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Looking Over the Horizon

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A Recognition of Honest Failure

It is past time to recognize that 20th-Century fisheries management has failed – not just in Atlantic Canada and not just with groundfish. The management system developed and refined over recent decades has quite simply proven to be a global failure, even though there are scattered, ephemeral moments of success. The systemic failure was obvious by 1995, in wake of the Canadian groundfish fishery disaster, and yet fifteen years have gone by as fishery after fishery continue to surge from crisis to crisis, while spiralling ever downward to ultimate failure.

I take no pleasure in drawing this conclusion. I was trained as a groundfish biologist and I shared my colleagues' commitment to the cause. From the early decades of the last century but particularly after 1945, many very bright people worked very hard, believing that we had the keys to sustainable, prosperous fisheries. We continued to believe, even though it never quite worked. There were many excuses:

> If only there was international agreement ...
> If only there was national jurisdiction ...
> If only there were adequate budgets ...
> If only there were longer databases ...
> If only fishermen stopped behaving like fishermen ...

However, from 1977 to 1992, Canada deployed the best funded and best supported fisheries-management system the world had ever seen. Few fisheries scientists had or have better databases. For few areas of the world ocean was there (or is there) the depth of biological and oceanographic research enjoyed by those of us working in the northwest Atlantic. No other country gives fisheries management as strong a legal foundation as Canada does. It is doubtful that any other nation will ever commit the scale of budgetary resources, relative to the value of the fisheries, that Canada did in those years. Indeed, the quality of the management delivered by DFO through the first 15 years of extended jurisdiction has rarely been exceeded, globally, and it would be naïve to expect that it will ever be markedly surpassed anywhere around the world. And yet our groundfish fisheries failed. Most have not recovered in close-on two decades.

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We can and must do better but resolving the problems will require more than the minor adjustments applied to date. It will require a wholesale and fundamental reconsideration of what fisheries are, what they are for and how they should be structured. Such changes cannot be introduced immediately but neither can they be put off indefinitely. It is time to look beyond the immediate planning horizon and to start thinking about the deep and wrenching changes that are needed.

Systems of Fisheries Management

20th-Century fisheries management, with its emphasis on conservation-oriented control by central government, based on quantitative advice from scientists, has failed but those who draw the conclusion that all fishing is thus unsustainable and should be stopped have erred – as have all who suppose that the modern way is the only way. There was, and is, a quite different way of managing fisheries that has worked rather well, over a period of about one million years of human seafood harvests. That traditional approach, emphasizing consensus among fishermen, enforced at a community level, has its roots in pre-human forms of managing resource use. Some of its highest developments were recorded in detail by anthropologists studying Pacific island peoples but its echoes can still be found operating today in the lobster fisheries of Nova Scotia (and even more in Maine). Unlike the "modern" version, with its hundred-year record of failure speckled with occasional temporary success, the effectiveness of the "traditional" approach has been proven over time – albeit with occasional failures.

It would not, however, be sensible to return to Palaeolithic, or even Medieval, management systems. We need to be looking forward, not back. Besides, 20th-Century management was developed to address the challenges posed by the great offshore fisheries, which themselves had been founded (600 years ago) in part as a deliberate attempt to evade the traditional local controls. Replacing a 20th-Century failure with a 15th-Century one would not be wise. What is needed is not a return to the past but a new departure which learns from both the successes and the failures of all of the approaches tried before.

What that new departure should look like remains very unclear. The requirement in 2010 is not to immediately implement some new form of management but rather to commence the discussions and studies that alone will find an effective route forwards. It is, however, possible to sketch in something of the way that the fisheries management systems of the 3rd Millennium might be organized. I will here offer one example, primarily to illustrate the depths to which we must reach in re-thinking fisheries.

Seeking a Balance

Contrary to popular rhetoric, resource conservation is **not** the proper primary objective of a fishery: Conservation could be assured by simply ceasing fishing,

which has never yet been the goal in Atlantic Canada. Rather, while we continue to harvest the resources of the sea, conservation is merely a means to an end – albeit a vital step on the road.

At its heart, fisheries management (at least: the management of the wild-capture fisheries of the open sea, which cannot be effectively enhanced by human effort) is a balancing act. To have a fishery, we must harvest fish. Yet, to have a fishery in the future, we must leave fish in the water. That duality is the essence of a fishery and hence the purpose of fisheries management is not to ensure conservation alone but to find a balance between the taking and the leaving: Not just any balance but the one that will best achieve the policy goals for the particular fishery, whatever those may be.

One of the reasons for the failure of 20th-Century fisheries management is probably that, following classic Western rationality, we compartmentalized the process. Resource conservation has been seen as a distinct process from fisheries development. They were formerly addressed by different units within DFO, until the Department largely withdrew from development work after 1994. For many years, the fishing industry was essentially told that its only responsibility for conservation was to follow the rules laid down by government, while it was increasingly left alone to generate such benefits for human communities as it could. Thus, where Canadian fisheries have been concerned, the dual facets of a fishery really only came together for balancing in the lap of the Minister – which placed an undue burden on the political leadership. In replacing such an unreasonable structure, it will surely be essential to bring both harvests and conservation, that is to say the taking and the leaving of fish, into balance across a spectrum of levels, from individual fishing operations up to national policies, and not to operate opposed systems pursuing mutually-contradictory objectives.

