



British Columbia Lost Fishing Gear Workshop February 6, 2019

A Project of World Animal Protection and the Global
Ghost Gear Initiative

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March 27, 2019



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Introduction and background

The British Columbia (BC) Lost Fishing Gear Workshop was held February 6, 2019, 8:30AM – 5:00PM at the John M. S. Lecky UBC Boathouse, 7277 River Rd., Richmond, British Columbia.

The workshop was convened by World Animal Protection Canada and the Global Ghost Gear Initiative (GGGI). The World Animal Protection lead was Lynn Kavanagh. The workshop was coordinated by Joan Drinkwin, Natural Resources Consultants, and Lynn Kavanagh, and facilitated by Hilary Wilkerson, Veda Environmental. A workshop advisory committee assisted in the planning and execution of the workshop. This committee included: Lynn Kavanagh, Joan Drinkwin, Joel Baziuk (Ocean Conservancy); Rachael Merrett; Jen Paton (Ecotrust Canada); Lillian Mitchell (Fundy North Fishermen's Association); Megan Eadie (T. Buck Suzuki Foundation); Catie Frenkel, Jenna Bright, Katerina Vitik, and Shelagh McKeller (Archipelago Marine Research).

Forty-six people attended the workshop. Please see Appendix 1. The objectives of the meeting were to:

- Connect and build relationships with others working on/interested in lost fishing gear in British Columbia.
- Gain a baseline understanding of:
 - the scope and scale of the lost fishing gear problem both *globally* and *locally*
 - the types of solutions being used to address lost fishing gear in British Columbia and beyond; and
 - fisheries management in British Columbia as it pertains to lost fishing gear.
- Share perspectives and insights about challenges and solutions to the lost fishing gear problem in British Columbia.
- Identify the key challenges, solutions, and next steps (including necessary interest/capacity/commitments) regarding lost fishing gear in British Columbia.

The agenda included presentations as well as breakout sessions. The following workshop summary reflects insights from the presentations and discussions as captured by note-takers and the facilitator. Please see the workshop agenda in Appendix 2.

Workshop summary

Welcome and Opening Remarks

Joel Baziuk opened the workshop with an acknowledgement that the workshop was held on the traditional unceded territory of the Musqueam First Nation. On behalf of the Musqueam Peoples, he welcomed participants to the ancestral territory of the hən̓q̓əmin̓əm̓ speaking Peoples.

Lynn Kavanagh welcomed participants on behalf of World Animal Protection and the GGGI, thanked the planning committee, and introduced the facilitator. Ms. Kavanagh acknowledged the broad array of interests represented by the participants and especially acknowledged Paul Scott, from Canada's Department of Fisheries and Oceans (DFO), for coming all the way from Ottawa to be at the workshop and share information about Canada's commitment to tackling the issue of lost fishing gear.

Hilary Wilkinson facilitated an ice breaker with all the participants, encouraging them to discuss some questions:

- What brought you here?
- What is an issue you want to learn about?
- How can you contribute?

Ms. Wilkinson then reviewed the workshop objectives and agenda.

Opening Panel: Lost Fishing Gear Removal Efforts - Stories from BC and East Coast Waters

Paul Edwards, Area A Crab Association

Lillian Mitchell, Fundy North Fishermen's Association

Sydney Cappus, Lillooet region, DFO

Paul Edwards, Area A Crab Association

Area A Crab Association has been involved in gear retrieval since before 2000, removing traps in Hecate Strait for the most part. Efforts extend designated soft-shell survey charters, often financed by fishers, removing 600-700 pots per year.

Area A fishery began in the early 1970s There are currently 28,000 crab traps used and typically a 10% annual loss per boat is seen. The Area A Crab Association started in 1997-1998. The fishery operates in challenging areas. Hecate Strait is a challenging water body, with 24-foot tides, 7-10 m sea in winter.

Lost gear often gets swept off the bank into deep water at Rose Spit, East Point of Haida Gwaii. Causes of lost gear are gear conflicts and interactions with vessel traffic or blown away from original set. Compliance of rot wires is high, and Dan Edwards does not believe many lost pots are still fishing. Each year Area A is recovering about 10% of those lost per year, which are retrieved on recovery charter trips. The first year the Association sponsored the retrieval of lost pots; 1500 pots were recovered that year. Now a successful year is about 300-500 recovered.

- Question: What are the impediments to gear retrieval activity?
 - Not legal to pick up other fisherman's gear, but it does happen. Unwritten rule between fisherman that they can retrieve someone else's gear if lost.
 - Can't use product out of recovered traps to sell to pay for gear clean up, funding must come out of fisher's pockets.
- Question: What do you do with recovered pots?
 - Try to give pots back to original owner because they are marked with CFV # marked on pots
 - May be auctioned off
 - Historically they were crushed before marking
- Question: Ideas on how to decrease loss?
 - Can't change the effects of weather which is major cause of loss
 - Need to know where gear moves to

- Work with shipping industry to set up shipping routes as they do not exist in that area
- Question: How to prevent gear loss?
 - Nothing to do about weather or fishing patterns. Additionally, lost gear is swept far during big weather events. Need to coordinate with shipping industry and create shipping lane so there isn't as much overlap within fishing locations.
- Question: How to get past hurdle of pulling up other people's gear?
 - DFO has been cooperative (have been working with them for 20 years), while it is not legal to pick up another boat's gear there is an unwritten gentleman's rule that if you pull up a lost pot, you keep the crab within it. DFO recognizes the value of what they are doing. Any abuse to this will be caught on their Electronic Monitoring (EM) systems. They are 100% monitored through these systems.
- Question: What impediments are there to cleanup efforts? What sort of funding exists or coordination with other fisher fleets?
 - Biggest challenge is funding. All fishers pay an annual charge to do the charters – which have been cut back and therein the gear cleanup efforts have been cut back as well.
- Question: Methods to find lost gear?
 - By sight mostly. During retrieval extreme caution must be used as nylon lines are prone to snapping. Seasonal growth on lines is also high in spring which can weight floats down and out of sight.

Other information – Specific buoy colors for each boat are used to differentiate who owns the gear. Traps use three different types of metals and have zincs. It typically takes ~ 10 years to disintegrate. The release of these metals into the ecosystem is not currently being studied.

Lillian Mitchell, Executive Director, Fundy North Fishermen's Association

The Fundy North Fishermen's Association represents lobster fishermen on the East Coast of Canada, SW New Brunswick. The Association's goal is to preserve fisheries in the area, which are still primarily a family business with young fishers. Seventy percent of crewmembers are under the age of 40, intergenerational operation. The Association covers Lobster Fishing Area 36, main fishery. This area used to be a finfish dominant area, but now it's lobster. Fundy North Fishermen's Association became involved in ghost gear when fishers noticing losses in income due to lobster mortality in ghost gear and were also concerned about whale entanglement.

Common causes of gear loss are big storms, gear conflict, setting on top of each other, snarling with existing ghost gear and debris, and cutting snaring, and dragging of trap lines by non-fishing vessels.

Since 2008 Fundy North has been working on ghost gear retrieval project.

- Fishers heavily involved as they know the area, ocean bottom and are excellent at grapneling.
- Target area was St. John's Harbour- high gear loss due to conflict with shipping industry.
- To date they have had 143 retrieval days
 - Retrieved 1500 lobster traps
 - 23,768m of rope
 - Aquaculture gear, twine
- Working on solutions to gear loss

- Introducing shipping lanes into the harbour for ships and tugs in St. John's Harbour
- No buoyed gear to be set in shipping lanes
- Prohibition on dredging during lobster season
- Gear loss compensation plan between fishery and other industries
- Put cages on aquaculture boat propellers during lobster season
- Encourage fisherman to grapnel for lost gear during the season, grapnel provided
- Cleaned up the worst spots
- Fishermen cooperating with each other when setting gear
- Communication between industries
- Result: Reduction in gear lost!
- Working on mapping areas where gear tends to congregate
- Target retrieval events
- Sharing information with other organizations
- Translating documents into French for collaboration with other fishing associations

There have been years of conversations with other industries including aquaculture industry, have come to a working relationship. Small area where everyone knows each other. Aquaculture industry supposed to report when they run over a trap, pay for lost gear and lost product. However, have not yet had a claim go through. Trying to streamline the process to have Fundy North fill out the claim and not the fishers to reduce conflict. Work in progress.

