Tay Aus Diving, College of the North Atlantic, Cooke Aquaculture, 360 Marine, and Fisheries and Oceans – AIS. Also, thank you to Mowi for providing the 2 beautiful Atlantic salmon for necropsies and to Fisheries and Oceans Canada for providing the delicious World Oceans Day cake! We hope to make this an annual tradition!

Marine Debris Scavenger Hunt

NAIA also invited youth across the province to join in on a marine debris themed scavenger hunt for World Oceans Day. Submissions were received across the province and a prize draw will take place soon, once all the submissions have been received.



eans Week Events




Clover Farm Cupcake Contest

During World Oceans Week, NAIA also sponsored a marine themed cupcake contest at Clover Farm St. Alban's and Midway Clover Farm in Head of the Bay, NL. Youth were invited to purchase a baked good design kit from the stores and use their artistic skills to create a yummy World Oceans Day cupcake design. Special thanks to both Clover Farm stores for organizing the events and also to everyone for their very artistic artwork submissions! NAIA provided a $25 gift card to the winners at both locations.

Isla Ismail was the lucky winner at Clover Farm St. Alban's.


Winner of the Clover Farm contest in Head of the Bay was sisters Brooke and Kinsley Hoskins.

World Oceans Day at St. Anne's School in Conne River







Roberta Collier, NAIA and MAMKA staff spent World Oceans Day with students of St. Anne's School in Conne River. They read books with grades K-3 and enjoyed a visit to the beach for ROV demos, eel and green crab pots and other marine-themed activities with students from grades 4-6.

Bay D'Espoir Academy Doing Their Part

On June 21st, NAIA staff spent the afternoon at the beach with Grade 1-6 students of Bay d'Espoir Academy in St. Alban's. Together, as a part of our World Oceans Day activities, we cleaned up a large area of shoreline in Vyce Cove and learned about the importance of keeping our beaches free of marine debris. Special thanks to the teachers and students for allowing us to be a part of your day! Also special thanks to the Kindergartens for cleaning the area around the school! Awesome job!

MOWI® Newfoundland to Scotland

By: Ian Roberts, Director of Communications, Mowi (Scotland, Ireland, Canada)

Visit to Eilean Donnan castle.

Three employees at Mowi took a 'road trip' recently – giving them each an experience of a lifetime that will also bring benefit to Newfoundland's growing aquaculture sector.

The 3500 kilometres and massive North Atlantic Ocean between the south shores of Newfoundland and the Scottish Highland couldn't stop three Mowi fish farmers from making the trip to learn and share with their UK colleagues.

Earlier this year, Jason Ingram, Gord Caines, and Cynthia Smith took Mowi up on their offer to visit the company's Scotland operations to not only share their own years of knowledge salmon farming, but to bring back some learnings to their colleagues back in Newfoundland.

Of course, it wasn't all business. The trio took time to visit Scottish landmarks such as the iconic Eilean Donnan Castle, historic Kilmuir Graveyard and An Corran beach to see the footprints of the Megalosaurus dinosaurs.

Heading to the Scottish site for grade seining.

Travelling to the Greshornish site after a snowstorm.

"First off we'd like to thank Mowi Canada East for this incredible opportunity," reflects Cynthia Smith, farm manager. "The knowledge, dedication, and determination of the Scottish crews was uplifting! We certainly learned a few 'tricks of the trades' that we can use here in Newfoundland."

Cynthia, Gord and Jason spent most of their time around the Skye area, where Mowi's salmon farms have been operating for several decades and is the location of the company's newest asset – a feed mill that opened in 2019. The visitors took a 'hands on' approach to best immerse themselves in how things are done on Scotland farms, which included grade seining at harvest, hydro sea lice treatments, remote feeding stations, and net changes ("enviro nets").

When not on the farm, days were spent visiting other parts of the value chain that support farming, including the state-of-the-art feed mill at Kyleakin and the company's latest freshwater recirculating aquaculture system at Inchmore.

A visit to one of Mowi's organic farms at Portnalong to learn about the certification standards that apply to salmon was also on the itinerary.

"We met farm manager Sarah MacDonald and her team at Scalpay that have an average age of only 21!" Cynthia recalls. "It was incredible and gratifying to see such young, dedicated workers joining us in the farming sector. One of the young workers came up and introduced himself and said he'd love to come visit Canada – and of course we'd love to return the favour and host our colleagues in Newfoundland."

