

FUNDY ISSUES

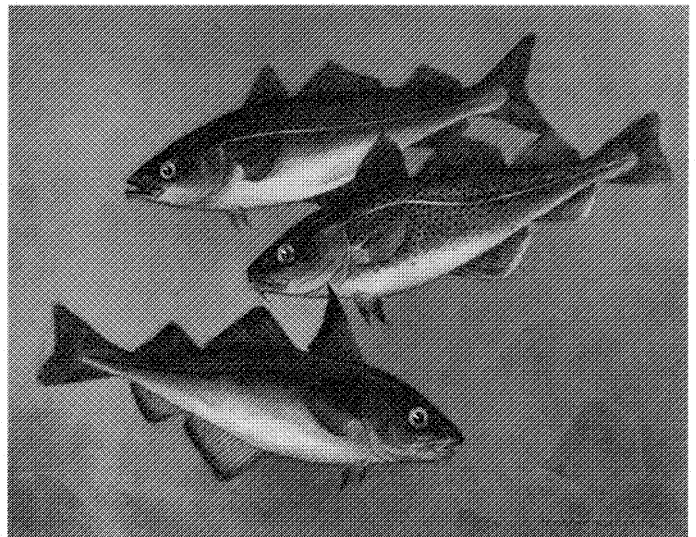
Managing Fundy's Fisheries

Who Should Write the Rules?

Fisheries in Flux

We often talk about managing "fish stocks", and indeed this is one of the key roles of the Department of Fisheries and Oceans (DFO). But this seems a little presumptuous on our part. Nature itself has been instinctively and effectively managing the great shoals of fish in the world's oceans for hundreds of millions of years, all without intervention by humans, and at no cost to us. People have never really "managed" wild fish stocks. True, the day may come when advances in ocean technology will make it possible to herd large schools of oceanic fish under reasonably natural conditions, and thereby "domesticate", manipulate and manage them. The booming aquaculture industry is a primitive first step in that direction. But for now, wild fish in the sea live well beyond the grasp of desk-bound resource managers with their rules and regulations. What we can and do manage, and also mismanage, are the many individuals who want to harvest those fish. Thus, when we speak about fisheries management we really mean managing the behaviour of those who chase the fish, and not the fish themselves.

Recent catastrophic developments in the fisheries worldwide suggest that traditional methods of managing the activities of fishermen are seriously flawed. Stocks of groundfish such as cod, haddock and pollock are severely depressed throughout the northwest Atlantic, including the Gulf of Maine and Bay of Fundy region. These, and many other once flourishing fish populations, have been so decimated that some of them are unlikely to recover in the foreseeable future, if ever. The finger of blame has pointed in

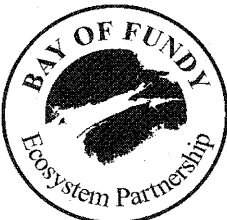


Stocks of pollock, cod and haddock (top to bottom) are depressed in the Northwest Atlantic.

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many directions - over harvesting by fishermen, habitat destruction by fishing gear, faulty assessments by scientists, poor management by bureaucrats, interference in quota setting by politicians and businessmen, or stresses inflicted by Nature - the target depending largely upon whose finger is doing the pointing. While there is little consensus about the real cause of the collapse, there is general agreement that

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the old ways of managing the fishing industry have failed badly and that new approaches are urgently needed. There are a number of fundamentally different ways of managing a public resource such as wild fish stocks. These include 1) open access, 2) rigid control by government managers, 3) private property rights, 4) co-management by managers and harvesters and 5) community-based stewardship. The first two are the traditional, largely discredited approaches, while the final three reflect newer, still-evolving ways of dealing with a very complex problem. Let's briefly consider each of these options.