- Question: Why do they not use rot cord on traps?
 - They do have escape vents but they are too small, regulations are not there so far for rot cord or larger escape vents
- Question: What happens to retrieved traps?
 - If usable, they are given back to fishers.
 - Ones that are too damaged are given to landscapers to be used in building retaining walls.
 - Non-reusable traps are crushed and taken to landfill.
- Question: What is loss rate?
 - Not entirely sure, less than 10%.
 - Fishers reporting between 3-25 traps per year.
- Question: Explain more about funding for recovery?
 - Receive grants from Federal Government and DFO.
 - Always looking for grants to support the program.

Sidney Cappus, Lillooet office, Department of Fisheries and Oceans Canada

There is a DFO and First Nations collaboration with the Lillooet Tribal Council. They have a global net recovery program that initiated in 2006 in the fall. Recovery Project is a two-day river clean up from Lillooet to Saw Net Creek (Yale) via two rafts. Hire 1-2 rafting companies in the area to conduct the project. Volunteers from First Nations participate. They collected 126 nets removed from base of Fraser River in 2006 recovery effort. 2016 only 5 nets were collected. 2017 zero nets were collected. 2018 only 3 nets were collected. Has decreased the number of derelict nets found in the river at base of Fraser River.

Presenting project to public schools, forums, community meetings. Fishers are increasing careful in their practices to not lose nets and remove nets at end of season.

- Question: What happens to the nets after collection?
 - If in good condition, they are given back to community
- Question: How are you removing?
 - Hand removed, so nets must be visible.
- Question: Is the location of nets recorded to track any trends?
 - Many nets are left on the beach at the end of the season, so they are often carried away by the river and snag somewhere
- Question: Are there regulations to address leaving nets on the beach? Are the nets marked?
 - The nets are supposed to be marked, DFO seizes unmarked nets
 - DFO does patrol the river for lost nets, often by helicopter
- Question: Do you have any data on how many nets are deployed and compared to how many nets are recovered?
 - No

Questions and summary discussion with panel of speakers

“Education and outreach is working” was a common theme among panelists.

Question from DFO Ottawa: What role might the Federal Government play in furthering their initiatives?

- Paul Edwards: If they could use the product recovered from retrieved gear to fund the retrieval efforts, they could recover more gear.
- Lillian Mitchell: Spend lots of their time applying for funding and if they don't get the grants, work will stop. Need financial support. They also do not have 100% monitoring. Fishers fishing other species outside of lobster season cannot haul lost lobster pots on their boats because they could get fined for having the gear, so they leave it in the water. They need a system to be allowed to retrieve the pots outside of season. Need for greater enforcement.
- Assistance with research impacts of lost fishing gear on habitats.
- Some NGOs expressed frustration with challenges of engaging in fisheries management processes.

Lillian Mitchell: Big concern of fishers about ghost gear is that they do not want “shell disease” to spread. There are misconceptions that gear floating around makes good habitat, which it doesn't.

Paul Edwards: Crab gear is made up of three types of metal, disintegrates in ~10 years. They also have rot cords and large escape holes. The effects on the habitat and other organisms is unknown.

Question: What method is used to find lost gear? How do they detect location?

- Paul Edwards: Picking up lost gear is dangerous work. Lines can break and injure person onboard. Growth on the line drags buoys. Location is determined from info passed on by

fishers, recording systems have GPS systems, so they can mark locations using this technology to best determine.

- Sidney Cammus: Rafting down the river and visual discovery
- Lillian Mitchell: Fisher knowledge, they know where gear congregates

Facilitated Group Discussion: Insights/Stories Regarding Lost Fishing Gear in British Columbia's Waters

Hilary Wilkinson facilitated a group discussion related to lost fishing gear in British Columbia. The participants shared their insights and observations. The following list reflects the discussion and what was captured on flipcharts with agreement from the participants that the notes accurately reflected their comments.

Ideas/Needs for Moving the Issue Forward in BC

- Develop a platform/portal for connecting people and sharing information within BC and beyond (NOTE: there is a DFO initiative related to this).
- Frame the issue as a marine debris issue for communication purposes and to engage more people in the issue.
- It is important to incorporate lessons learned from the Puget Sound work.
- Education and communication are very important aspects of this.
- Develop incentives (NOTE: several existing incentive programs were shared).
- There should be better gear tracing/tagging at point-of-sale to inform whether gear is lost.
- Focus on prevention, specifically:
 - Product stewardship. Extended Producer Responsibility (EPR) example was given – incentive to recycle and not dump.
 - Increase collective awareness within specific fisheries.
 - Enhance enforcement: example: names on nets.
 - Improved Individual Transferable Quotas (ITQ) management for halibut and groundfish helped reduce lost fishing gear.
 - Eco-friendly branding.
 - Distribute maps to fishers identifying high-risk areas.
- Need agreements with shipping community such as designated lanes to reduce gear interference.

Hurdles and Challenges In BC

- Infrastructure for processing end-of life gear. Needs to be unbiased; non-punitive; and not cost anything.
- Education and communication.
- Crab pot removal is labor-intensive.
- A lost gear reporting mechanism is needed.
- Training is needed for gear removers, especially divers. There are challenges with volunteer divers – they need training.
- Recovery is challenging (growth on gear for example) and dangerous.
- Question: Can there be insurance for fishing gear?

- Insurer clarifies that only if equipment is stored in a warehouse but NO for anything that goes overboard (during fishing).

Global Ghost Gear Initiative

Lynn Kavanagh, World Animal Protection

Joel Baziuk, Ocean Conservancy

Lynn Kavanagh and Joel Baziuk gave an overview of the problems of lost fishing gear globally and the motivation for World Animal Protection to initiate the Global Ghost Gear Initiative (GGGI). Its mission is to ensure safer, cleaner oceans by driving economically viable and sustainable solutions to the problem of ghost fishing gear globally. The GGGI achieves its aims through the collective impact of its participants. Currently there are 95 participants, including 6 high level global affiliates (UNEP, NOAA, FAO, etc.) and 13 countries, including Canada, which recently signed on as a participant of the GGGI.

The GGGI works through three working groups: the Build Evidence Working Group, the Define Best Practices and Inform Policy Working Group, and the Catalyse and Replicate Solutions Working Group.

Major GGGI outputs include a data reporting app, a global data portal, a Best Practice Framework for the Management of Fishing Gear, and several solutions projects around the world.

- Question: can the lost gear database interact with other databases?
 - It can in theory. Limitation is drawing data from broad base of clients, there are many different privacy requirements. Receiving other databases is not as much an issue in raw form.

Canada's commitment to the Global Ghost Gear Initiative

Paul Scott, Integrated Resource Management-National Programs, Canada

Paul Scott spoke about the current global momentum and Canadian commitment to address abandoned, lost, and discarded fishing gear (ALDFG), or ghost gear.

There is global momentum through:

- G7 and G20 Marine Litter Action Plans
- FAO Voluntary Guidelines on Marking of Fishing Gear
- United Nations Sustainability Goal 14 – Life under water
- International Maritime Organization (IMO) Marine Environmental Protection Committee (MEPC) recently released a draft action plan to address marine plastic litter from ships

Canada is a signatory country of the GGGI as of 2018. Canada's intention is to support the aims of the GGGI in ways that align with national priorities. Canada will focus efforts on science, prevention, mitigation as well as recovery and management as we develop a national program for the management of ALDFG. Canada will host a 2019 Fishing Gear Innovation Summit, which will include a stream focused on technological solutions to address ghost gear. on the east coast with respect to

North Atlantic right whale in the gulf. Federal government currently closes fishing areas when whales present but are looking for ways to use technology to avoid doing this. A ropeless fishing gear technology is needed. Also wanting to focus on technology solutions for ghost gear. DFO has committed \$2.6 million dollars towards initiatives that will develop innovative technologies to reduce domestic marine plastic waste through Canadian Plastics Innovation Challenges. Proof of concept and prototype etc. will get funds to remove and manage marine debris and aquaculture gear.

