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National Advisory Panel on MPA Standards
Speaking Notes Marine Protected Area Standard in Canada

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Marine Protected Areas

My main point is that certain MPAs are both necessary to protect and maintain some types of ecosystems and also quite feasible to implement in a reasonable time and at reasonable cost. However, MPA benefits to fisheries have been largely overstated, especially in a Canadian and west coast Canadian context.

Because of the highly connected nature of the sea, which efficiently transmits substances and forcing factors, an MPA will rarely succeed unless it is embedded in, or is so large that it constitutes, an integrated ecosystem management regime. (IUCN 1999. Best Practice Protected Area Guidelines Series No. 3)

1. **IUCN Guidelines clearly recognize that protecting living resources in the sea is very different from protecting living resources on land.** The sea is a highly dynamic transport medium capable of distributing nutrients, water masses, and organisms over 1000s of kilometres. And any particular area of the ocean might change its basic properties over time. Limiting or eliminating activity within a static box is only likely to succeed at protecting particular species (stationary ones) within a particular ecosystem at a particular time (climate change).
2. **IUCN Guidelines also recognize the need to integrate MPAs into existing ecosystem-based management regimes.** Canada is not an under-developed country in terms of fisheries science and management. We have a suite of fisheries policies aimed at sustainable use of fish stocks and habitats. Most of

these policies are relatively recent and, so broad implementation is just beginning.

- a. Implementing **Canada's Sustainable Fisheries Framework** would probably achieve most objectives for fish conservation and fisheries benefits compared to MPAs, which are mainly aimed at highly exploited fisheries. Exploitation rates are low in most Canadian fisheries potentially affected by MPAs;
- b. Discarding, misreporting, and illegal fishing, which are sometimes used to justify MPAs, are also not major issues in Canada – on the west coast, groundfish fishery landings and at-sea discards are accounted for (100%) via strict annual quotas, human observers, and video-audited logbooks.
- c. MPAs could have unintended consequences of promoting illegal fishing because they are so difficult to monitor and enforce, thus penalizing legal fisheries that have invested time and money in MPA processes. Any increases in fishable biomass inside MPAs will create incentives for illegal fishing on high value species such as abalone (already happening!), sablefish, halibut, prawn, crab, etc. There is already direct evidence of extensive illegal fishing inside British Columbia's Rockfish Conservation Areas.

3. **There is not overwhelming scientific evidence that MPAs are broadly successful conservation tools or providing economic benefits to fisheries.** A 2014 study in the journal *Nature* examined 87 MPAs around the world and found only 4 that could be considered successful by standard measures. This small success rate depends on simultaneously meeting 5 MPA criteria:

- a. 100% closure/protection;
- b. Strict enforcement;
- c. In place at least 10 yrs;
- d. At least 100 km² in size;
- e. High degree of isolation (i.e., complete containment of organism life cycles)

MPAs failing any of these criteria showed no effect of the MPA – that is the current state of scientific evidence. The cost of meeting these 5 criteria is hard to imagine, but will likely far outweigh the benefits compared to implementing an ecosystem-based fisheries management approach based on Canada's SFF and other policies.

In a Canadian west coast context, economic benefits to large-scale fisheries, e.g., for hake, halibut, sablefish, will probably be negative for a few reasons:

- a. Canada could lose negotiating power for fisheries managed under international treaties such as The Pacific Hake Treaty or Pacific Halibut Treaty.
- b. Based on decades of tagging studies showing that adult fish move, closing fishing areas in British Columbia will result in net

outmigration of fish that will subsidize fisheries in Alaska, Washington, and Oregon (who don't have MPAs);

- c. Closing fishing areas increases the cost of fishing in open areas as higher fishing effort density causes lower catch rates and higher operating costs;
- d. MPAs that don't allow scientific fisheries surveys will disrupt the information sources needed to sustainably manage fisheries in open areas;
- e. Loss of scientific information from MPAs will negatively impact fisheries managed under Canada's SFF (Sablefish), where risk targets must be maintained despite the presence of scientific uncertainty. Specifically, under a precautionary approach, fisheries outside MPAs will need to be managed more conservatively because of higher uncertainty associated with exploitation rates and productivity in open areas;
- f. All BC groundfish fisheries are involved in scientific surveys and research in collaboration with DFO (via formal Joint Project Agreements) – these programs will need to be revised with substantial loss of historical continuity and information value.

4. MPAs are not likely to be effective scientific tools.

- a. MPAs are not easily replicated, especially if they need to be large (i.e., above success criterion 3d). Lack of replication leads to a high degree of confounding in location/time effects;
- b. Again, unless they are very large, MPAs are subject to substantial outside perturbations associated with climate and oceanographic regime changes – they are not ideal experimental units like forest patches or lab mice;
- c. It is difficult to establish proper control areas, especially when MPAs are aimed at protecting large, unique ecosystems;
- d. Sampling ocean ecosystems has low statistical power – that is, there is low probability of detecting effects even if they actually exist. This is because most sampling of marine organisms is very expensive, time consuming, technologically demanding, and biased (e.g., by organism size, age, behaviour).

5. MPAs could only benefit fisheries under very unlikely conditions:

- i. Ideal ratio of closed to open areas that balances production and spillover;
- ii. Fish movement (spillover) cannot be too high or too low;
- iii. We need perfect knowledge of the source-sink structure of the fish stock(s);
- iv. Plus the 5 criteria listed above for point #3.

6. **MPAs are needed to protect non-commercial benthic invertebrate species such as corals and sponges that help form fish habitat: the good news!** Sedentary benthic organisms, such as corals and sponges, have high larval retention and are "mappable" – although we currently don't know where these habitats occur on large spatial scales, we do have the technology to measure presence/absence and density from which we can build maps showing where they *probably* occur (Doherty et al. 2017). This is an active and productive area of research worldwide, including in Canada, and the main benefit is to inform MPA placement, size, and levels of protection for corals and sponges.
7. **Many in the fishing industry want to contribute to developing MPAs that protect sensitive benthic habitat.**
 - a. On the west coast, Wild Canadian Sablefish Ltd has contributed over \$250,000 in cash plus in-kind vessel time and expertise mapping coral and sponge habitat on Bowie Seamount and along the continental slope using custom-designed deepwater video cameras and motion detection systems on their gear.
 - b. The Canadian Groundfish Conservation and Research Society deliberately prohibit fishing outside a pre-defined footprint to protect benthic habitat.

Future MPAs protecting coral and sponge habitat could utilize a range of IUCN categories via an adaptive approach: One option would be to broadly apply categories IUCN IV-VI based on our current state of knowledge, and then adaptively assess whether and where further protections are needed. Canada's fishing industry could probably obtain the information at substantially lower cost and shorter timeframes than high-overhead government surveys.

- a. GPS combined with harvester knowledge could allow "precision fishing" and surveys (already demonstrated at SK-B Seamount);
- b. Fishing can follow scientifically-design fishing protocols in the vicinity of MPAs that aim to improve habitat maps;
- c. Vessels could be required to deploy cameras and other technology on their gear to improve our understanding of where MPAs are most needed and productive

If ecosystem and/or species protection are the goals of MPAs, then a combination of fishery harvest management and spatial (MPAs included) controls would be practical, feasible, and probably acceptable. It is generally easier to get stakeholder buy-in and action on a reasonable end goal than it is to sell an arbitrary management approach, especially one as scientifically unproven to benefit fisheries as MPAs.