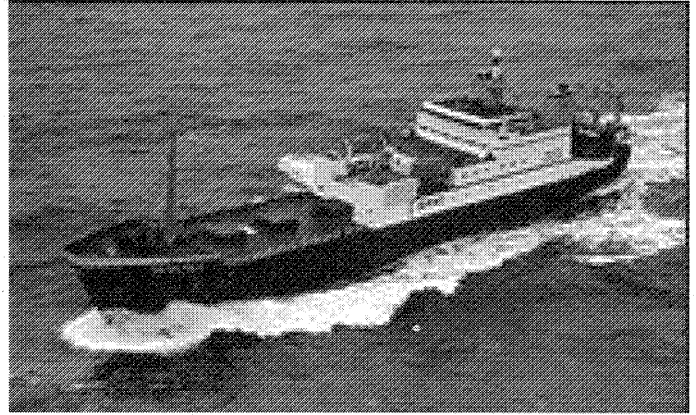
Fisheries Free-for-All

All fisheries at one time largely involved "open access" to a seemingly inexhaustible resource owned by no one in particular and everybody in general. The sea's bounty appeared to be as boundless and limitless as the ocean itself. Its plants and animals were so plentiful and so remarkably resilient that nothing humans could do could ever deplete them or reduce their productivity. For untold generations this held true, and there was no reason to restrain people from harvesting whatever they wanted. Human populations were small, scattered and their technical prowess primitive at best. The wind-driven small boats and small, fragile fishing gear were suited only to sheltered, shallow coastal waters, bringing only an insignificant fraction of the ocean's vast recesses and resources within reach.



Wind-driven, small boats and primitive fishing gear posed little threat to the ocean's resources.

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Large factory trawlers are a mainstay of modern industrialised fisheries.

Photo: Pelagic Freezer-trawler Association

The sea's immense regenerative capacity quickly replenished anything that man harvested and promptly repaired the minor scars that he inflicted on marine habitats. The ocean needed no legal protection from these puny efforts. Thus, there developed over time a tradition that the sea and its living resources are a common property available for the use and enjoyment of all, without serious restraint.

However, over the past two centuries, human populations soared and spread, demands for quality seafood surged and boats and fishing gear became larger, more ruthlessly efficient and capable of pursuing fish anywhere, at any time. Eventually corporations entered the list and began to dominate an increasingly industrialised fishery. It soon became ominously clear that continuing unrestricted and unregulated access to a common resource would quickly deplete it. This is a good example of what ecologist Garrett Hardin aptly termed "the tragedy of the commons" in a 1968 article in the journal *Science*. The example he used focused on the devastation of publicly owned community meadows, or "commons", as a result of uncontrolled grazing by livestock belonging to many individuals. However, a similar misfortune can happen whenever there is unregulated overuse of any resource considered the property of everyone. Such common property is often misused, even by the well intentioned. For example, a responsible fisherman might think about throwing back smaller fish as a conservation mea-

sure. But if he feels that other, less scrupulous fishermen are only going to scoop them up anyway, he may think twice about it. Why should he be a "sucker" and act in a way that will benefit his competitors but do nothing to help the stock in the long run? It makes more sense for him to keep the undersized fish. Thus as each individual competes to secure his share of the resource there is little incentive to act responsibly now and conserve the stock for the future - it may not be around in the future anyway.

Limiting by License

Nowadays, to conserve stocks it is absolutely essential to place strict limits and controls on all fisheries. According to Hardin this is "accomplished best through the mediation of administrative law", in other words by government regulation and rigorous enforcement. The Department of Fisheries and Oceans (DFO) and its predecessors have long handled this responsibility in Canada. Similar government agencies assume the role in most coastal states. But any state's effective control extends only over its territorial seas, at one time within a mere three miles from the coast. Coastal states eventually extended their marine jurisdiction to 12 miles. Then in 1977, Canada negotiated an Exclusive Economic Zone extending out to 200 miles, within which it would manage the exploitation of marine resources. Many other coastal states have followed this lead. However, there still remained large areas of "international waters", beyond the jurisdiction of any one country. Until very recently, virtually uncontrolled "open access" was still the norm in these vast extraterritorial expanses of ocean. Large "distant water" fleets from several nations spanned the globe to heavily exploit the more productive of these "international commons". A number of multinational organisations such the International Council for the North Atlantic Fisheries (ICNAF) were established to try, with varying degrees of success,

to regulate these oceanic fisheries and conserve the stocks.