"Gord, Jason and I were thrilled to be given such an amazing opportunity by Mowi to experience and exchange ideas, techniques and overall knowledge of the team. This opportunity gave us an overwhelming feeling of support by knowing that we are all one big family who are there to help and support one another."

Marine Institute and CAHRC Launching New Aquaculture Training Programs

By: Madeline Meadus, Public Relations and Communications Officer - Fisheries and Marine Institute of Memorial University of Newfoundland

The Fisheries and Marine Institute of Memorial University of Newfoundland is partnering with the Canadian Agricultural Human Resources Council (CAHRC) to offer a new aquaculture training program.

These programs are designed to equip new entrants, career changers and current aquaculture professionals with the knowledge and skills necessary to succeed in the rapidly growing aquaculture industry.

CAHRC, with funding from the Government of Canada's Sectoral Workplace Solutions program, is investing $1.8 million to support the Marine Institute in developing and delivering four new, certificate courses.

This initiative is fully funded and open to students from across Canada. Classes will be delivered in English and French, both online and in person.

Students will exit the program well-equipped for a career in the industry or with the necessary skills to advance their careers.

"We are proud to partner with the Canadian Agricultural Human Resource Council in developing new courses aimed at providing management-level training for aquaculture employees and helping to expand the industry's workforce," said Dr. Paul Brett, Vice-President of Memorial University (Marine Institute).

Marine Institute has an extensive history with aquaculture-based programs, offering short training courses and community-based learning opportunities for over 30 years. In addition to short courses, the Marine Institute also offers a graduate diploma in aquaculture.

"Our School of Fisheries brings 35 years of expertise in aquaculture training, research and curriculum development to the partnership to attract new employees to the industry and provide existing employees with new skills to advance their careers."

Students may choose to complete one course to receive a certificate of completion or complete all courses to receive the program certificate. Industry organizations across Canada can contact the Marine Institute for information on how to customize the training programs for new entrants or current employees.

The Certificate of Aquaculture Management program is currently open for registration. The remaining programs will open for registration later this year and into 2024. To register, or to learn more about the Growing the Canadian Aquaculture Workforce of the Future offerings, visit www.mi.mun.ca/aquaculturecan.

naia Community Profile
Town of Winterton

All across Newfoundland and Labrador the aquaculture industry contributes to local rural economies by providing employment for residents and supporting infrastructure investments and service sector companies. Our towns support our sustainable industry by providing a positive and supportive environment for aquaculture development. With this in mind, the Community Profile Column, in each edition of the Cold Harvester magazine, will celebrate a community where the aquaculture industry is active and is boosting rural economic activity.

Mayor: Mark Sheppard

The community of Winterton is located in Trinity Bay, on the western side of the Avalon Peninsula on Newfoundland's beautiful east coast. It was originally named Scilly Cove. In 1912, the town was renamed Winterton for Sir James Spearman Winter, former Premier of Newfoundland.

Winterton offers the Wooden Boat Museum of Newfoundland & Labrador, a large RV park, Trinity Hall Recording Studio, a Pharmacy, School, Scilly Cove Foodery & several service businesses. There are scenic hiking trails, gorgeous lookouts and so much more.

Green Seafoods Ltd. which has provided employment to the surrounding area for the last 117 years, are also located in the small town. The processing plant is located on Pinhorns Beach, and processes millions of pounds of mussels, sea cucumber & whelk each year. The positive livelihood impacts of aquaculture are well known and include provision of rural livelihoods, better income, and new employment opportunities to those around Trinity Bay.

Aquaculture is increasingly recognized as one of the most environmentally sustainable ways to produce food and protein. It creates year-round jobs, supports resilient working waterfronts and coastal communities and provides sustainable economic growth. Aquaculture is transforming our coastal towns into the vibrant, prosperous communities they were meant to be. It's creating a Newfoundland and Labrador that our children can truly call home.