Managing a Fishery

It would be well to recall that, in typical fisheries, the only person in a position to directly manage a fishing operation is the man in the wheelhouse. Under the 20th-Century approach, he has been expected to manage the boat, the crew, often the business operation and particularly the taking of fish. Yet the fishing captain's role in managing resource conservation has been reduced to a naïve demand that he obey directives from a management agency, perhaps coupled to an expectation that he will provide unpaid support to the agency's attempts at resource conservation. That is absurd.

Government fisheries agencies, including our own DFO, typically apply themselves to annual plans, each concerning some resource in a defined area covering tens of thousands of square miles. When DFO has attempted to work at finer scales of time and space, it has correctly been criticized for "micro-management": Government processes are simply too cumbersome to respond effectively to the swiftly-changing

patchiness in the sea when it is examined at anything but the coarsest of scales. Yet marine scientists well know that fish live out their lives on scales much finer than those of formal management plans: The arbitrary units which masquerade as "stocks" are composed of multiple, semi-discrete sub-units; individual members of a resource population segregate by size and age; habitat usage changes with the seasons; fish distributions shift with the tides, and so on and on. Fishermen necessarily respond to this complexity and they target their fishing effort over scales of minutes to days, metres to miles – which is to say some orders of magnitude finer than the scales of the management plans. No government agency can match that and even the Soviets never tried to.

Situations often arise in which a captain has the option of fishing here and now, thus maximizing his catch rate at the cost of discarding small fish, trawling through corals or otherwise causing collateral harm, or else fishing a short distance away or at a slightly different time, avoiding the undesirable side-effects at the cost of a lower catch rate. A man whose orientation is solely around the taking of fish can be expected to aim for the highest catch rates, within the limits of the coarse-scale rules set by government, whatever pious hopes the management agency may have about encouraging captains to "do the right thing". The net result is inevitable: The management agency sets rules seeking to conserve resources over large scales, while fishermen act to optimize their taking of fish over small scales. It is no wonder that each very successfully frustrates the objectives of the other. Indeed, the wonder is that the world's fisheries, thus absurdly managed, have not collapsed even faster and further than they have.

There can be no effective balancing of the taking and leaving of fish, hence no sustained prosperity of fishing communities and fishery resources, until both sides of the equation are brought into harmony over all scales of time and space, from metres and minutes to decades and whole ocean regions.

Since harmonization would be unrealistic with divided authority and (in typical fisheries) only fishing captains can effectively manage at the smallest scales, it follows that the fishing industry should take the lead role in fisheries management, with national agencies such as DFO only having supporting and oversight functions. However, lone fishing captains can only manage the operations of their own boats, while the consequences that arise in common-user fisheries from the conflict between individual self-interests and collective group interests (the mis-named "Tragedy of the Commons") are well known. Thus, what is required for effective fisheries management appears to be a tiered structure, with captains managing the fishing of their boats, community-level or fishery-level bodies managing their respective fleets, and regional or national bodies to oversee the interactions between fleets. Effective linkages between the tiers (most likely founded in a system of representative democracy) would be essential to avoid having them work at cross-purposes, while each tier would need to consider both the taking and the leaving of fish – the conservation of the resources and the optimization of human benefits arising from the fishing.

Beyond the obviously-necessary transitional stage, I see no evident benefit in placing the top, national, tier of such a structure within a federal department but public involvement would clearly be essential:

- Authorizing an industry-based structure to manage a fishery would require an Act of Parliament, while there would be an on-going need to ensure that the management abided by the terms of its authorization.
- In the modern world, it is unacceptable to have infractions punished by local community action, without appropriate controls and an avenue of appeal to the justice system. Hence, public involvement in enforcement mechanisms is essential.
- Non-fishing Canadians (and recreational fishermen, if they were excluded from the management system) would retain an interest in their marine resources, which interest would best be represented by the elected government's involvement in the management process.

Most importantly, many Canadians would retain an interest in non-fishery uses of ocean space and the marine biota living there – most specifically including non-consumptive uses of those biota. Hence, there would necessarily continue to be public oversight and some oceans-management decision-making process superior to the peak tier of the fishery-management system, which process would presumably define the resources open to exploitation, the areas reserved from fishing and the limits within which the fishery-management system would operate.

Utopian Dream or Viable Option for the 3rd Millennium?

That is a proposal for nothing less than a fundamental re-organization of what we currently see as a fishery. It would be a wrenching change for the current staff of DFO, though the good news is that the change would come slowly and largely through retirement of those trained in the failed, 20th-Century approach. A far greater burden, however, would fall on fishermen, fishing communities and the fishing industry generally. It would be easy to dismiss such a proposal as an impossible dream.