Over the years, governments have tried many different devices to limit and regulate fishing activities within their coastal waters. They have limited the total number of people or boats fishing by issuing access "licenses". Only a specific number of licenses are issued for each fishery. A fisherman

who wants to fish has to buy a license (or work for someone who has one). However, the license doesn't guarantee any fish, it simply grants permission to go after a particular type of fish, alongside all the other license holders. The license may specify the size of vessel, the area and the type of gear that can be used. They are normally transferable and can be bought and sold on the open market. Thus their value for lucrative fisheries such as lobster or snow crab can become very high. This is good for older, established fishermen because on retiring they can sell their license and use the proceeds as retirement income. However, the high cost makes it difficult for younger, aspiring fishermen to enter the fishery. Another problem is that when a fishery prospers there are irresistible pressures on regulators to issue more licenses. However, when the inevitable slump occurs, too many fishermen end up chasing fewer and fewer fish. Then governments have to reduce the pressure on the resource by buying back licenses.

**"The law locks up the man or woman
Who steals the goose from off the common,
But the greater villain the law lets loose
Who steals the common from the goose."**

— 17th Century satirical verse

***"when a fishery prospers there
are irresistible pressures on
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Managing by Mathematics

But simply restricting the number of license holders is not enough to protect stocks, particularly when continuing improvements in gear and vessel design make it possible for fewer and fewer fishermen to catch more and more fish. It is ultimately necessary to try to control the actual quantity of fish caught by all fishermen. This involves setting an harvest limit or Total Allowable Catch (TAC) for each commercial species. The TAC is based on fisheries scientists' best estimate of the largest amount of fish of

each species that can be harvested that year without depleting the amounts available for harvest in following years, often referred to as the “maximum sustainable yield” (MSY). However, calculating the MSYs and setting the TACs is one of the weaker links in the whole fisheries management process. It marks the culmination of a long process of sampling, calculating and modelling that is an incredibly complex, daunting task for the responsible DFO scientists. Not the least of their difficulties is the fact that the sizes of the fish populations are constantly changing, because of harvesting by humans, consumption by other predators and environment variations that affect reproduction, growth and survival. Estimating population sizes and calculating TACs is a never-ending round of assessing, calculating, modelling and tweaking the figures for each commercial species. Some critics contend that DFO devotes far too much of its limited resources to “assessing stocks”, at the expense of studying their fundamental biology and ecology.

The biomass, or total weight of fish present, has traditionally been estimated by test fishing in selected areas. Nowadays, sophisticated sonar devices that bounce sound waves off objects in the water and analyse the returning echoes are also sometimes used to estimate the biomass of certain types of fish. However, fish are very patchy in their distribution and only a limited number of sampling sites can be visited within the vast areas where they roam. Both test fishing and sonar surveys have to be done at randomly selected sites for the results to be meaningful. The test catches or sonar records are analysed with statistical formulas that give an estimate of the fish biomass. The procedure also gives an indication of the likely accuracy of the results, similar to the polls at election time that claim to be within 3% of the correct value 19 times out of 20. However, fisheries scientists never aspire to that level of confidence in their estimates; within 50% or more of the

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correct value is a more common outcome. A recent book on fisheries management suggests that by far the “weakest link in the current assessment process is the inability to accurately determine total biomass”.

But knowing the quantity of fish present, even with great accuracy, is not enough to make a sound judgement about how many could be prudently harvested. Most fish live for several years and the population includes fish of many different ages, or “year-classes”, born in different years. When environmental conditions are good, there may be many eggs laid, with large numbers of them hatching out as a “strong” year-class. However, when environmental conditions are poor there may be a “weak” year class with few young. Environmental and other factors that result in the death of large numbers of growing juveniles might also produce a weak year class. The scientists need to know the relative “strengths” and rates of growth of the various “year-classes” in order to calculate how many fish are likely to reach a marketable size, or be “recruited” into the fishery, in the coming years. They also need to know how many are mature females that may soon produce a new year-class. Such size, sex and maturity information is gathered during the scientists’ own test fishing, as well as by sampling the landings of commercial fishermen.