The Launch: Marine Institute's Holyrood Facility Opens Doors to Ocean Innovation, Education and Collaboration

By Moira Baird Public Relations and Communications Officer, Fisheries and Marine Institute of Memorial University

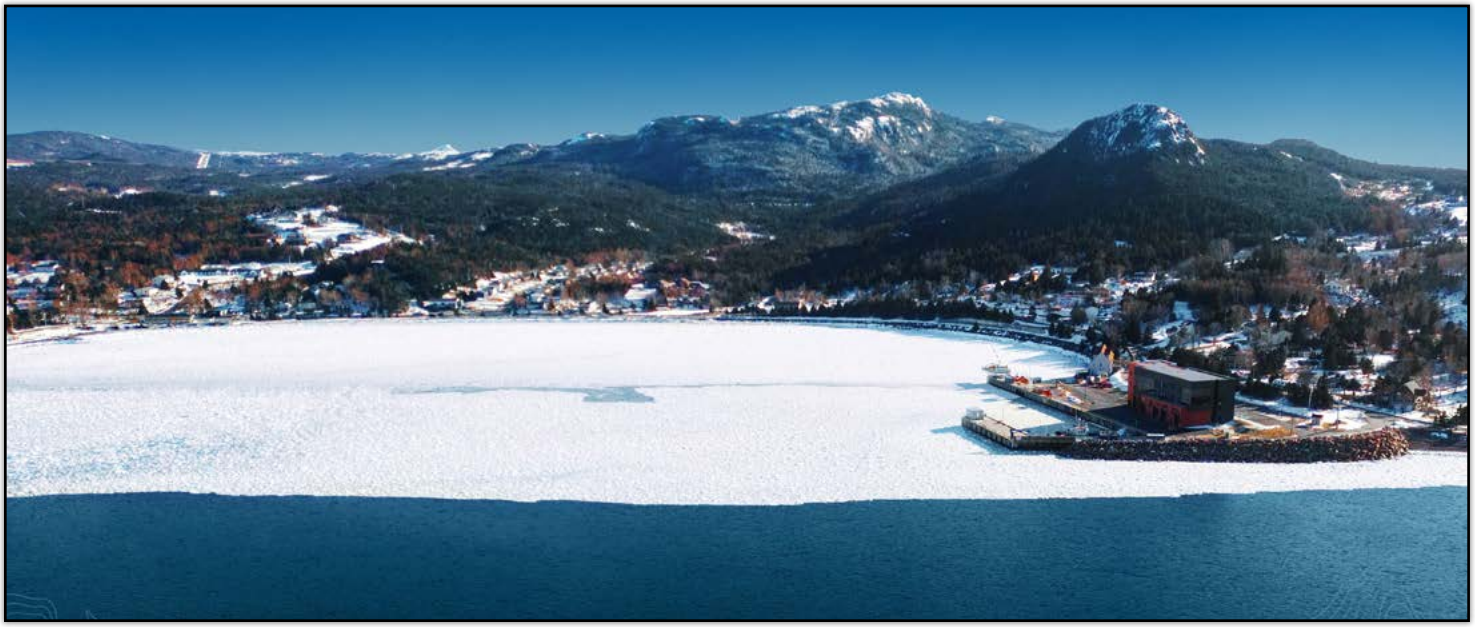
The Fisheries and Marine Institute of Memorial University has officially opened The Launch, its state-of-the-art marine living lab that offers a safe, reliable, near-Arctic environment to test new technology, train in harsh conditions and explore the next advancements in ocean research — in, on and under the water. The facility also plays a key role for Marine Institute students who also use the facility for experiential, at-sea education as part of their academic programs.

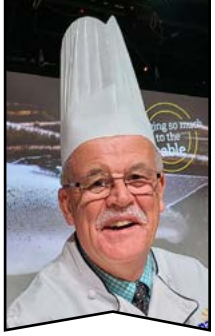
"In the United Nations Decade of Ocean Science, we are excited that our ocean industry innovators, researchers and students will avail of a dynamic facility designed to advance our knowledge and expertise in the ocean economy and build a multidisciplinary workforce," said Dr. Paul Brett, vice-president, Memorial University (Marine Institute) pro tempore. "The Launch is an important cornerstone in the growth of our ocean technology sector and we are grateful to our industry, government and community partners for their support in making this happen."

Developed in phases since it first opened in 2010, the final phase includes the new $22-million Arthur W. May Building, supported by a combined federal-provincial investment of $8.5 million announced in 2019. The multi-purpose building is named for the late Dr. Arthur May, Memorial president, and vice-chancellor from 1990–99. Under his leadership, the Marine Institute became part of the university, strengthened its education, industrial training and applied research programs within Memorial and oversaw the introduction of its first bachelor's degree. Dr. May was also the founding chair of the Centre for Fisheries Ecosystem Research. The 36,000-square-foot building includes technical workspaces, dry laboratories, classrooms and open collaboration spaces for researchers, students, and ocean technology partners.