Seven challenges put out, the two applicable to this discussion are:

- Remove and manage ghost gear and marine debris
- Sustainable fishing and aquaculture

Canada is identifying options to engage industry and interested partners in the retrieval of ghost gear and data collection. Interested in expansion of current mandatory reporting requirements for lost gear to additional fisheries, and introduction of a retrieval gear reporting requirement.

Regional Fisheries Management Organization participation and international forum. Canada supports the improvement of fisheries management. Canada is encouraging other countries to sign on to support GGGI at international forums

Canada is developing an Action Plan. Phase One of the Action Plan: Focuses on 10 priority result areas for actions:

1. Product Design
2. Single Use Plastics
3. Collection Systems
4. Markets
5. Recycling Capacity
6. Consumer Awareness
7. Aquatic activities
8. Research and Monitoring
9. Cleanup
10. Global Action

Phase 1 of the action plan will be developed in 2019 focusing on the first 5 actions.

Question: Where does ghost gear sit as a priority for the feds in relation to other initiatives, for example, glass sponge reefs, marine conservation targets, etc.

- Does not have a priority rank, but the issue of ghost gear is extremely important and high priority on DFO's agenda.
- Comment: Recommend federal government to talk to other countries where gear often comes from and lands on BC to work together to address ALDFG across borders
- Comment: Karen Wristen-Government is willing to fund research and innovation, but what we need is the money to support the removal and prevention, we have the technology and knowledge now.

- Comment: Gideon Jones- As a non-profit we were excluded from Plastics Challenge competition and because they had to demonstrate new technology and innovation, which they could not provide. Need to open up opportunities to non-profits and not require new techniques to qualify.

Canadian Council of Ministers of the Environment (CCME) Strategy on Zero Plastic Waste 10 prioritization action steps:

- Product design, single use plastics, collection systems, markets, recycling capacity, consumer awareness, aquatic activities, research and monitoring, cleanup, global action (6 ->10 are applicable action areas)
- Phase 1 developed in 2019 (1 through 5)
- Phase 2 developed in 2020 (6 through 10)

For more information please contact Marina Petrovic or Paul Scott

Question: To look at solutions you need more information within fisheries, but there is vague national directive to quantify data for their fisheries. They also want this to move forward with this issue, but are dealing with many different initiatives and it is unclear where ghost gear fits in terms of prioritization. Please clarify what national issues are a priority for each fishery?

- Tricky area and he cannot prioritize where everything fits, but GGGI is a "huge one" as minister Wilkinson delegated it as "hugely important" (in his commitment to co-lead the Plastics Charter?).

Question: Is phase one of the Canadian Plastics Innovation Challenges still open for proposals?

- No, phase one is closed for proposals

Question: Will there be more incentivized program grants like this? GGGI missed the deadline.

- Stay tuned. Government is aware this is going to have to be an area of growth.

Question: Motion 151 (National Ocean Plastics Strategy) was not included in this presentation, how does it fit in with this initiative? **A** –

- "Will punt that question" not something he has actively dealt with. 151 may not be totally on the radar for this work plan.

Question: Canada is only country of G20 not providing money to citizens and industry. They are funding research for innovative technology – we don't need that, we have the gear. What we need is the money. When are we getting the money?

- "I will take that back to Ottawa"
- Comment Paul Edwards: Lack of fishers in this room, yet industry has been at the forefront of these initiatives. Many ocean currents are also bringing gear in from all over to us to deal with and fishers have had a huge hand in financing clean-up efforts. Can we encourage the federal government to focus on the north end of Vancouver Island to Haida Gwaii? It would stand to be a good example, but we also need to collaborate internationally.
- Comment by Gideon Jones: Speaking from an NGO, we would like to take advantage of funding, but are locked out because we don't have new innovations, there are only so many new technologies to remove gear... we are standing by to do work, we want to give the time, we just need the funding. Not successfully finding funding within their organization.

Local Solutions Case Studies Part 1: Efforts to address lost fishing gear in BC – What we know

Peter Mieras, Rendezvous Dive Adventures

Joan Drinkwin, Natural Resources Consultants

Gideon Jones and Bourton Scott, Emerald Sea Protection Society

Peter Mieras, Rendezvous Dive Adventures – Removal of gillnets from Barkley Sound

Peter Mieras is a charter dive business owner in Barkley Sound. He has been working on recovering gill nets on reefs off coast of BC. Nets are a monofilament nylon. He sees high mortality of wildlife found in the gillnets.

He worked with DFO to develop new regulations:

- Reporting of the loss of a gillnet is required as part of their licensing conditions
- Fishers now have to have to put identification on lead lines so that the nets can be traced back to the fisher
- Hand out maps to fishers each year to identify hotspots for high risk areas
- Fishers have been compliant and have not had to remove a net in the past year
- Question: What happens to removed nets?
- DFO takes responsibility for most, may take them to landfill. They have also worked with the Steveston Harbour Authority Net Recycling Program.

Joan Drinkwin, Natural Resources Consultants (NRC) – Newly Lost Net Reporting, Response & Retrieval Program in Puget Sound

Joan Drinkwin gave an overview of the derelict fishing gear program in Puget Sound and the Northwest Straits Foundation's Newly Lost Net Reporting, Response and Retrieval Program. She previously worked for the Northwest Straits Foundation, who have been working on ALDFG since 2000. The program focuses on prevention through reporting, has a response and retrieval program in place, and has a statewide database that is linked to the reporting system.

- Puget Sound Net Removal Results as of 2016
 - 5785 nets
 - 344.8 metric tons
 - 3.35 km squared habitat recovered
 - 298,383 animals:
 - Mammals: 71
 - Birds: 1103
 - Fish: 5709
 - Invertebrates: 482,865
 - 255 unique species

NRC works for Northwest Straits Foundation and manages the Reporting, Response and Retrieval Program. The program is designed for fishers to report gear that is lost in addition to a response and

retrieval process in place. Gillnet fishers are required to report a lost net within 24 hours of loss which goes into a database. Currently, it is estimated that 12-30 gillnets are lost in Puget Sound per year.

Question: This is a shot of hope in the dark, it's an emergency response to an emergency situation. Where is the money coming from?

- Grant funding from NOAA and approximately 30 other entities.

Question: Up to 2015 there was cleaning of legacy nets, over the last three years, what is the cost trend like to manage a program like that?

- There are 12-30 gillnets lost in Puget Sound each year, so not extensive.

Joan Drinkwin, Natural Resources Consultants (NRC) – Derelict Fishing Gear Removal in BC Waters

NRC and the Northwest Straits Initiative have worked in Canada for a long time. In 2010 they conducted a project with the Ministry of the Environment and Parks Canada.

Boundary Bay Work

- Used side-scan sonar in Boundary Bay in 2011 to find pots. Found 390.5 pots per km². This amounts to over 1800 lost pots in the area
- Were only able to remove 218 pots due to funding restrictions
- 10% of the pots removed were still fishing
- 54.5 pots removed per day by divers.
- Did another side-scan sonar project in 2018
- Found ~1300 pots in just 2km².
- Were not able to remove any of those pots

Net Removals

- Removed part of a purse seine net off of Pender Island in 2011 and back again in 2015 with Emerald Sea Protection Society, Rendezvous Diver Adventures, and World Animal Protection.
- Have also worked in Baynes Sound and near Malcolm Island, surveying and removing nets.

Hotspot analysis has also been done within the Salish Sea by Kyle Antonelis (NRC). The analysis identified potential areas of lost net accumulations based on the same criteria used to identify accumulations in Puget Sound. But when field verification did not yield as many nets as suspected, NRC has Hypothesize that this is due to there being no depth restrictions for setting gillnets in the US and there is in Canada.

Gideon Jones and Bourton Scott, Emerald Sea Protection Society (ESPS)

Emerald Sea Protection Society is a Non-profit organization started in 2015. The group consists of a mix of commercial divers, teachers, and scientists. ESPS is interested in ALDFG and marine litter in general. They want to emulate work being done by Northwest Straits Initiative in Puget Sound. They participated in the 2015 Pender Island net recovery to learn from the Puget Sound dive team how to safely remove the net, technique, etc.

ESPS conducts surveys, gear removals, educational outreach, communication. They have done inshore recovery projects with school children on Vancouver Island. Their challenges are having highly trained divers, insurance costs, equipment costs, safety, tides, weather, lack of proper equipment, personnel. They received a grant from CBC to create a documentary about the issue. They feel the path forward is to work with fishing fleets to bring expertise of fishers about nets and navigation together with expertise of divers to work together to address the problem together.

