BRINGING THE Seafood ABOARD

By Kara Kuryllowicz

A meaty, perfectly grilled swordfish steak, the sweet ocean taste of seared scallops, the rich red and white flesh of a hearty lobster tail, a slab of wild-caught Coho salmon…

Consumers expect fresh, quality seafood will always be available from their shop and the fishers who catch it fervently hope the fish will be there because their livelihoods depend on it.

Increasingly, consumers realize just how vulnerable Canada's and the world's wild fish stocks have become, due in part to the ever-increasing focus on sustainability. Organizations such as Canada's SeaChoice and Ocean Wise and the Marine Stewardship Council address unsustainable fishing, support sustainable fishing and in some cases, certify fisheries and identify more eco-friendly seafood to consumers.

And as much as fishing is about a great meal, it's also all about jobs and economics. In Canada in 2014, 40,940 commercial fish harvesters and crew worked on 18,250 registered fishing vessels and brought in 866 thousand tonnes of marine and freshwater fish valued at roughly $2.9 billion.

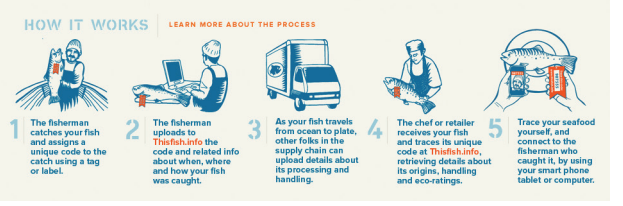
As well, consumers, harvesters, processors and governments in Canada and around the world remember the utter collapse of Canada's cod fishery. The horrific economic impact of the 1992 moratorium resulted in more than 35,000 workers in over 400 coastal communities becoming unemployed.

"Harvesters now walk the talk because we know that we can't assume the fish stocks will always be there," says Ian MacPherson, executive director of the PEI Fishermen's Association, whose approximately 1,270 active members earn about 90 percent of their income from lobster. "I really hope we all learned from what happened to the cod fisheries."

"Sustainable harvesting is the key to the future of

Photo: sf foodphoto – iStockphoto

Sustainability guides Canada's fishing industry



L: Atlantic lobster tagged with a unique ThisFish code from Nova Scotia. R: Consumers can trace codes on computers, tablets and mobile phones to discover the story of their seafood using ThisFish's app. (Photos: Ecotrust Canada)

the fisheries—we all saw what happened to our cod stocks," adds Bob Hanner, a professor at the University of Guelph, Ontario who has been working in DNA-based species recognition for over 20 years, and is chief technology officer at TRU-ID, which was founded in 2013 to authenticate food products using DNA.

It was a painful lesson all the way around and today, Canada's federal government is doing a better job of protecting and monitoring our wild fish resources. Meanwhile, the fishing industry knows the onus is also on them to comply with the regulations to preserve fish stocks.

"So many of our fishers are into their third, fourth and fifth generations of fishing and if we want that for future generations, the resource must stay strong. So there is a real spirit of collaboration and cooperation with the Department of Fisheries and Oceans (DFO), and a willingness to comply with those stringent regulations because it's to our own benefit," says MacPherson. "For example, DFO's boats do random checks which are a real deterrent to catching undersize or egg-bearing female lobsters because DFO has the power to seize equipment, lay fines and even suspend licenses."

Across Canada, the regulations vary significantly based on the fishery. Complex, even for industry insiders, the enforcement of those regulations relies on a

pg 24

FISH FINDER

This Fish, launched by Ecotrust Canada in 2010, was created to help consumers make informed choices about the authenticity, quality and sustainability of the seafood they eat, while promoting the men and women who actually catch the fish.

Right now, This Fish has about 960 vessels and fleets registered, ranging from small inshore hand-liners in Newfoundland and Labrador, to hundreds of hand-line tuna fishermen in Indonesia, to larger offshore trawlers. To date, about 90 species are registered with This Fish, typically the higher-value species destined for niche and upscale markets.

Fishers upload data about where, when and how the fish was caught, then consumers visit this thisfish.info and enter their seafood's code to connect to the fisher and get their story.