Once the scientists have done a “stock assessment” and roughly estimated the quantity, size and maturity of the fish in the area, they face yet another difficult task. They have to figure out the largest amount that can be caught without significantly reducing the quantity of fish available in future years. To do this they need to take into account the “population dynamics” of the species. This involves the use of sophisticated computer models of the population that incorporate many aspects of their life cycle. This might include such things as the

number of eggs produced by different sized females, the proportion of the eggs that eventually hatch (without dying or being eaten by predators), the growth rate of fish of different ages under different conditions, the proportion that live to each age, and the number that die from natural causes. Few of these values are accurately known and thus one can't be overly confident of the results produced by the computer models. There are other weaknesses that further erode confidence in the accuracy of the results. The models largely ignore the fact that the conditions in the ocean environment vary greatly from year to year. Changes in water temperature, food supply, numbers of predators and the occurrence of diseases or parasites, and many other factors, determine the number of fish that survive to adulthood. Since these cannot be easily measured every year, it is usual practice to assume that a fixed percentage of the fish (typically 20%) die each year from a mix of "natural causes". In some years, few fish die, while in other years a very large proportion do; but the models are largely blind to such fluctuations.

Another problem is that the models typically consider only the single target species. They make no allowance for the fact that every species relies on others as food, and in turn serves as prey for yet others. Thus, separate models are used to calculate Optimum Sustainable Yields for capelin and for cod. Yet neither model acknowledges that a lot of capelin are eaten by cod, and that their natural population cycles are thus inextricably linked. Neither do the models consider fluctuations in the numbers of the many other species that the cod intimately shares the ocean with, from shrimp to seabirds to seals. Each commercial species is assessed, modelled and managed as though it lived all by itself in the ocean. The flaws in such "single species management" have long been apparent. However, the incredible complexity associated with a "multiple species" approach to fisheries management has frustrated ef-

forts to construct more realistic models. The emphasis on managing commercial species solely for the benefit of humans also ignores the fact that many marine species, such as whales and seabirds, have an equally legitimate, and more time-honoured claim to a share of the marine resources. Any sus-

tainable fisheries management plan has to recognise their needs too, if we are to have a diverse, productive and healthy ocean ecosystem. Another difficulty

with the scientists' models is that in order to keep the calculations to a manageable size they focus on specific areas of the ocean called fisheries zones. However, such zones are often big enough to contain a number of largely independent sub-populations of a species. These may have very different life history characteristics, environmental conditions and fishing pressures. Yet, they are often all assessed, modelled and managed as if they were one large uniform school of fish.

In view of the complexities, uncertainties and imponderables associated with assessing and modelling fish stocks, it should come as no surprise that the "optimum sustainable yield" that is finally calculated is a figure that may be much, much higher or far, far lower than the real value. David Coon and Janice Harvey, with the Conservation Council of

New Brunswick, in their book *Beyond Crisis in the Fisheries* suggest that the assessment and modelling process is a "numbers

game". In this game, "if the numbers going into the model are off, the numbers coming out are also going to be off". The truly vexing point is that usually no one knows how far off they really are.

In spite of all their uncertainties, these scientifically certified model results are presented to the resource managers who decide on the total allowable catch (TAC) and quotas for each species. Traditionally, such decisions were made behind closed doors with little public input or accountability. The managers faced intense pressures from the fishing industry, coastal communities and local politicians, to set the

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TAC and resulting quotas as high as possible. The great statistical uncertainty hovering about the assessment results allowed great scope for interpretation and negotiation. Harvey and Coon perceptively point out that, "working with exactly the same set of numbers, fisheries scientists could call for a great deal of caution in setting quotas, while fisheries managers and politicians could see potential for setting high quotas". There are many who are convinced that such behind-the-scenes horse trading over equivocal stock assessments was a contributing factor in the collapse of Atlantic groundfish stocks.