The Launch is home to the Centre for Applied Ocean Technology, at-sea safety and survival training from the Offshore Safety and Survival Centre, SmartAtlantic ocean observatory system, the Holyrood subsea observatory, a fleet of training and research vessels and state of the art technology. The facility features a subsea centre of excellence providing a controlled environment for technology development, mission planning and demonstration of remote operations capabilities. It also includes a water lot for training and testing and installation of subsea infrastructure to evaluate positioning systems for robotic and autonomous underwater vehicles.

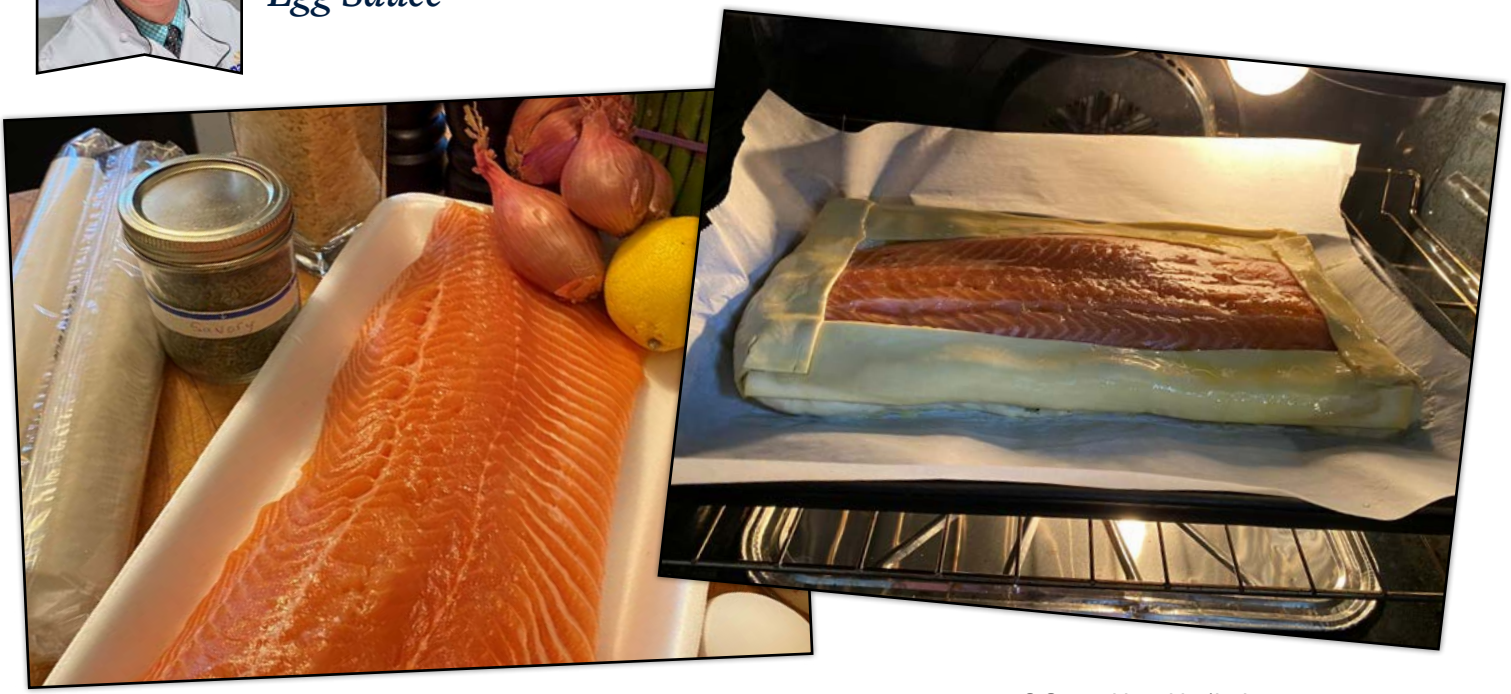
To learn more about how The Launch can support your R&D and testing needs, visit www.thelaunch.mi.mun.ca.