Question: Do you use underwater COMM masks?

- Yes, it is a benefit of using commercial gear. The whole team is involved in the removal. There is also bottom to surface video connections.

Question: What are some of the challenges of pulling up gear that you've encountered?

- Having to deal with the gear that they have. Nets are difficult – had to cut it into pieces because there was no strong winch on the vessel to pick up heavy portions of the net. Challenges vary from lack of equipment to having a full team. As well as visibility, narrow weather, and tidal stream area. Safety is first so you might only have a half hour to get the job done. Funding is a major challenge. Certification is expensive so few commercial divers will volunteer.

Questions and summary discussion with panel of speakers

Question: How are you disposing the nets and is that the majority of costs?

- Joan Drinkwin: Most of the stuff is really fouled, so there is no acceptable recycling opportunities and they are landfilled. Pot removals, generally crab pots, are metal and that can be recycled. No, it's definitely not the biggest cost. The biggest cost is vessel costs and commercial / harvest divers.
- Comment: Recreational / harvester divers are really great for reporting, have them to report.

Question: Are identifiers of hotspots made public?

- Joan Drinkwin: Kyle Antonelis would be happy to share the methods from his thesis – part of follow-up to the workshop.

Question - On one hand we want incentives, on the other hand, it sounds like it's illegal. Please clarify?

- Good management structures are key to solving gear issue.
- There are some regulatory impediments to others gathering gear, but it is something under review.
- Comment from Joel Baziuk – Regulations were not for preventing retrieval of GG, but can be seen that way so now there are streamlined permissions for this.

Key take-aways

- Removing ghost gear is expensive. Funding for various programs, such as the Puget Sound program, has come from myriad sources. Current funding for that particular program (through mitigation money) is not ideal. A long-term funding mechanism is needed.
- The greatest expense in terms of removal involves vessels and divers.
- Reporting systems must be paired with retrieval/removal capabilities.
- A solid approach for identifying high-risk areas exists from the work done in Puget Sound and can/should be used as a model in BC.
- Trained people, especially divers, is critical for this work. It is highly dangerous.

- Partnerships are important.
- Investments are needed in recycling infrastructure. Currently, Slovenia is the go-to destination for nylon filament recycling – getting export/duties/etc. addressed is extremely challenging. Facilities are planned (?) for Arizona and California, though these are still geographically far away.
- Smart technology can help (ex: SMART buoys), but for them to be widely adopted, they must be cost-effective, simple and implementable.

Fishery Management (commercial and recreational) in British Columbia

Cynthia Johnston, Director of Resources Management, Department of Fisheries and Oceans Canada

Cynthia Johnston provided Fisheries management 101 overview to “help people understand that there are some things that are easier to do than others.”

- International drivers - UN declarations on the Rights of Indigenous Peoples – reconciliation and treaty commitments; Convention on Biological Diversity Marine Conservations Targets; Changes to Import Laws in Other countries US Marine mammal regulations; illegal unregulated and unreported regulations, Marine Stewardship Council (MSC) Eco-certification, United Nations fish stock agreements, Sustainable Fisheries framework, changes to import laws in other countries.
- Domestic Drivers – Policies (Sustainable Fisheries framework, Wild Salmon Policy, Salmon Allocation Policy); First Nations (15 modern treaties: 4 in BC and 11 in Yukon; legal obligations for Food, Socials and Ceremonial fisheries); ETC Legislation and Regulations (Fisheries Act, SARA, Oceans Act); Management tools (Fisheries general regulations, license conditions, IFMPs, notices)
- Fisheries Drivers – Salmon (own distinct director); Invertebrates; Groundfish; and Pelagic species (last three report directly to one director) – All report to a regional director and on to another head director.
- There is also a recreational fisheries group
- All must be addressed when making policies for GG

Fisheries Management Cycle

Fisheries management cycle is heavy on process. Science/advice feeds into fishery management (consultation/IFMP process/conditions of license). Science advice doesn't tell us what to do. Managers take this information and consult with stakeholders.

- Decision is reflected in Integrated Fisheries Management Plans (IFMP) – sent out for 30-day consultation period where anyone can comment
- Salmon IFMP goes all the way to the minister, other fisheries don't quite go that high
- Groundfish quota can be changed within season, but IFMP is very consistent
- No drastic changes within season without consultation

Post-season consultation process on improvements

- Feedback goes into priorities
- Science requests submitted for the next year

Preseason planning and IFMP development for upcoming year

- Engage fishery managers and advisory boards
- Apply the 30-day open comment period

In-season implementation of change

- Only apply minor adjustments and usually avoided
- Do not do so without a science advisory process
- Tricky letting fishermen know in-season
- Avenue for changes are notices

In-season management of fisheries

- All have different catch monitoring and reporting requirements, ie. log books, electronic monitoring, etc.

Post-season review, repeating in a circular fashion

Sector specific processes involve Sport Fishery Advisory Board, Commercial Advisory Board, and First Nations Fishery Council, while also managed by species specific regulations. Science provides advice on stock assessment, limit reference points, practice conservation, conduct field surveys, develop assessment reports, and describe modelling techniques. Fisheries management uses science advice to develop harvest control rules, quotas, and other conditions of license. Advisory processes provide information to the Minister of Fisheries and Oceans.

How to engage

- Provide feedback during the IFMP 30-day consultation period
- Attend industry association meetings (CSAS – invite only)
- Raise discussions with advisory board members
- Contact fisheries managers
- Review science reports
- Tools to implement change:
 - IFMP feedback
 - Conditions of license adjustments
 - Regulatory change (takes ~ 5 years)

It is essential for effective implementation to promote the support of science, consultation, enforcement, review, and the applied assessment of successes and challenges

Question: How can we make federal bodies work together?

- It is not an easy answer but there is more funding for federal and provincial to work together. Integration between other bodies and First Nations is constantly being worked on. For example, how do we engage transport Canada on shipping lanes? Also there is the top-bottom, or bottom-up processes. We all need to meet somewhere in the middle, collaborating with provincial and federal governments.

Question: Hard for NGOs to become part of the solution, what can be done here?

- There is room for NGOs in advisory processes (stated David Suzuki foundation as that NGO).

Question: NGOs struggle to find the science to support the problems they see, let alone having the capacity to become part of the conversation. You create thresholds that exclude smaller NGOs. What about this?

- They only want scientific papers to build on. If there are priorities around ghost gear, we ask if there is science already or do we need to create next steps. Marine Conservation Caucus is on the advisory board, but maybe not everyone feels they represent all NGOs. If you don't believe that is representative, you should call out to the minister of whichever fishery you want and ask how you can get involved.

Question: Regarding ALDFG and setting priorities, how can people engage with this aspect of the decision-making process?

- GGGI is new to the Canadian government and they are still trying to figure out how to address this issue and what the steps are. Discussions are being had to describe what the first steps are in tackling this problem (CCME is starting this discussion) and they are starting to grab onto the low hanging fruit. There is need to identify and understand where the issue is and how to approach reporting in pacific region. Some further work will go to determine a long-term work plan. This includes starting to engage in a formal consultation process, gaining early feedback. They are hoping to continue implementing the Fisheries Management Cycle (typically a multi-year process), while also taking initiative to address this problem in real time – which is different.
- Comment from Joan Drinkwin: Thank you for the 101, we want to talk about solution so knowing how to incorporate them and where to start helps everyone here.

Local Solutions Case Studies Part 2

Guy Dean, Albion Farms and Fisheries

Joel Baziuk, Ocean Conservancy (speaking for Steveston Harbour Authority)

Kortney Opshaug, Blue Ocean Gear

Guy Dean, Albion Farms and Fisheries

Albion is a protein distributor, with main focus in Canada. They are a GGGI member. Became interested in GGGI because plastic waste and single use plastic have become mainstream and wanted to address how plastic use affects business. Mr. Dean explained the prolific negative impacts of marine plastics on marine life. Fishing gear is primarily made of plastics that are pervasive and breakdown into microplastics. Humans are consuming over 11,000 microplastic pieces annually. Albion is concerned that these facts will detract people from eating shellfish and other marine seafood, which would be bad for business. Wants to prevent people from not eating seafood, prevent global food shortages and health problems associated with plastic ingestion.