Race for Resources

But limiting access and restricting the total harvest of marine resources still doesn't do away with the economically inefficient and ecologically destructive "race for fish". A fish in the sea still doesn't belong to anyone until it is netted and hauled aboard a vessel. Putting a cap (TAC) on the total amount of fish that can be caught in a season only raises the tempo of competition between fishermen. The economic survival of each depends on catching a large quantity before the TAC is reached and the fishery is closed. To compete in this race a fisherman needs the largest boat and the best gear he can afford, as well as a willingness to gamble with weather and sea. Assigning quota portions of the total TAC to different gear types (long liners, draggers etc.), areas (inshore, offshore etc.) and classes of vessels (company owned offshore trawler fleets, small inshore draggers etc.) does little to dampen the competition within each group. In the fishing zone encompassing the Bay of Fundy and southwestern Nova Scotia there were twelve separate quota groups within the fixed gear sector alone. Such subdividing of quota, results in an increasingly complex set of policies, regulations and penalties that are difficult to administer and expensive to enforce.

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Managing by the Markets

Given the failures of the open access approach and the great problems associated with management based principally on regulation, there has been a growing interest in recent decades in other ways of managing marine resources. Economists and others have long argued that common resources are abused largely because they don't belong to anyone. There is little personal incentive to use them wisely and conserve them for the future. It would be better, the argument goes, if the fish actually belonged to individuals or companies as their own private property to manage as they wish. After all, this is normally how things are done on land, with individuals owning the herds of livestock, as well as the pastures they graze on. Anything the farmer does to enhance the size or health of his herd, or the productivity of his pastures, will eventually be of direct benefit to him. If, on the other hand, he neglects them, then he and his family are the ones who lose. Thus, there is a great incentive to manage his stock wisely. And, if he no longer needs or wants them, he can simply sell them to the highest bidder.

Why not adopt a similar approach with the fish in the sea? If fishermen actually owned the fish, wouldn't they be just as conscientious about looking after their "stock" and "pasture" as any farmer? There are marine situations where this approach is feasible and sometimes used. Stationary shellfish, such as oysters or mussels, living in shallow protected coastal areas can be "owned" and farmed. Defined areas of seafloor can be leased to individuals to manage, enhance and harvest the shellfish, with minimal regulation by government. In addition, some species of fish and shellfish are resilient enough to tolerate crowding together in small enclosures. The booming salmon and scallop aquaculture industries attest to the seeming economic feasibility of this approach, although its ecological feasibility is still being questioned.

However, problems arise when it comes to “ranching” the large assemblages of wild fish that freely roam in the ocean. It’s simply not feasible to give each fisherman ownership of a specific school of wild fish to manage and harvest. The fish must move freely amongst their widespread spawning, maturing, feeding and wintering areas. It is not possible to exercise direct ownership in such a situation.

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However, while it may not be feasible to possess a particular group of fish, it is possible to “own” a guaranteed share of the TAC of a particular species. Fisheries scientists still must determine the “sustainable yield” and fisheries managers have to set the annual TAC for each species. But each individual fisherman “owns” a quota share that is a guaranteed fixed percentage of the TAC. He can harvest his share of the fish in the way that best suits his capabilities and needs. He can catch his entire quota early in the season, catch it gradually over the whole season or leave it till late in the season. He doesn’t have to worry about racing against others, investing in a bigger boat or buying heavier gear in order to catch his share of the TAC. His individual quota (IQ) belongs to him and cannot be taken by others without his agreement. This guaranteed share is also an individual “transferable” quota (ITQ), that is much like any other commodity that can be leased, traded or sold, in whole or in part. If a fisherman catches more than his quota of a particular species he can lease or buy more from others with quota to spare.

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Both profit from the transaction and there is no need to “dump” the excess fish at sea or risk landing them illegally.

Economists, and others who favour such a market-driven “property rights” approach, suggest that it makes a fishery more efficient, orderly and safe. Because the ITQs can be bought and sold, it is likely that profitable and efficient harvesters will

eventually acquire quota from inefficient ones. It also makes for a safer fishery by doing away with the reckless race for fish. “Owning” a share in the fish also encourages fishermen to support measures to conserve stocks and protect habitats, since they will benefit directly from any increase in the fishable stock. Resource

managers also favour such a free-market approach, because it reduces the regulatory burden of managing fewer, larger, efficient fishing operations. It is also easier to recover costs of stock assessments, monitoring and enforcement.