Cooking with Chef Steve Watson

Open Faced Atlantic Salmon Coulibiac with a Mount Scio Savory Egg Sauce



Ingredients:

2 lb. Side of Atlantic salmon skin off, remove the pin bones and tail
4 Shallots, finely chopped
2 Cloves of crushed garlic
2 cups Cooked rice
3 tbsp. Olive oil
2 tsp Dried oregano
1 x 11oz Fresh baby Spinach
1 x 450 g Packet of butter puff pastry
1 lg. beaten egg
1 tbsp. Liquid chicken base
¼ cup White wine

Spinach Mixture - Method

Heat the olive oil over medium heat. Sauté the shallots, garlic and oregano until translucent. Add the white wine and spinach and cover until spinach is cooked. Add the cooked rice and the liquid chicken base and stir. Allow to cool, making sure all the liquid has been reduced. Preheat a large cookie sheet in the oven at 250°F.

On a large sheet of parchment paper, roll out the full pastry so it's 4 inches bigger than your salmon all the way round.

Spoon the spinach mixture on the middle of the pastry and spread it across the surface, leaving a 1inch border at the edges. Place the salmon in the middle, then roll up the sides of the pastry to create the crust, going right up to the salmon and pinching it at the corners to secure it in place. Brush the exposed pastry with the egg then carefully lift the parchment paper with the salmon coulibiac on to the preheated tray. Bake at the bottom rack for 30 - 40 minutes, or until golden and cooked through. Serve with Mount Scio savory egg sauce.

Mount Scio Savory Egg Sauce

Ingredients:

I tbsp. Mount Scio savory
¼ cup White wine
2 finely chopped Shallot
2 tbsp. All-purpose flour
3 tbsp Sea salt butter
2 cups 2% Milk
2 Grated hard boiled eggs
2 tbsp. Chopped parsley
Salt and pepper

Method:

Sauté the finely chopped shallots in the butter with the savory until translucent. Pour in the white wine and let reduce, then stir in the flour, gradually stirring in the milk. Leave it to simmer for 5 minutes. Season to taste. Just before serving it, add the grated hardboiled egg and Chopped Parsley

This Recipe is my adaption of a Coulibiac which is a type of Pirog (Traditional Savory Pie) from Eastern Europe usually filled with salmon, rice or buckwheat, hard-boiled eggs, mushrooms, onions, and dill. The pie is baked in a pastry shell, usually of brioche or puff pastry. In the early part of the 20th century, Auguste Escoffier, the famed French chef, brought it to France and included recipes for it in his masterwork The Complete Guide to the Art of Modern Cookery.

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Curious? Let us know! We'd love to hear from you!

Couturier on Culture

Old MacDonald Had a Farm – AI, AI, O!

By: Cyr Couturier, School of Fisheries, Marine Institute of Memorial University

Cyr Couturier is marine biologist, aquaculture scientist and chair of the MSc Sustainable Aquaculture program at the Fisheries and Marine Institute of Memorial University. He has 35+ years of experience in applied research and development, training and education in aquaculture and fisheries. He is a Board and Executive member of several farming & development associations, including CAIA, CFA, CAHRC, HORIZON TNL, and is a past president of AAC, CAIA, and NAIA. He has worked in aquaculture and fisheries development in over 18 countries. The views expressed herein are his own. Contact: cyr@mi.mun.ca or follow on Twitter @aquacanada

ARTIFICIAL INTELLIGENCE AND THE FARMING WORLD

The concept of Artificial Intelligence or AI, was first described in the mid-20th century in a now famous article entitled "Computing Machinery and Intelligence" (Turing 1950). At the time it was thought that computers could eventually enable humans and eventually machines to perform certain tasks with the aid of computers to address production needs. However, it was expensive to use computers with limited computing capacity that were the size of a standard bungalow, and it often took hours, if not days, to do large computations. It was also difficult for computers to connect to machines by any other means than a phone line, as cel phones and the internet had not yet been widely invented (1960s for cels, 1990s for the internet, and 2000s for cloud computing). Fast forward to the present day with cloud computing, the internet, wireless communications (cel or satellite), even our handheld smartphones are much more powerful and faster (almost real-time) and allow humans to activate or enable certain tasks to be done on the farm remotely by machines. The definition of AI from the Oxford Dictionary is "the theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages". It has taken awhile to get to this point since AI was first recognized almost 75 years ago.