Question: How much of the ocean plastics are ghost gear?

- From Joan Drinkwin: 20-30% of plastics are from sea-based sources. The rest is from land-based sources.
- From Joel Baziuk: The Ocean Cleanup Report states that 46% of all floating macroplastic in the ocean are from fishing gear. All plastic that enters the ocean will eventually breakdown to microplastics, but it takes a longer time to breakdown once it's in the ocean as it requires UV to begin degrading.

- From Guy Dean: Majority of microplastics are from the textile industry.

Joel Baziuk, Ocean Conservancy, Steveston Harbour Authority Net Recycling Initiative

Joel Baziuk was working for Steveston Harbour Authority when it started a program in 2013 to recycle end of life fishing nets. The harbour was having to pay for disposal of nets left at the harbor. Putting them into the landfill or incineration were the only option. Nets were breaking down in the sun, not usable for fishing.

Challenge has been that fishers see an intrinsic value to end-of-life nets because they had cost them so much money to purchase, so it was difficult to get the fishers to donate the nets to the program. Fishers were being charged for storage of the nets at SHA or they could take to landfill and pay the burial fee. It made sense to donate to the program.

Another high cost was to clean the nets to prepare them for recycling. Aquafil is the largest recycler of fishing nets in the world and is in Slovenia. But challenges arise from import/export details, how clean the nets were, stripping of weights, line, floats, packaging, shipping costs. Ship out 40,000 pounds of nets in a shipping container. Quality of nets were very high, thus can recycle into high quality nylon that can be used to make new materials.

Proved they could make this program work in Steveston, but goal is to make this a regional program. There is opportunity for a robust end-of-life recycling program throughout BC.

Question: Any thoughts on bringing the recycling infrastructure here?

- Ocean Legacy Foundation is working to make this happen. Also, the company Aquafil is now in Phoenix and potentially in California. Have to justify the cost of product because the infrastructure is approximately 30 million to start up. There must be an intrinsic value for the end-of-life nets so they won't end up in the water. There is momentum happening in North America to think about plastics solutions.

Question: How clean do the nets have to be?

- About 80% clean. When they are very fouled they can be pressure washed but it is still cheaper to mechanically clean by hand, even though it is more labour-intensive than it is to clean with a power washer.

Kortney Opshaug, Blue Ocean Gear, Technology for Sustainable Fishing

Blue Ocean Gear develops technology for tracking lost fish gear, gear innovation. Started focus on trap fishing as they are based in California where there is a Dungeness Crab Fishery. Developed Smart Buoys to Locate Gear. Buoys have GPS and other sensors attached to central buoy. Information is sent to fisher if the buoy starts to move. The fisher gets an alert digitally. Technology needs to be inexpensive, reliable and easily accessible.

Buoy Communications:

- Worked with commercial fishers to test equipment
- Mesh Network (radio + satellite)
 - Low cost

- Reliable
- Low-power
- Does not hinder operations

Fishers suggested tech be used for whale entanglements as well, help locate entangled whale. Fishermen own their data. Long-term analysis possible on where gear has been lost, where crab have been year to year.

Next step is to look at how this technology can be adapted for other fisheries, other gear, etc.

Question: Can it be used for whale entanglement prevention?

- Yes, as well as detects and locates gear entanglement and snarls, sending location for retrieval efforts. Long-term power of this technology is the accumulation of lost gear hot spots over time.

Question: Costs to the fishers?

- Volume production is just ramping up – as volume goes up cost goes down. It has to cost less than what the fishers lose in gear.

Questions and summary discussion with panel of speakers

Question: Is there a more local company to send nets to for recycling to avoid logistics problems and costs

Question: How clean do the nets need to be in order to be recycled?

- About 80% clean. Can be done effectively with pressure washer and brush, but requires lots of manpower and space to do at scale.

GGGI's Best Practice Framework for the Management of Fishing Gear (BPF)

Joan Drinkwin, Natural Resources Consultants

Joan Drinkwin gave an overview of the GGGI Best Practice Framework for the Management of Fishing Gear (BPF). The document provides guidance to seafood industry stakeholders to prevent fishing gear from becoming ghost gear. The framework was developed through a comprehensive industry consultation process. It lays out management options and mechanisms for responsible fishing gear use and explains which options are available to different industry stakeholders. Seafood industry stakeholders identified in the Best Practice Framework include: fishing gear designers, manufacturers, and retailers; fishers; fisheries organisations; port operators; fisheries manager and regulators; fisheries control agencies; fisheries and marine environmental researchers; seafood ecolabel standard and certification programs; seafood businesses; and non-governmental organisations.

The document focuses on four key strategies:

- Voluntary actions
- Third-party seafood certification
- Regulatory measures

- Building awareness

The framework emphasizes many of the fishing gear management options that have been discussed during the workshop:

- Spatial/temporal separation of fishing gear or other industries
- Innovative gear design to reduce gear loss
- Vessel design to prevent gear
- Fishing gear marking and identification
- Improved disposal facilities for end-of-life gear
- Education and awareness
- Best fishing practices
- Innovative gear design to minimize ghost fishing
- Lost fishing gear reporting and retrieval

Solutions and Next Steps – Breakout Group Discussion

Participants were divided into eight smaller groups of about 5-6 people to discuss a list of questions that were pre-prepared and printed on large sheets of paper. Each group had a reporter assigned from the planning committee whose responsibility it was to take notes and record the discussion's key points and answers to the questions. Each group was to select a spokesperson to help report out at the end of the session.

The questions that were assigned for the discussion were:

Information needed

1. What additional information is needed, and how should it be collected, to help inform solutions to the lost fishing gear issue in British Columbia?

Geographical issues

1. Are there certain fisheries and/or geographical areas within BC where lost gear is a particular challenge?
2. If yes, what are your thoughts on how to tackle the problem?

Actions needed to move the issue forward

1. What are some of the barriers to actions/solutions to addressing the issue of lost fishing gear in BC?
2. What are some of the opportunities for action:
 - Short-term (~1 year)?
 - Medium-term (1-3 years)?
 - Longer-term (more than 3 years)?
3. Of the opportunities for action identified above
 - which ones do you think are the most urgent?

- what do you think are the “low hanging fruit” – e.g., easily adopted/implemented - to help address gear loss and/or its impacts?

4. What (else) can Canada (federal government? Or what else can be done within Canada?) do to move the ghost gear issue forward in BC?

After ample time was given for small groups to answer each question and have discussion, the facilitator harvested answers to the questions from the groups. Key thoughts were recorded on flipcharts, eliminating duplicate ideas generated by the groups. The following answers were generated by the group. Complete notes from the small group questions sheets are included in Appendix 3.

Information needed

1. What additional information is needed, and how should it be collected, to help inform solutions to the lost fishing gear issue in British Columbia?

- A business case for addressing ghost gear is needed.
- Need to identify the source of ghost gear.
- The question of why so much ghost gear is in Boundary Bay should be answered.
- The question of necessary regulations should be addressed.
- The location and extent of the problem in BC should be assessed and high-risk areas identified.
- Rates of gear loss per fishery should be determined.
- A cost/benefit analysis and/or agreed-to standard that helps people determine quickly when it makes sense to leave gear in place and when it makes sense to remove it needs to be developed.
- The question of how to increase electronic monitoring data to inform the issue should be answered.
- There should be more clarification of how data that is being collected and how it will be used (to address concerns from industry).

Geographical issues

1. Are there certain fisheries and/or geographical areas within BC where lost gear is a particular challenge?

- Areas where fisheries operate in locations with high tidal exchange, challenging weather, and/or heavy vessel traffic, including:
 - Haida Gwaii
 - Area A
 - Cape Scott
 - SeaMounts
 - Boundary Bay
 - Fraser River
 - S. Coast Brooks
 - Baynes Sound

2. What are your thoughts on how to tackle the problem?
 - Have designated vessel traffic corridors.
 - Involve fishing associations.
 - Need federal government leadership on policies and funding.
 - Survey fishermen about loss, high-risk areas, and potential solutions.
 - Demonstrate economic value to fishermen.