The first major push towards privatisation of fish stocks came in the wake of the 1982 Kirby Task Force Report on the management of East Coast fisheries. DFO embarked on a program to reduce the number of participants in fisheries and promote “privatisation”, leading to a manageable number of efficient and financially sound fishing operations. The Department first tackled the companies that dominated the offshore fisheries and were generally amenable to such a market-driven approach. In 1982, a form of ITQs, termed “enterprise allocations”, were assigned to the 23 companies that operated the offshore trawler fleets fishing for groundfish. It was not long before two large companies, National Sea Products and Fishery Products International acquired control over 90% of the off-

shore fleet and associated quota. The privatisation program was expanded in 1988 to include the mid-shore fleet, consisting of vessels longer than 65 feet that fished for groundfish. In

1991, ITQs were extended to draggers over 45 feet operating in near-shore waters. DFO would eventually have liked to bring the remaining inshore fisheries into the program. However, the proud, fiercely independent, fractious individuals that make up the backbone of the small, traditional fisheries proved a far more difficult nut to crack.

The Case for Community Control

Most inshore fishermen are adamantly opposed to such a wholesale transfer of a public natural resource into private hands. They fear that eventually a few large, ruthlessly efficient, profit-driven corporations based in large urban centres would acquire much of the quota. Such industrialisation of the fisheries would threaten not only their livelihoods, but also the very existence of their coastal communities and a cherished way of life. They also fear that if market forces largely dictate how the fisheries are managed and prosecuted, little consideration will be given to the long-term conservation of fish stocks and their habitats.



Should independent fishermen have a greater role in managing the fisheries?

These independent fishermen have a very different view of how the fisheries should be managed. Their's is a vision that is more flexible, undoubtedly more difficult to administer and whose scope and structure are still as yet only discernible in dim outline. However, they believe that it is a vision that will restore dignity, self-reliance and economic stability to fishermen and their communities and guarantee the well-being of fish stocks and habitats for generations to come. Their ultimate goal is to have the inshore fisheries managed primarily by the coastal communities that best know them, value them and depend on them. The exact meaning of "community" in this vision is still a matter of some debate. For many fishermen it would include only those individuals directly involved in the harvest. They are the ones who know the fisheries and the coastal ecosystems where they work, and have the most to gain from managing and using the stocks wisely. However, the fish in the sea are a public resource belonging to all, not just those

who harvest them. There are many other members of coastal fishing communities, such as families, storeowners and small businesses, who also have a vested interest, albeit indirect, in a successful harvest and the long-term conservation of fisheries resources. Clearly, the community as a whole should have some say in how fisheries are managed for the benefit of all. But what about others who use the sea in different ways, the scuba divers, the naturalists, the submarine petroleum geologists, the whale watch operator and a host of others - shouldn't their views be heard too? However, as more and more diverse interest groups become involved in the process, the more difficult it becomes to

create an organisational structure that is balanced, fair and efficient. Nevertheless, proponents of community management are convinced that with creative thinking, careful planning and good will on all sides, it is possible to achieve such management.

The Bay of Fundy region has been in the forefront in exploring new, innovative and decentralised approaches to fisheries management. An early example involved the purse seine fishery for herring. In

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1976, faced with declining herring populations and low prices, DFO granted authority for local quota management to the Atlantic Herring Fishermen's Marketing Co-operative. DFO assigned a quota for the exclusive use of the Co-operative, which in turn allocated shares to its members. These shares were the property of the individual members. They were eventually made transferable, thus effectively becoming ITQs. At first the arrangement worked well, but eventually disputes about different types of gear caused some fishermen

signed a quota for the exclusive use of the Co-operative, which in turn allocated shares to its members. These shares were the property of the individual members. They were eventually made transferable, thus effectively becoming ITQs. At first the arrangement worked well, but eventually disputes about different types of gear caused some fishermen

to leave the Co-operative, along with their quota share, resulting in its eventual collapse. The failure was largely attributed to the lack of a workable procedure for resolving disputes, as well as to the fact that the Co-operative didn't have the authority to exclude those who were not members from the fishery. In spite of the failure, some valuable lessons were learned.