It would certainly require, as a first prerequisite, that individual fishermen, their communities and their industry commit to stewardship, not simply of the resources and the marine environment but of their fisheries as a whole. That would require a supportive environment (quite different to the adversarial one which exists today), which in turn would necessitates a clear commitment by government to the well-being of fishermen and fishing communities, not simply that of fish. It would require community education. It would require some form of rights-based system (in most fisheries, likely **not** ITQs), rather than licences issued as "privileges" by Ministerial decision, so that those who opt to leave fish in the water can be assured that they will enjoy the future benefits. Moreover, it would require that the fisheries be returned to prosperity: Nobody can be asked to contribute to the fisheries of the future if doing so would cause the bank to foreclose on his boat loan and the

mortgage on his house. Unfortunately, the reality is that there are and always will be finite limits on marine fish production. Even with the possibility of enhanced prices, fishermen's families' right and proper modern expectations for their living standards mean that only a limited number of such families can be supported by the productivity of the fish. Thus, the increased prosperity of fishermen necessary to support stewardship would mean an increased gap between those few active in the fishery and those many who would wish to be but cannot be accommodated. That would be a severe change to the egalitarian structure of fishing communities.

Transitioning to the system proposed above would also require much organizational and other development. It would, for example, be necessary to invent a new form of fisheries science, adapted to advising fishermen on how best to conserve while harvesting, in contrast to the present form of the science, with its emphasis on generating quantitative limits to be set into governmental management plans. While that would be a radical departure in the fisheries sector, it is no different to the sorts of extension services that professional foresters provide to the owners of small woodlots.

Much the greater challenge would lie in re-shaping the perceptions and self-image of fishermen. There is still a strong belief in fishermen as rugged individualists, resisting all outside authority, including that of their peers. Yet, that attitude is not heroic, nor is it the traditional way for fishermen. Rather, it is an aberrant human behaviour which only emerged with the advent of offshore fishing and which only replaced community cooperation in Nova Scotia's inshore fisheries within living memory. It will not be easy but we need to unlearn the mistakes and return to more constructive behaviour patterns. Humans are, after all, social beings.

The task would, of course, be simpler if fishing communities were truly isolated. In reality, fishermen and their families are members of mainstream Canadian society and are exposed to all of its encouragements. That society, in turn, is built on an economic model that encourages growth and consumption – a model applicable to an industrial and post-industrial world. Marine fishing, in contrast, remains a "hunter / gatherer" activity and hence calls for a very different set of values, appropriate to finite limits on growth and the need to maintain the wild ecosystem while exploiting it. The Mi'kmaq have much to teach other Atlantic Canadians about those values – lessons that we would be well advised to learn. Yet we cannot expect fishing families and communities to divorce themselves from the mainstream and thus we face the challenge of developing effective stewardship amongst individuals who are firmly embedded in an increasingly "me first" society.

There is no denying that the challenges will be daunting.

Further Failure is NOT an Option

Marine commercial fisheries, or rather their fishery systems (extending all the way from the energy of sunlight falling on the ocean's surface to a satisfied seafood consumer paying for his or her meal), are academically interesting because each encompasses, as in a microcosm, all of the challenges confronting the survival of human populations within the biosphere. The attempt to operate modern commercial enterprises and to sustain coastal communities on a foundation of the production of a wild ecosystem brings many challenges into sharp relief, when wider human societies can push those same challenges to the fringes, compartmentalize them and ignore the ones that pose awkward problems. When considering fisheries issues, it is impossible to separate the protection of ecosystems and the species within them from the pressing need to feed 6.8 billion humans and the legitimate desires of fishermen that their families should enjoy wealth comparable to that of other members of our society.

The many fishery systems thus provide us with an opportunity for replicated, medium-scale experiments into the ways by which wider human societies might be brought into sustainable co-existence with the ecosystems that we inhabit, without sacrificing too much of the wealth and material comfort that Canadians enjoy today. Not everything that might be attempted will work but lessons could be learnt in fisheries management that would aid us all in surmounting far larger challenges than those posed by any fishery. Yet, seeing fishery systems as microcosms of greater human interactions with the biosphere presents us with an awful corollary :

> **Marine commercial fisheries, complex though they unquestionably are, remain immeasurably simpler than global human society. If we cannot find a way to transform the fisheries into a state of sustained prosperity, then there is very little hope that we can effect the same change in larger and more complex systems. If we cannot re-structure fisheries so that they work, then humanity has a rather short future on this planet.**

From that perspective, even daunting challenges must be faced. And if the proposal outlined here is deemed unsuitable for the management of Canada's fisheries, then it is profoundly to be hoped that someone can offer a better alternative.

Immediate Steps

This paper offers only a brief glimpse beyond the current planning horizon for Canadian fisheries management. Much more thought, debate and experiment will be needed before meaningful progress can be made and even before it should be attempted. However, some 15 years have passed since the groundfish disaster showed that major change was needed. If yet more time is not to be wasted, resources need to be found for the thinking, debating and trials.

In the interim, we should at least stop moving away from where we need to go.