Actions needed to move the issue forward

1. What are some of the barriers to actions/solutions to addressing the issue of lost fishing gear in BC?
 - Legal barriers to gear removal
 - Funding
 - Infrastructure/capacity/training
 - Sector relationships/trust, especially with the fishing industry
 - Spreading out costs
 - It is not a priority across stakeholder groups
2. What are some of the opportunities for action:
 - Collaborate with fishers, vessels.
 - Collect gear at its end-of-life.
 - Apply model programs (such as Puget Sound work) to BC.
 - Raise awareness.
 - Integrate existing projects with academic studies.
 - Centralized data collection – potentially could be fed into GGGI.
3. Of the opportunities for action identified above, which ones are the most urgent?
 - Leverage energy around ocean plastic.
 - Identify champion within federal government to ensure this is integrated throughout Canada (and federal agencies).
 - Engage fishing industry from the bottom up.
 - Engage recreational fishers.
4. What else can be done in British Columbia to move the ghost gear issue forward?
 - Continue discussion with GGGI.
 - Support for continued dialogue.
 - Possibly have a similar workshop on the East Coast as well.
 - More communication around grants, like innovation funding.
 - Extended producer responsibility (EPR) program

Workshop Recap

Joan Drinkwin, Natural Resources Consultants

Lynn Kavanagh, World Animal Protection

There was strong support amongst the participants to continue the collaborations begun at this workshop. There was interest in continued on-going forums in BC. Joan Drinkwin noted that with the strong national focus on solving this issue combined with the many local efforts already underway, she sees a lot of promise for making progress to prevent harm from lost fishing gear in British Columbia.

Lynn Kavanagh thanked everyone for participating and the speakers for their efforts. She reminded everyone that materials and a report from the workshop would be provided to everyone. She also let everyone know that the GGGI will continue its work here in Canada and that she and Joel Baziuk can be contacts for everyone interested in continuing the collaborative dialogue.

Summary, Recommendations and Next Steps

Summary of key insights and recommendations

1. Causes of lost gear and barriers to gear retrieval

Participants identified causes of lost gear and barriers to gear retrieval. The primary causes of lost gear include weather events, gear conflict and entanglement in lost gear, and conflict with other industries (overlap between shipping and fishing lanes). Barriers to retrieval efforts include funding constraints, regulatory obstacles, lack of skill/training and limited incentives.

2. Addressing causes and impacts

Preventing gear loss as well as mitigating harmful impacts of lost gear through timely and comprehensive retrieval programs are key to minimizing the problem of ghost gear in British Columbia waters. To this end, the GGGI's Best Practice Framework outlines strategies for prevention and mitigation actions that may include:

- Pay close attention to weather patterns and avoid setting gear when poor weather is expected
- Ensure that gear is set to avoid conflict with other users, and take appropriate precautions when fishing in areas of high marine traffic
- Always carry net retrieval gear aboard and
- Reduce risk of gear loss or abandonment through the avoidance of high-risk areas / situations and the use of well-maintained fishing gear
- Encourage and participate in gear zoning initiatives to reduce conflicts with other fishers
- Communication between different fishing fleets operating over the same ground to make others aware of set static gear (location, marking, spatial extent, when it will be retrieved, etc)
- Dedicated shipping lanes
- Exemption for handling other's gear/pots from DFO

- Mapping of areas with high risk of lost gear accumulations
- Management and regulatory approaches
- Lost gear reporting scheme (Canadian government is mandating reporting of lost fishing gear)
- Fisheries management plans have ghost gear prevention and mitigation measures in place
- Training for gear removals (fishers and divers)

Workshop participants also shared insights on the situation in British Columbia that can inform priority areas for action to ensure best practices are implemented:

- Given that the lost and abandoned gear retrieved during removal events is generally located visually, improved gear marking or tracking systems would be useful in helping to locate gear that is less visible.
- More data is needed to understand high risk areas for gear loss. Such data should include region, fishery, gear type season, and reason for loss (if possible). This will help to inform solutions. A comprehensive lost gear reporting system should include these variables.
- Funding to support training and annual removals by fishermen, divers or DFO.
- Historical or legacy gear is a current cause of gear conflict. Capacity and funding are needed to remove it.
- Stakeholder engagement across industries to develop collaborative solutions for temporal and spatial management measures.
- Fisheries management and regulations must incorporate actions to prevent or reduce gear loss.
- Trialing new solutions such as gear marking and tracking technologies.

Next Steps

1. Support current effective strategies to prevent and manage lost fishing gear.

The workshop identified current activities in British Columbia that are effectively preventing and managing lost fishing gear. We recommend continued and increased support for these programs to build on this success.

- The Area A Crab Association's lost crab trap removal program, executed in conjunction with its softshell surveys, has effectively removed hundreds of lost crab traps over several years from the Area A crabbing grounds in Hecate Strait. More support for this program would allow the Association to charter longer lost crab trap survey operations.
- In Barkley Sound, recreational divers from Rendezvous Diving regularly collaborate with the local DFO office to locate and remove newly lost gillnets. Continued support for this work and expansion of the model to other DFO regions is recommended.
- In the Fraser River, the Lillooet Tribal Council removes lost fishing nets from its fishing areas and has increased education around the problems of lost fishing nets within its community. This work, done in collaboration with the regional DFO, as eliminated the accumulation of legacy lost fishing nets and is now maintaining an annual cleanup of newly lost nets. Continued support for this effort and sharing this model with other first nations and in other regions is recommended.

- In Boundary Bay, the local DFO office removes lost crab traps by grappling for them from a chartered vessel on a semi-regular basis. Most recently, sidescan sonar imagery from a GGGI-funded project was used to focus these removal efforts. We recommend increased funding for regular removal of lost crab traps from Boundary Bay. Use of sidescan sonar imagery will improve the efficiency of these operations.

2. Ensure that required reporting of lost fishing gear is compiled and analyzed to inform prevention and management of lost fishing gear.

The Canadian government is implementing required reporting of lost fishing gear through its fisheries management authority. Such reporting is important to document amount and extent of lost fishing gear over time. This will help to pinpoint areas where more management actions are needed to prevent harmful impacts of lost fishing gear. Therefore, the reports of lost fishing gear should be compiled into a central/regional database for ease of analysis so that they truly inform management decisions.

3. Encourage the development of a newly lost gear reporting, response and retrieval program in British Columbia.

In Puget Sound, a program is in place to receive and respond to reports of newly lost fishing nets from active fisheries. This program, in place since 2012, includes a telephone and online reporting system, and an on-call response and retrieval component to ensure that newly lost fishing nets are retrieved from the water before they sink and cause lasting damage. The program could be replicated in British Columbia by the Department of Fisheries and Oceans Canada, working cooperatively with fishers, first nations, and response and removal contractors throughout the province.

4. Identify fishery-specific causes of lost gear and develop prevention and management strategies.

Areas of high fishing gear loss, such as Boundary Bay and Hecate Strait, were identified during this workshop. The causes of gear loss should be identified in these and other areas identified through systematic gear loss reporting. Fishery-specific prevention and management strategies should be identified for all appropriate stakeholders to reduce harm caused by lost gear.

5. Implement removal activities in areas with high concentrations of legacy lost fishing gear that are causing significant problems.

Areas of high fishing gear loss, such as Boundary Bay and Hecate Strait, were identified during this workshop. These areas should be studied to determine if legacy lost fishing gear is causing significant harm. If so, removal activities should be undertaken to eliminate harm from legacy lost fishing gear.

Appendix 1. Workshop participants

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Appendix 2. Workshop Agenda

British Columbia Lost Fishing Gear Workshop

Agenda

February 6, 2019, 8:30AM – 5:00PM

John M. S. Lecky UBC Boathouse

7277 River Rd., Richmond, BC

Overall Meeting Objectives:

1. Connect and build relationships with others working on/interested in lost fishing gear in British Columbia.
2. Gain a baseline understanding of:
 - the scope and scale of the lost fishing gear problem both *globally* and *locally*
 - the types of solutions being used to address lost fishing gear in British Columbia and beyond; and
 - fisheries management in British Columbia as it pertains to lost fishing gear.
3. Share perspectives and insights about challenges and solutions to the lost fishing gear problem in British Columbia.
4. Identify the key challenges, solutions, and next steps (including necessary interest/capacity/commitments) regarding lost fishing gear in British Columbia.

