

Electronic monitoring for the Area A Dungeness crab fleet



Introduction / The Area A crab industry on the northwest BC coast is one of the most important and lucrative Dungeness crab fisheries in Canada. To ensure it remains that way, it needs to be effectively managed. In 2010, the Area A Crab Association partnered with Ecotrust Canada to develop an Electronic Monitoring (EM) system that was both cost effective and adaptable to the changing conditions of their fishery. In 2019, Teem Fish spun out of Ecotrust Canada as a new social enterprise and took over the technical support role of the Area A program and began upgrading the fleet's EM technology.

Commercial crab fish harvesters have long been committed to using on-board electronic monitoring (EM) as the best means of managing their fishery. EM allows for careful management including trap limits, for monitoring location and for dealing with thefts of product and gear. Our role as EM service provider for the Area A Crab Fishery allows us to support them in remaining sustainable and economically viable.

This work is a perfect fit for Ecotrust Canada's vision of supporting community-built solutions that result in more sustainable fisheries, and Teem Fish's mission to provide commercial fish harvesters in smaller vessel fleets with innovative and affordable data tools to

better manage their enterprises, add value to their catches, and meet evolving regulatory requirements.

Together we bring to this work:

- Knowledge of the region;
- Longstanding and trusted local relationships;
- An innovative, community based approach;
- Technical expertise with application development;
- Truth-tested experience in management of fisheries monitoring and observer programs.

*PHOTO /
Area A Crab Vessel
heading out
for the 2011
fishing season.*



PHOTO, L to R /
Crab sketch, Haul-
ing in Dungeness
crab catch



Furthermore, we are committed to providing a system that addresses conservation, industry and Department of Fisheries & Oceans (DFO) needs and concerns. We continue to work closely with fishermen and the Area A Crab Association to improve service delivery and the program itself.

On-Going Project objectives /

- Work with Area A crab fishermen to design a system responsive to *their* needs;
- To offer a new alternative and increase EM options available to the Area A crab fishermen;
- To create a system that contributes to the sustainability of the fleet, healthy crab stocks and North Coast communities;
- To use electronic fisheries monitoring technologies to support better-informed decision-making in fisheries management processes that are also more equitable, inclusive, and continuously improving.

Our approach /

Ecotrust Canada and Teem Fish both bring to fisheries monitoring a unique '3E' approach, partnering with communities to build fishery plans and solutions that consider 'Economy', 'Environment' and social 'Equity'. With regards to our work in EM, building and implementing cost-effective, accessible, efficient marine monitoring systems, these principles translate as working to:

- Reduce costs, to make EM more accessible;
- Increased functionality and customization of EM systems to meet both fleet and regulatory needs;
- Remain true to the principle of encouraging and demonstrating information democracy by being third party stewards of data that is available to both DFO and participating fish harvesters

Our new EM system solution/

Ecotrust Canada's Fisheries and Knowledge Systems and Planning teams worked hard to develop, build and install electronic monitoring systems for the Area A Crab fleet in time for the 2011 season. These systems have been maintained for the past nine fishing seasons. Starting in 2019 these systems are being replaced by state-of-the-art technology from SnapIT.

This technology includes:

- ruggedized hardware that you can set and forget;
- cameras that include NASA argon purging innovation to eliminate condensation;
- On-board processing and video compression capabilities that allows for data transfer through WiFi or cellular

Together Ecotrust Canada and Teem Fish continue to offer a suite of services to the fleet, including:

- Onboard observation and assistance;
- Maintenance issues;
- Developing database for logbook info;
- Building and maintaining relationships with the fleet; setting up processes for finances and inventory;
- Reporting on deliverables to fleet and DFO;
- Reporting on non-compliance and issuance of compliance notices.

EM system components /

Our EM system includes the necessary equipment for collecting video, vessel tracking, hydraulic sensor and trap scan data. The EM system itself is divided into three components.

1. **Hardware for each vessel:** the physical EM system 'box' is a small computer that records data incoming from video cameras, RFID scanners, GPS and hydraulic pressure sensors;
2. **Software for recording and reporting:** Each vessel's hardware contains software drivers to read and compile data into databases either on internal drives for remote transmission or onto removal hard drives for pick-up;
3. **Hardware for data management:** The data is removed from the vessel, and studied in Prince Rupert using analytical software that isolates potential compliance issues for review by a trained technician.

The system and accompanying program plan and management services also address DFO requirements, such as:

- System development and installation;
- Administration of the program;
- Providing logistical support for all system operations including maintaining RFID tag registry, replacing faulty RFID tags and other equipment as needed;
- Providing all data analysis for data collected by EM systems, including necessary GIS

systems analysis;

- Submitting regular and final reporting to DFO, the Area A Crab Association, and individual Area A crab fishermen;
- Providing a 24-hour 'Hail-in/Hail out' phone service; registry of information;
- Key punching data from each vessel's logbook, and supplying this data to the Shellfish Data Unit.

Best practices /

Our EM system is further designed to address the following considerations:

Buoy registry Each trap used in the fishery must be fished separately, and is required to be individually buoyed. Additionally, each vessel is required to have its own identified buoy pattern, approved by DFO. At the start of the season each vessel owner registers their buoy pattern with our Fisheries Program staff who keep an updated electronic registry of the buoy patterns used by each vessel.

Trap limit management Each season, maximum area trap limit is distributed amongst the fleet based on vessel lengths. Trap limits are managed using RFID tag distribution.

Inventory Management We work with vessel owners to inventory the fishing gear they will use for the season, scan the RFID tags in their buoys to ensure they are all working, replace and scan new tags as needed, and collect the data associated with their buoy inventory.

Area, time and gear restrictions When conducting analyses of data collected, we check that each vessel is complying with DFO restrictions for area, time and gear, including use of hoop traps, soft shell opening and closures, and trap limits.

Gear location management The EM hardware and software is designed to create datasets of the last known location of every trap in the fleet. These datasets are used for both in-season and post-season lost gear removal efforts. Annual aggregates of this data can be used in marine spatial planning and to demonstrate effort in relation to things like proposed closed areas or known whale migratory patterns.

“Our goal is to use electronic fisheries monitoring technologies to support better-informed decision-making in fisheries management processes that are also more equitable, inclusive and continuously improving.”

PHOTO, clockwise L to R / Skeena Harbour, Ecotrust Canada's EM box, and the new Teem Fish/ SnapIT box, which is replacing old systems with new tech after 8 years of great service



Partners /

To achieve all our objectives, we brought together a number of people and practices, combining our own technical in-house expertise with feedback from partners for more integrated, supportive systems.

By this sharing of fisheries and monitoring knowledge, we have been able to connect the North Coast fishing community to a shared vision of what the conservation economy can look like.

Looking to the future /

Having worked closely with fishermen, the Area A Crab Association, and various key partners for the last 9 years, we have improved service delivery and the program itself. In 2020 we are excited to be introducing new hardware and software to the Area A fleet, as well as working with various partners to bring federal supported electronic reporting to this fleet.

We hope this way of doing business on our oceans, demonstrated at the local level, will provide a blueprint for communities in similar situations.

More information /

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Teem Fish is a social enterprise whose focus is on the design and delivery of efficient and effective electronic monitoring programs for fisheries. We build on the experience of our founder, Ecotrust Canada, in fisheries policy and monitoring program delivery, and our partnership with New Zealand based Snap Information Technology to develop and deliver innovative high-tech fisheries monitoring solutions to fish harvesters, fisheries managers, and resource dependent communities.