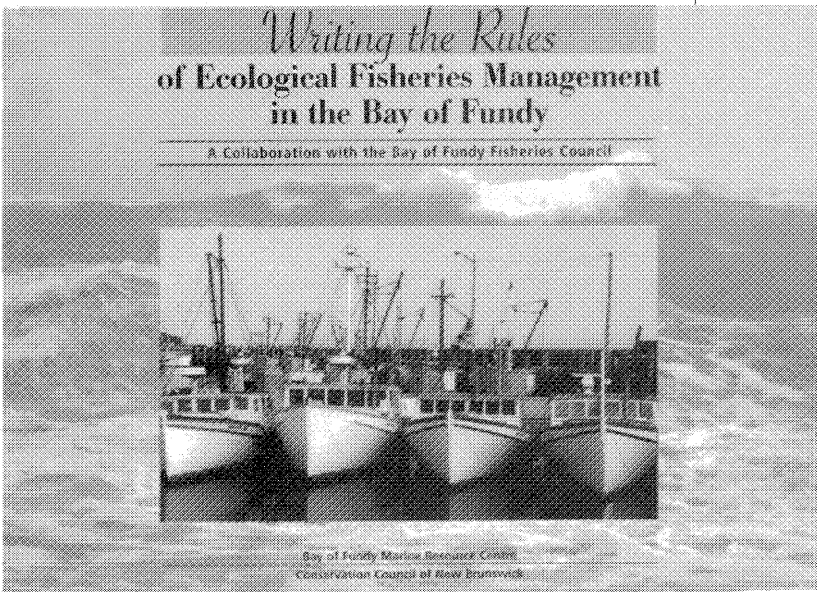
Another attempt at local management came in 1996, following massive protests by inshore fishermen throughout the Scotia-Fundy Region. They were angered by DFO's announced plans to expand the use of ITQs to the inshore fisheries.irate fishermen occupied most DFO buildings in Nova Scotia for almost a month. As part of the eventual settlement, DFO agreed to allocate a specific quota of groundfish in the Fundy area for hook and line fishermen. This quota would be managed by a newly formed management board, the Fundy Fixed Gear Council (FFGC), consisting of representatives from several local fisheries groups. The Council was authorised to allocate quota among the participating groups and to manage the fishery in a flexible way. To

participate, fishermen had to sign a binding contract with the Council agreeing to comply with its decisions and regulations. Preparing for this transfer of management authority involved a great deal of work in a very short time. Fishermen scrambled to set up committees to represent the various gear types, to consider the scientific information needed for making

sound management decisions and to decide on ways to deal with any infractions of their rules. Wharf representatives were also appointed to inform fishermen about management decisions and to seek their views on how the fishery should be managed. Arthur Bull, an advisor to the FFGC was impressed with the effort - "I've never seen people get organised so fast in my life". This initiative was so successful that David Suzuki's Nature of Things television program highlighted the Fundy fisheries management project, along with another in India, as outstanding examples of how community management of fisheries can be made to work effectively.

This initial success stimulated efforts to expand the scope of community management by encouraging fishermen in other regions of the Bay of Fundy, or engaged in other fisheries sectors, to participate in the process. To this end, FFGC and thirteen other fishery groups from all around the Bay joined together to form the Bay of Fundy Fisheries Council (BFFC). This group promotes the concept of community management throughout the region, and works to ensure that fishermen and their communities have the primary responsibility for the stewardship of the marine resources they use. One of the BFFC's first projects was to research, write and publish a slender volume entitled *Writing the Rules of Ecological Fisheries Management in the Bay of Fundy*. This publication reflects the views of more than 100 fishermen from all around the Bay of Fundy who participated in "kitchen table" and "community hall" discussions about how

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Fundy fishermen express their views on sustainable, community-based management of the fisheries.