The system includes online software to collect, store and share traceability data and tags or labels to identify product with unique codes. Tags or labels can be branded by the seafood businesses themselves. Fishers can register for free, but depending on their level of usage, the annual fees range from $100 to $400 annually.

"Harvesters are as interested in where their catch is going as the consumer is keen to know where it came from," says Eric Enno Tamm, general manager, Traceability Initiatives, This Fish, Vancouver. "Transparency creates accountability and fish harvesters tend to handle their catch even more carefully when they know that consumers will trace their fish."

Above: An Archipelago technician installs a video camera on a fishing vessel. Right: Archipelago's EM Observe monitoring system, including the control centre, cameras, sensors, satellite modem, and GPS unit. (Credit: Archipelago Marine Research)

variety of systems that run the gamut from humans with pen and paper to low- and high-tech solutions. They're designed to track and monitor the boats and their catches for Canada's fishing industry, which includes commercial fishing (harvesting) and aquaculture or fish farming.

If fishers are caught breaking the rules, there are tangible consequences. Fines may be a few hundred dollars to tens of thousands, with the value depending on the species and volume. Equipment forfeitures run from nets, traps and crates to capital-intensive mechanical and hydraulic equipment as well as the vessels themselves. A license may be suspended for months or years.

Fisheries monitoring, generally a requirement for operation and licensing, typically ensures compliance with government regulations pertaining to where the fish are caught, the volume and species caught and the percentage that's returned to the water.

Whether the monitoring is done by human observers or by automated, electronic systems, both collect high-quality, independent catch and compliance data. It's used by fisheries scientists and managers as well as fishers to allow the best long-term decisions about the fish population and ecosystem.

"Overall, the Canadian fishing industry has accepted the observer and automated, electronic monitoring alternatives as a way to demonstrate transparency and disprove public notions of abuse," says Howard McElderry, a founder and director of Archipelago Marine Research in Victoria, BC, which has been providing marine resource management products and services to commercial fisheries, industry regulators and coastal communities for more than three decades.

The data collected will vary widely depending on the location and type of fishery involved. For instance, human observers will gather biological data, such as the size and sex of the species caught and collect age-determining structures such as scales or otoliths, "ear bones" that have growth rings much like tree rings.

Electronic monitoring collects data such as location, catch per unit and compliance with fishing regulations, such as how long a crab trap has been in the water or if fishing occurred in a prohibited location. Sensors that collect water salinity and temperatures may also be used to assess the health of an ecosystem, and video imaging can provide detailed information about the catch, such as species, size and disposition (kept or discarded).

Traditionally, observers are marine sciences graduates, who are hired by third-party contractors to provide monitoring services to industry and government. They've been riding with Canada's domestic fleets since 1978 when countries, including Canada, became responsible for managing the resources within their 200-mile ocean limits.

While the larger operators and vessels can cover the cost of an observer and accommodate the extra person, it can be economically prohibitive and even dangerous for the smaller boats. Observers are paid 24/7 whether they're actually performing their monitoring duties, sailing four days to and from a far-away fishing ground, stuck ashore until a storm passes, waiting for the capture equipment to be deployed or eating and sleeping.

"As a result, we now have automated, electronic monitoring—which costs 75 to 80 percent less than human monitors—in place in Canadian and international waters," says McElderry.

Today, 100 percent of British Columbia's commercial hook-and-line and trap groundfish fishing is monitored using Archipelago EM technology. This involves about 200 vessels, 1,200 trips, 10,000 sea days, and 20,000 fishing events annually.

The British Columbia Groundfish Hook and Line/Trap Catch Monitoring Program (GHLCMP), a primarily industry-funded initiative, started back in 2006 to help ensure the long-term sustainability of BC's ground fish. Its total at-sea catch monitoring is accurate because it quantifies previously unknown at-sea catch and as importantly, the releases.

The Archipelago EM Observe electronic monitoring

From the foreign fishers' and the processors' perspective, *selling* a low-value fish as a higher-value fish is a highly profitable *fraud*.

system includes a GPS receiver, multiple equipment sensors, and up to eight, strategically positioned digital video cameras, all linked to an onboard control centre. It's equipped with data logging software to manage and log fishing activity data, while providing wheelhouse crew with a real-time view of key fishing activities on deck.