Time	Topic
8:00	Registration and continental breakfast
8:30	Welcome and Opening Remarks First Nations representative TBD Lynn Kavanagh, World Animal Protection Hilary Wilkinson, Veda Environmental, Facilitator
9:00	Opening Panel: Lost Fishing Gear Removal Efforts - <i>Stories from BC and east coast Waters</i> Jen Paton, Ecotrust Canada Paul Edwards, Area A Crab Association Lillian Mitchell, Fundy North Fishermen's Association Janice Billy, Lillooet Tribal Council
9:45	Facilitated Group Discussion: Insights/Stories Regarding Lost Fishing Gear in British Columbia's Waters
10:30	Break
10:45	Global Ghost Gear Initiative Lynn Kavanagh, World Animal Protection Joel Bazuik, Ocean Conservancy

Time	Topic
11:15	Canada's commitment to the Global Ghost Gear Initiative Paul Scott, Integrated Resource Management-National Programs, Canada
11:30	Local Solutions Case Studies Part 1: Efforts to address lost fishing gear in BC – What we know Peter Mieras, Rendezvous Dive Adventures Joan Drinkwin, Natural Resources Consultants Kyle Antonelis, Natural Resources Consultants Gideon Jones and Bourton Scott, Emerald Sea Protection Society
12:30	Lunch
1:30	Fishery Management (commercial and recreational) in British Columbia Cynthia Johnston, Department of Fisheries and Oceans Canada
2:00	Solutions Case Studies Part 2 Guy Dean, Albion Farms and Fisheries Joel Baziuk, Ocean Conservancy (speaking for Steveston Harbour Authority) Kortney Opshaug, Blue Ocean Gear
2:45	Break
3:00	Best Practice Framework Joan Drinkwin, Natural Resources Consultants
3:15	Solutions and Next Steps – Breakout Groups
4:30	Recap Joan Drinkwin, Natural Resources Consultants Lynn Kavanagh, World Animal Protection
5:00	Adjourn

Appendix 3. Solutions and Next Steps – Breakout Group Notes

What additional information is needed, and how should it be collected, to help inform solutions?	
Group 1	<ul style="list-style-type: none"> • Amount of gear being deployed vs. Amount lost/being returned. • Clarity around what gear is included under mandatory reporting (ie aquaculture, different fisheries). • Aggregate data • Objective of data collection - transparency • ID (gear tagging; unmarked gear non-compliant)/responsibility/source (complicated by international sources) • DFO gear loss data management
Group 2	<ul style="list-style-type: none"> • High resolution bathymetry available (and used) to avoid areas where gear is commonly lost. • Analysis of how harmful removal process is and when it might be better to leave it. • Volume of nets that reach end of life each year (within harbors). • Where are the lost nets? • Who can recycle nets?
Group 3	<ul style="list-style-type: none"> • Volume and type of gear • Reporting of lost gear - particularly location • Better tags/gear registry at point of sale? • Type of fishery the gear is from? • More reporting/eyes in more remote areas
Group 4	<ul style="list-style-type: none"> • Who, what, where, when to strategically apply solutions. • Why important to prevent and mitigate. • Electronic logs; but need resources to manage and process and store. • Fishermen solutions/ education/ awareness
Group 5	<ul style="list-style-type: none"> • Consistent reporting across the fishing industry & locations for data (that include -Data consistency, practicality and user-friendly interface, for example an electronic log books. • Database and management systems • Funding sources? • Agreement of shipping lanes and passages to avoid gear conflict. • Identification of conflict areas. • Fishers education on all DFG impacts, incentives • More information in records? how/where gear is lost. • Historical fishing effort & areas with potential of legacy gear.
Group 6	<ul style="list-style-type: none"> • Legacy net locations • Loss rates of each fishery on the coast • More data, more reporting of lost gear. • Requirement to report gear w/ no fines or penalty (if you don't report and your gear is found, you will be fined). • Filter data into GGGI to recover and analyze.

What additional information is needed, and how should it be collected, to help inform solutions?	
Group 7	<ul style="list-style-type: none"> • What gear is actually being lost? Diversity of gear. How much? What Kind? Which Fishery? What "legacy" gear? • Extrapolate based on known factors • Scientific credibility • What will it take to remove them? Funding? Capacity? Timeline? • Scope of problem by fishery. • Other sources of data; Puget Sound Data, fishermen and diver experience, DFO data.
Group 8	<ul style="list-style-type: none"> • What - Location and extent of lost gear, type of gear. • What - Reporting incidents of lost gear from fishers and others. • What - Analyzed data to ID potential hot spots. • What - Business cases/economy of lost gear vs prevention. • What - Business cases/economy of lost gear vs prevention. • What - Source of gear, poaching? • How - Funding & grants to support reporting/data management. • How - Technology adoption, regulatory changes, mandatory tagging /inventories. • How - Link to licensing.
Are there certain fisheries and/or geographical areas within BC where lost gear is a challenge?	
Group 1	<ul style="list-style-type: none"> • Fraser River (& Skeena + other) • Southern Coast • Baynes Sound • Haida Gwaii
Group 2	<ul style="list-style-type: none"> • Anywhere remote due to transport logistics • Anywhere shipping traffic, ferries, multiple fisheries intersect • Area A • Cape Scott - deep sea fishing gear washes ashore • Seamounts - very deep, can snag gear, difficult to remove
Group 3	<ul style="list-style-type: none"> • Remote locations - North of Campbell River, West Coast/offshore • Shipping lanes • Area A - Stormy areas
Group 4	<ul style="list-style-type: none"> • Boundary Bay - illegal/intense • Rose Spit - storms, moving sediment • Open Ocean - perpetual fishing, but huge • Certain fisheries: gillnets, cannot be repaired, fishing close to shore • West coast Vancouver Island - Crab Fishery
Group 5	<ul style="list-style-type: none"> • Fraser River • Boundary Bay • Hecate Strait • Rose Spit • North end Vancouver Island • Fisheries: Trap & Gillnets
Group 6	<ul style="list-style-type: none"> • Hecate Strait

What additional information is needed, and how should it be collected, to help inform solutions?	
	<ul style="list-style-type: none"> • Crab/gillnets/traps... • Cable, gas pipelines • Boundary Bay crab pots • Fraser River gillnets
Group 7	<ul style="list-style-type: none"> • Rose spit - north end of Haida Gwaii • Crab fishing, gillnets • Historical fisheries around seamounts - legacy gear • Regional differences in habitat must be considered. • Understand that some areas with lower loss may be of bigger impact due to habitat, etc.
Group 8	<ul style="list-style-type: none"> • Hecate Strait/McIntyre Bay (high weather) • Hard to identify due to limited surveys/data • Pot fisheries • Poaching areas??
If yes, what are your thoughts on how to tackle the problem?	
Group 1	<ul style="list-style-type: none"> • Guardian programs w/ First Nations (Fraser River) • Reporting • Partnerships between industry & non-profit • Funding that is permanent/reliable
Group 2	<ul style="list-style-type: none"> • Marine protected areas around seamounts. • Cool robots for deep sea net removal. • Communication between multiple users of the same region.
Group 3	<ul style="list-style-type: none"> • Education - Make positive case of improvements from better data use. • Business case for reporting (lost gear/found gear) what fisher will gain? • Funding for clean-ups. • Collaboration across sectors. • NGO/ Government/ Fishing Industry
Group 4	<ul style="list-style-type: none"> • Transport/port corridors • Fisher self-reporting • Stray gear recovery association funding • Federal gov't leadership - funding/ legislation/ policy support • Common goal to unite sectors
Group 5	<ul style="list-style-type: none"> • Management of shipping lanes and fleet communication • Stronger engagement with all stakeholders. • Partnerships between fishers, First Nations, Gov't, and NGO's • Identify areas of common ground between stakeholders. • Core/Seed funding to establish solutions • Clear roles for fisheries management
Group 6	<ul style="list-style-type: none"> • Heavy equipment for retrieving snags to avoid lost gear. • Mark hotspots or snags. • Cooperation between US and Canada for Boundary Bay.
Group 7	<ul style="list-style-type: none"> • Prevention; best practices, updated requirements, fishing association involvement, education, dedicated shipping areas/zones.