When combined with machinery that serves a purpose, AI algorithms are capable of machine learning, so to speak, whereby input data from a variety of sensors (visual, auditory, or other), are used repeatedly, and if requested by the farmer, offer decision-making on a course of action. AI systems do result in the recognition of individual animals and can take on a task suitable for that animal's welfare. One only has to think about milking robots used in the dairy industry today, all powered by AI and "learned" machine technology. In this case, the computer develops an algorithm (a mathematical model) that is constantly being updated millions of times over, which tells the robot which cow is entering the milking area, the size and shape of her udder and teats, her daily production of milk, and whether or not she is developing mastitis, among other health attributes. In other words the machine (i.e., the robot) has learned to take care of the individual dairy cow, and relays that information to the farmer (on wireless or other comms) so he or she can take appropriate management action, for the animal's welfare.

These AI powered machine learning Ag and Agrifoods operations are referred to nowadays as Precision Farming or Smart Farming. It's also been employed in terrestrial agriculture for well over a decade, from dairy milking robots mentioned earlier, to spreading fertilizer and monitoring plant growth in field crops

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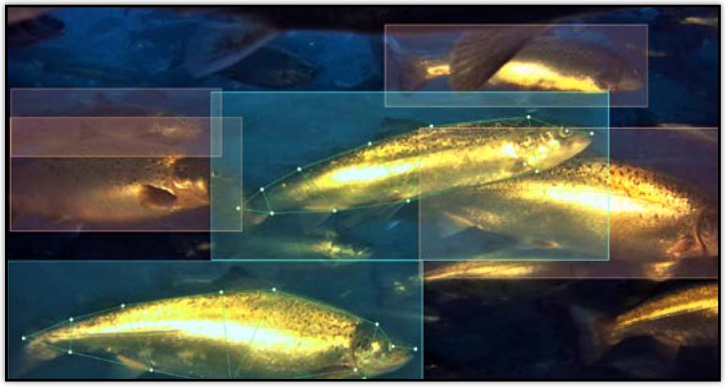
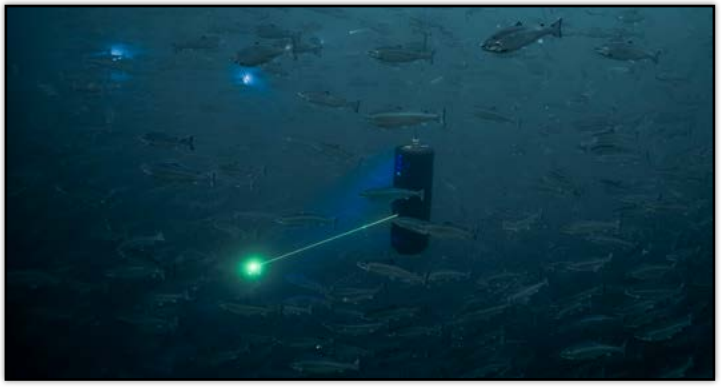


Optical imaging and biometric measures employed for fish biomass estimates in near real-time in land-based tanks. Credit: ReelData Inc.



The Stingray Laser system in action in a fish net pen. Credit: Stingray

by using real-time indicators of water and nutrient levels in the soil. An additional benefit of these systems is that they allow the farmers to reduce Green House Gas Emissions (GHGE), to reduce costs of production, and enhance yield and productivity in their crops. Some robots can even identify weeds and pests, and remove these mechanically or chemically, all using AI –powered algorithms.

Machine learning of course is only as good as the sensors, the input data they generate, the algorithms behind it all, and the communications available for decision making. Communications in real-time, via satellite, mobile phone, or other internet connection is crucial for effective decision making, and so are infrastructure needs in order for this to be of benefit to all farm producers, whether on land or sea.

AI, MACHINE LEARNING, AND AQUACULTURE

AI is currently being used in aquaculture settings on land and at sea for a variety of purposes, including environmental monitoring, tracking from egg to plate, early disease and parasite detection and animal health, growth and biomass estimation, processing, and feeding, among others. Some aquaculture machinery that is AI powered even serves to treat animals for health conditions.

One example of a fish health application, fit for purpose, is the Stingray delousing system (www.stingray.no), developed over a decade or so. The devices are able to count and size sea lice stages, determine infection rates, and destroy the parasites with the use of underwater lasers. This laser system has been trained to delouse a couple of salmon and cod parasites. All of this without further human intervention or decision making. The system also uses biometric data to estimate biomass and growth in a given net pen of salmon. After years of development, the system appears to work well with over 800 units in operation in Norwegian and Nordic salmon farms at present, with a huge order backlog. A continuous development of both hardware and software over the years have improved the system several times. All nodes are online and in a virtual neural network that secures over the air updates and frequent training of each detector. The overall system is now referred to and called The Fish Health Hub from Stingray.