All video, sensor, and GPS data is recorded securely to a portable hard drive, where it can be retrieved once the vessel reaches port, and reviewed using data review software. If it took the catch three hours to come aboard, the off-site reviewer will require 60 to 90 minutes to view the footage, whereas on a boat, real-time is the observer's only option.

Meanwhile, EcoTrust Canada, a non-profit that supports green economic growth, launched its observer program in 2010, and automated, electronic monitoring the very next year. They're both important tools in the fishery manager's toolbox, collecting data on the location, amount and type of harvest as well as identifying the fisherman and vessel out at sea.

EcoTrust worked with the Gulf of Maine research institute, the Nature Conservancy and Maine Coast Community Sector to develop its automated electronic monitoring system. It includes the technology required for collecting video, vessel tracking, hydraulic sensor data and can create an electronic log of vessel activity.

"Electronic monitoring is a great alternative to observers," says Amanda Barney, general manager of the Marine Monitoring Initiative for EcoTrust in Skeena, BC.

As effective as the observer and automated, electronic systems continue to be when it comes to monitoring, traceability is often more about marketplace differentiation. Accurately identifying ocean-based proteins is considerably more complex than land-based proteins because of the number of species. While harvesters generally have the experience and expertise required to identify the catch pulled from the water, genuine mistakes are easily made with similar fish species.

Whole fish right out of the water present enough of a challenge, but once it is cut up and cooked, particularly if it's breaded or battered, a DNA test is often the only means of accurate identification to protect the consumer and our fisheries, as well as the foodservice and retail industry.

"Once finfish are processed, they lose their morphological characteristics, such as the head, skin/scales, fins and tail, which are key to the identification process," says Dane Chauvel, who with fellow independent West Coast fishermen Steve Johansen and Frank Keitsch, founded Organic Ocean in 2007 to promote ocean-friendly, sustainable and responsible harvesting of wild fish. "DNA authentication is the only reliable way of addressing concerns around fraud and illegal, unreported, unauthorized or endangered species catches."

Over the last eight years, Organic Ocean's business and fleet have grown ten-fold and additional fishers need only commit to sustainable harvesting and quality handling processes for which they'll be paid a premium price to be part of it. TRU-ID randomly audits Organic Ocean two to four times a year, comparing tissue samples against their database to confirm the species on the Organic Ocean label.

Weeks later, TRU-ID publishes a compliance report that is also posted to Organic Ocean's website for public viewing. While Organic Ocean's record is almost perfect, there have been instances where a product was mislabeled, for example, a Keta or Chum salmon was included with Sockeye because even the most experienced harvesters are challenged to visually differentiate the two species.

"The seafood industry is in the very early adoption stage when it comes to DNA authentication," says Chauvel, "We believe the market will acknowledge the value of species authentication, but to date, there has been no measurable, quantifiable ROI, which we believe is the lot of the early adopter. When the market ultimately catches up with us, there will be a payoff as greater consumer confidence in our Organic Ocean brand will translate to higher sales."

TRU-ID runs DNA tests in its labs, but when some customers indicated they couldn't wait even a day for the results, the company developed an onsite, confirmatory test that will indicate for example, whether the sample is, or is not, Atlantic salmon. If the sample fails, it can then be sent to a lab for sequencing to get a species-level identification.

This type of testing works best for companies that deal with a relatively limited number of commodities in high volumes. Clients using this portable system will still need to be audited to ensure their system is performing properly, but it gives them the information they need to make real-time business decisions.

"Our customers need to know if they should reject that batch or shipment right away to effectively run their businesses," says Hanner.

To a consumer, a piece of wild, Ontario-caught walleye may look and taste a lot like an Eastern European Zander, but they're willing to pay more to support the local walleye fisher and Canadian industry. From the foreign fishers' and the processors' perspective, selling a low-value fish as a higher-value fish is a highly profitable fraud.

"We need to know that the walleye is not an Eastern European Zander and that Coho salmon is really Coho not Atlantic salmon which is actually a different species, because such misrepresentation artificially depresses the price of the higher-value catch which in the short- and long-term has a negative impact on the local fishers," Hanner says. **MM&D**