What additional information is needed, and how should it be collected, to help inform solutions?	
	<ul style="list-style-type: none"> • Survey; air surveys where possible, sidescan sonar, dives, etc. • Recovery; probably can't grapple, engage fishermen to identify and remove gear. • Who can help fund this? • Province/Government • Engage First Nations
Group 8	<ul style="list-style-type: none"> • Formalized ghost gear survey for known locations. • Integrate reporting of observations into standard operating procedures. (Culture change to support reporting). • Identify/Market/Peer engagement to show benefits to fishers.
What are some of the barriers to actions/solutions to addressing the issue of lost fishing gear in BC?	
Group 1	<ul style="list-style-type: none"> • Funding: Fisheries specific (\$ gear mod) • Source? Gov, public, private; How much does it cost? (Economic analysis) • Retrieval and recycling (economically viable, markets available) • Regulatory limitations; gear retrieval
Group 2	<ul style="list-style-type: none"> • Fast track approval for removal projects by qualified groups • Legality around gear removal (definition of net) • Funds for cleanup projects • Lack of recycling facilities/end of life options • EPR might be difficult for small-scale artisanal producers (e.g. there is one main purse seine producer in lower mainland) • Passing on additional costs might be unfair for smaller scale fishers
Group 3	<ul style="list-style-type: none"> • Funding • Negative perception/ misreading of problem/ blame • Legal implications for volunteer
Group 4	<ul style="list-style-type: none"> • Funding, relationships, conflicts • Ugly issue • See no evil • Knowledge gap: impacts, how to remove
Group 5	<ul style="list-style-type: none"> • Funding/ Resources • Building relationships (conflicts between stakeholders) • Representation of all fisheries • Clear direction from government • Knowledge gaps & learning curve
Group 6	<ul style="list-style-type: none"> • Regulatory hurdles, laws against retrieving nets need to be resolved. • Getting fishermen involved and active in the solutions w/ positive dialogue. • Financial support, funding. • Streamlined, standardized process for doing the work. • Get fishermen to pull lost gear w/ compensation. • Gear recycling programs, bins for debris.
Group 7	<ul style="list-style-type: none"> • Funding • Government direction for fishing industry associations • Not yet a collective issue, lack of awareness of GGGI.

What additional information is needed, and how should it be collected, to help inform solutions?	
	<ul style="list-style-type: none"> • Top down pressure, All the way down through gov't to industry. • Understanding/ perception of fishing industry's role in problem - often framed negatively.
Group 8	<ul style="list-style-type: none"> • Grants/Funding • Education/Outreach • Regulatory Challenges (Net recovery), inability to haul others gear. • Lack of infrastructure to accept end of life gear (multi-level support required). • Business Case • Mandatory participation in recycling programs.
Short-term (~1 year)?	
Group 1	<ul style="list-style-type: none"> • Gear tagging /marking that is industry specific • Reporting
Group 2	<ul style="list-style-type: none"> • Small scale cleanups at known hot spots by groups who already can do cleanup.
Group 3	<ul style="list-style-type: none"> • Collaboration and improved communication
Group 4	<ul style="list-style-type: none"> • Information: logs • Disposal • Education/ Engagement • Champions
Group 5	<ul style="list-style-type: none"> • Info & Reporting • Disposal of Gear • Education & Engagement
Group 6	<ul style="list-style-type: none"> • Engaging w/ fishermen and fishery groups • Build dialogue/trust now
Group 7	<ul style="list-style-type: none"> • Raising awareness in fishing industry - using existing info! • Identifying/Scoping hotspots through; existing data/modeling, fishing knowledge, recreational divers
Group 8	<ul style="list-style-type: none"> • Funding for legacy gear program; use off-season fishers. • Survey Fishers - re Ghost Gear (map/list/other)
Medium-term (1-3 years)?	
Group 1	<ul style="list-style-type: none"> • Collection • Coordination
Group 2	<ul style="list-style-type: none"> • Building database, promoting its use. • Designated areas to process and store old gear.
Group 3	<ul style="list-style-type: none"> • Emergency reporting system set up (similar/integrated with marine mammal system). • Education campaign - Keep eyes open for reporting seen gear. • Public statistics getting reported (How many calls are being made? Hotspots?)
Group 4	<ul style="list-style-type: none"> • Infrastructure • Recycling • Management measures: conflicts, losses • Technologies to improve
Group 5	<ul style="list-style-type: none"> • EPR & Recycling • Fisheries management members

What additional information is needed, and how should it be collected, to help inform solutions?	
Group 6	<ul style="list-style-type: none"> • Funding - government and public support • Bird people/ conservation grants
Group 7	<ul style="list-style-type: none"> • Education of recreational/sports fishery (public) & analysis of their loss • Building on existing initiatives (Oceanwise, Howe Sound, Puget Sound)
Group 8	<ul style="list-style-type: none"> • Collection at fishing ports; funding & infrastructure • Gear inventories/Licensing
Longer-term (more than 3 years)?	
Group 1	<ul style="list-style-type: none"> • M151
Group 2	<ul style="list-style-type: none"> • Ability to process plastic that has been in environment for a long time.
Group 3	<ul style="list-style-type: none"> • Global standards of data reporting. • Policy changes to facilitate better gear removal for marine debris.
Group 4	<ul style="list-style-type: none"> • New products/ materials
Group 5	<ul style="list-style-type: none"> • New technologies • Fisheries monitoring systems & policy • Designated shipping lanes
Group 6	<ul style="list-style-type: none"> • Monitoring and programs in place for future. • Setup end of life net recycling around Canada.
Group 7	<ul style="list-style-type: none"> • Management solutions • Sustained programs
Group 8	<ul style="list-style-type: none"> • Legislation/ Regulations • Gear marking & technology (link to license).
Which ones do you think are the most urgent?	
Group 1	<ul style="list-style-type: none"> • M151 • Identifying source pollution points • Recycling
Group 2	<ul style="list-style-type: none"> • Ocean plastic is sexy right now! • Finding free floating nets that impact marine mammals.
Group 3	<ul style="list-style-type: none"> • Funding
Group 4	<ul style="list-style-type: none"> • Get started: • Information
Group 5	<ul style="list-style-type: none"> • Short term - Just get started
Group 6	<ul style="list-style-type: none"> • Dialogue/ trust w/ fishermen • Funding
Group 7	<ul style="list-style-type: none"> • Educating public (recreational sector) • Engaging fishermen
Group 8	<ul style="list-style-type: none"> • Funding • Education/ Outreach/ Engagement
What do you think are the "low hanging fruit" - e.g., easily adopted/implemented - to help address gear loss and/or its impacts?	
Group 1	
Group 2	<ul style="list-style-type: none"> • Use empty vessels and trucks returning from deliveries to transport gear that has been collected in remote locations.

What additional information is needed, and how should it be collected, to help inform solutions?	
Group 3	<ul style="list-style-type: none"> • Education, awareness, inspiration Linking existing data and academic projects with boots on the ground.
Group 4	<ul style="list-style-type: none"> • Short term funding
Group 5	<ul style="list-style-type: none"> •
Group 6	<ul style="list-style-type: none"> • Removal projects
Group 7	<ul style="list-style-type: none"> • Build off/adopt solutions from elsewhere (Puget Sound)
Group 8	<ul style="list-style-type: none"> • Disposal bins with links to engagement.
What (else) can Canada (federal government? Or what else can be done within Canada?) do to move the ghost gear issue forward in BC?	
Group 1	
Group 2	<ul style="list-style-type: none"> • Use empty vessels and trucks returning from deliveries to transport gear that has been collected in remote locations
Group 3	<ul style="list-style-type: none"> • Less focus on innovation and more stuff available for existing practices. • Linking ghost gear to marine debris in general - wider appeal.
Group 4	<ul style="list-style-type: none"> • Champion/Funding • Reporting • Education • More Meetings
Group 5	<ul style="list-style-type: none"> • Education • Regulation
Group 6	<ul style="list-style-type: none"> • Better communication between the federal plan and the actual potential recipients or organizations who are doing the work. • -First Nation involvement, support
Group 7	<ul style="list-style-type: none"> • Take a leadership role internationally on this issue. • Effectively communicate down the chain to managers & industry. • Fund this work.
Group 8	<ul style="list-style-type: none"> • Fund it