New upstart companies are also developing even smarter AI systems for fish health management, providing treatment options depending on the environmental conditions in which the farms are located. For example, AquaByte (www.aquabyte.ai) highlights the following on their site "Healthy fish at lower cost. Automatic lice counting, welfare scoring, and biomass control. Information for data-driven decision making to increase revenue." One of the different attributes in this system is that real-time environmental data can be incorporated into the algorithm for more rapid development of patterns and treatment options. This has captured the attention of several large fish farming corporations in Europe, North America, and South America.

Another startup has planted its feet firmly on land-based fish farming systems. ReelData (www.reeldata.ai) uses optical and water quality data in real-time to optimize feeding of salmonids autonomously, while measuring growth, biomass, and stress in fish in real-time in recirculating aquaculture systems. A number of these systems are in operation in in North America, Europe, and South America.

Innovasea is an ocean technology leader using the best in situ communications and environmental monitoring for fish growth, biomass, autonomous and remote feeding (www.innovasea.com), oxygenation in ocean pens, using specialized acoustic receivers to transmit data via satellite or mobile. All of this is in real-time so rapid decisions can be made by the farmer on a

Blue Lion Labs image of plankton detection system. Credit: Blue Lion Labs.

course of action.

The CageEye system from Norway portends to accomplish the same in automated feeding for salmonids in particular.

On the plankton monitoring front, there are AI systems emerging to detect plankton that may provide much better predictive capacity and decision support for mitigating impacts on these types of concerns. The leader in this space is Blue Lion Labs (www.bluelionlabs.com), who is using machine learning to automatically identify and count plankton for dealing with toxic or harmful plankton concerns for aquaculture farms.

Wittaya Aqua (www.wittaya-aqua.ca) has developed a feed ingredient and supplier AI system for mixing and sourcing necessary ingredients for a variety of fish and shellfish farms and conditions. For a nominal monthly subscription fee, almost anyone in the world can have access to the advice from this system. Their AquaOp Farm and AquaOp Feed platforms allow companies to analyze data in real-time, on the farm, to optimize production.

Last, but not least, autonomous delivery of feed by vessels to remote salmon farms has taken place in Norway recently, powered by AI and machine learning to deliver the food safely in open ocean conditions.

I have given the reader but a sampling of a few types of AI – machine learning applications in aquaculture. Future endeavours in farm AI at sea and on land in aquaculture will almost certainly include robot mitigation of unfavourable environmental conditions such as plankton blooms, low oxygen levels, temperature anomalies, and other health and welfare challenges. At some point, entire farms will be autonomous production facilities, requiring only oversight by humans on the technical side of things.

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Aquabyte general dashboard for various metrics in real-time. Compatible with mobile phone monitoring. Credit: Aquabyte AI.

Aquabyte fish health display showing fish welfare indices over time. Credit: Aquabyte AI.

ISSUES, CONSTRAINTS AND FUTURE TRENDS IN AI

Communications and sensor performance are essential for good AI solutions for fish farming. If reliable data cannot be transmitted in real-time to the operator, he or she may not be able to manage or instruct robots on performing a life-saving operation or an environmental mitigation instruction for the fish. So these communications tools need to be rapid, precise and use reliable sensors for a well-run operation, with animal welfare always first. This is often a constraint in many parts of the world where cel or internet service unreliable, but perhaps satellite high-speed internet might be option, at relatively low cost? (e.g., Starlink).

Another possible constraint is that farmers will need access to data scientists or employ these folks to develop and understand their AI systems. These positions are increasingly in demand across economies of the world using large data inputs and analytics tools. Farmers will ALWAYS want to own the data from their own farms, so they need to be careful as to the terms of service and security provided by AI-machine learning specialists and providers. So, security of data and who uses it and for what purpose is always something a farmer will be concerned about.

One exciting trend in the AI-machine learning sphere is the use of real-time eDNA monitoring for pests, parasites, diseases, even fish presence and absence. Readers may be familiar with detection of infection loads from the COVID-19 viruses and their variants in municipal wastewater, but systems are now available to detect organism presence or absence in aquatic systems in real-time, so why not use them for predicting plankton, disease organisms, or pests like sea lice larvae, and other interactions among farmed and wild organisms, in real-time? Lots to be done on this in the near future I suspect.

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