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Underwater refuge and the future of fish: Marine scientists say a last hope for our imperilled fish stocks may be the establishment of parks where submarine species are protected and allowed to thrive.

by Nancy Baron

British Columbia is proud of its parks. Covering 12 per cent of the province -- over 10 million hectares -- they are part of our very identity. But there is a line where conservation thinking has historically stopped in British Columbia: the shore-line.

Maybe it's because much of the ocean's underwater richness and complexity is out of sight, out of mind. On the surface, the ocean still appears as beautiful and stirring as it ever did. It's hard to appreciate what once was in here in Georgia Strait -- humpbacks, giant sturgeon, and an abundance of salmon, ling cod and rock fish that only our elders remember.

Maybe it's because many people think "no-take" marine protected areas already exist, confusing tiny recreational marine parks (places to park your boat) with areas that actually afford protection for the life within. Most people are astonished to learn that of the 160 provincial marine parks and ecological reserves in B.C., only tiny Whytecliff Park, Porteau Cove, a single reef near Point Atkinson and a small area near Race Rocks are fully protected from all exploitation, including fishing. This amounts to less than .01 per cent of our coastal waters.

On land, the very definition of "park" prohibits removing anything. Nothing in the oceans compares to Canada's protected land areas. There is no ocean wilderness counterpart to the Tatshenshini or Banff.

And yet the reasons we need no-take marine protected areas go even beyond the arguments for their establishment on land. Preserving the diversity of life -- the complexity of plants, animals and environments that make our world what it is -- and ensuring their survival for future generations is reason enough to need them. In the sea, the benefits we can realize from the establishment of reserves spill over well beyond their borders.

Historically oceans have been "managed" for maximum extraction, focusing on one species, at times leading to serial depletion. On the East Coast, the fight for cod has now switched to shrimp. On the West Coast, the salmon crisis has the department of fisheries and oceans desperately looking for what they call "underutilized" species on which to divert the fishing effort -- an absurd notion in an ecosystem. Yet as Tony Pitcher, director of the UBC Fisheries Centre points out: "We've known for a long time that hunting on land is not sustainable, but we've behaved in the oceans as if it were."

When it comes to fishing, nothing has to be put back. The competitiveness to extract as much as possible has led to practices that on land would be unthinkable. One pass of an industrial bottom trawler can bulldoze a complex underwater habitat thriving with plant and animals into a desolate underwater wasteland.

Ussif Rashid Sumaila, an economist based at the University of British Columbia's Fisheries Centre, says: "We need marine protected areas to hedge against uncertainty and mistakes in management. We can't know everything about the oceans."

Setting aside no-take marine protected areas provides insurance against heavy fishing pressure and errors made in stock assessments. They can allow depleted stocks of "homebodies" (fish and invertebrates that are non-migratory) to rebuild by providing refuge for adult spawners. Areas of abundance are beautiful, and provide recreational and economic opportunities through tourism -- cruises, sea kayaking, scuba diving and whale watching -- the very image of ourselves we've promoted with "Super Natural BC." They also provide ecological benchmarks showing what could be if we give the ocean an opportunity to rebuild.
Marine protected areas function like an RRSP, where the resources you set aside compounds over time. While there are many good reasons you might want to spend the money now (or harvest the fish), if you want to secure your future, you have to have an investment strategy.

In the Strait of Georgia today, ling cod stocks are less than three per cent what they were 100 years ago. Many fish now caught (anything less than 65 cm in length) have never had a chance to reproduce.
One 27-kilogram ling cod, for example will produce far more eggs than six four-kilogram ling cod. Big fish act as huge seed banks, helping guarantee a sustained supply for fisheries by spilling their offspring into neighbouring waters and dispersing as larvae. Fishermen and scientists agree that bigger means better when it comes to fish. Within protected areas, female fish can survive long enough to attain sizes they wouldn't otherwise.
Fishermen plying the waters outside the closed area reap the benefits. This has been the case near Cape Canaveral, where the long-term closure of 40 square kilometres of water for security reasons (as opposed to ecological) are responsible for the inadvertent realization of the benefits of a marine protected area.

A study led by Jim Bohnsack, a National Marine Fisheries researcher, showed that not only were game fish 2.6 times as abundant in the cape's protected region compared to the surrounding fished zones, but bigger too -- within the reserve, but also in surrounding areas, where a thriving sport fishery has developed.

"Marine protected areas are not an ivory tower notion," explains UBC fisheries scientist Daniel Pauly. "Fish, until recently, had naturally protected areas. They were the places that fish could hide.
"We add vitamins to food because they have been lost through technology. A marine protected area replaces a refuge that technology and intensive fishing effort has made us lose."

Refuges are not going to be the salvation of migratory species such as salmon, but they could mean the difference for animals that tend to be homebodies, such as ling cod, snapper, or invertebrates including abalone and geoducks, all of which have been overharvested. Approximately 30 per cent of B.C.'s commercial marine resources harvested today fall into this category.

By collecting data from the few no-take reserves that do exist off B.C., California and Washington, marine ecologist Rod Fujita calculated that fish populations increase in abundance by a factor of 2 to 13 and reproductive capacity of 20 to 55.

Scientists are now struggling to quantify what shapes, sizes and locations of marine reserves could produce the greatest returns. They are trying to calculate how far larvae of various species are dispersed. (Most marine organisms have far more complicated life histories than do species on land and in many cases we still have only the dimmest understanding.)

Because of the historical precedents of open access, the resistance to establishing no-take reserves is huge. Prove it, say the fishermen who are naturally reluctant to lose any more than they feel they have already lost. Yet in countries like New Zealand, where marine reserves are now in place, they are supported by the fishing industry which is reaping the benefits.

One of the main ways scientists are circumnavigating the limitations of existing reserves is through the use of computer modelling and case studies. Sumaila has been looking at the conditions under which marine protected areas can produce ecological and economic benefits.

His work around the world shows that to realize the full potential economic benefits from the establishment of marine protected areas, fisheries have to be managed cooperatively -- scientists, managers and fishers working together. Amanda Vincent, a McGill University scientist, is working with communities in the Philippines, where the local fishermen have been actively involved in establishing the boundaries of marine reserves and monitoring the returns. These communities are catching bigger, more desirable fish that command higher prices and other communities, seeing their success, are now setting up their own community-managed marine protected areas.

In order to pull together the state of knowledge from around the world and to try to speed up progress in making advances, Sumaila and UBC Fisheries Centre director Tony Pitcher have organized an International Conference on the Economics of Marine Protected Areas for today and Friday at UBC. "The point of this," says Pitcher," is to analyse the hard-nosed benefits for the fishing industry."

The UBC centre is scrambling to accommodate the deluge of interest from around the world -- twice as many scientists as anticipated have headed here to grapple with these issues. "The situation is urgent," say Sumaila. "We have to figure out new ways to better manage our resources given all the disappointments we've had so far with traditional methods."

While marine protected areas are not a panacea for all that ails the ocean, they are a powerful additional management tool that has been so far underutilized. The challenge now is to get on with their establishment and to build the necessary public and political support to establish a network of no-take zones to complement other traditional measures.

But at the bottom of it all, we need marine protected areas not only for economic reasons, but for the conservation of the diversity of life within the seas, and the stability of ecosystems. The establishment of a representative system of marine protected areas will be critical.

Imagine how much poorer we would be today without parks where at least enclaves of wilderness still survive. Imagine how much poorer we will be tomorrow if we fail to do the same for the seas.

For more information on the "Economics of Marine Protected Areas Conference" contact Ussif Rashid Sumaila (Sumaila@fisheries.com) or Gunna Weingartner (Gunna@fisheries.com).

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