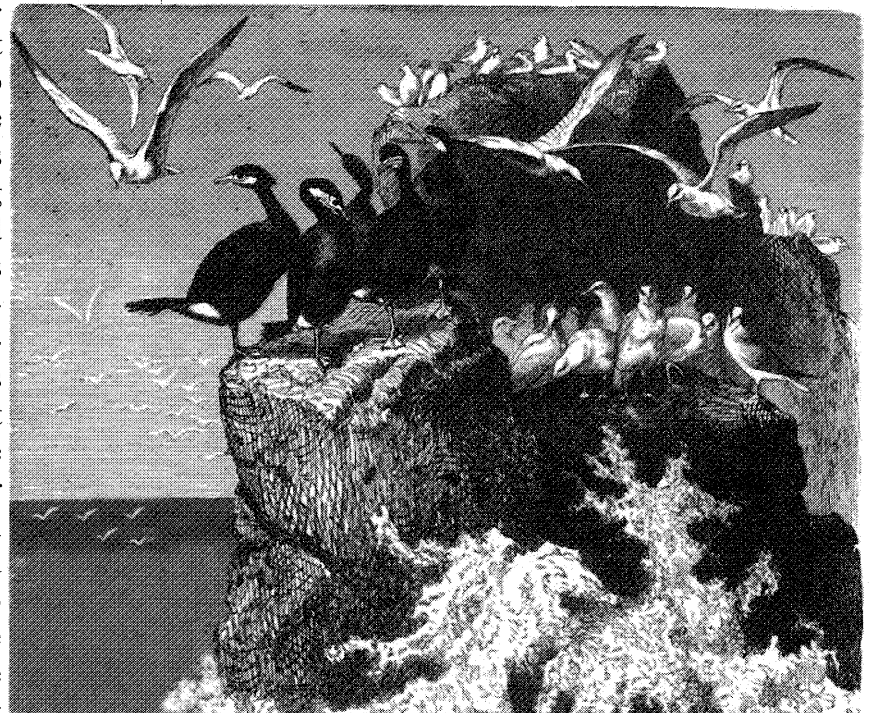
the fisheries could be managed in a fair and ecologically sound way. The participants reached a consensus on two basic management principles. Firstly, local community-based groups should be primarily responsible for the “stewardship and management of all adjacent fisheries resources and the ecosystems that support them”. Secondly, any decisions concerning the management of a fishery should be made at the “most local level possible”.

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The fishermen consulted were also adamant that the fish in the sea must continue to be a public resource and not privatised. The inshore fisheries should largely be the domain of independent fishermen who own and operate their own boats, rather than dominated by large corporate interests. Participants in the community meetings also highlighted a number of ecological principles that should guide all fishery operations, to better protect fish stocks and their habitats. The fisheries must be managed holistically as part of a complete and integrated ecosystem. Since reproduction is absolutely critical to a species survival, important spawning grounds should be closed to fishing when fish are spawning. The catch of juvenile fish on nursery grounds should be reduced, by modifying fishing gear to allow smaller fish to escape. Food web and predator-prey relationships should be taken into account in management planning. For example, management of fisheries for key prey species such as herring should allow for the fact that many other fish, seabirds and marine mammals also depend on them. Particular efforts should be made to protect critical habitats such as spawning grounds and nursery areas from damage by heavy fishing gear. Care should be taken to ensure that local stocks of particular species are not fished out, by spreading the fishing effort across a number of different stocks. There should be some limits placed on fish catching efficiency, recognising that

built in inefficiencies in harvesting would be beneficial to the stocks in the long run. The use of bigger, more powerful boats, heavier, more deadly gear and high-tech fishing aids should also be carefully regulated. Fishermen should be permitted to diversify and catch several different species rather than being forced by quota to concentrate exclusively on, and thus possibly overfish, a single species. Fishermen should be given the freedom to adjust their fishing efforts to the natural fluctuations in abundance of different species. If fishermen were largely responsible for developing and implementing such rules, it is likely that they would be more inclined to obey and enforce them.

If there is to be a significant shift in fisheries management responsibilities to the local community level, a great deal still has to be done to develop effective organisational structures within the communities to carry out the tasks. The *Writing the Rules* document recommends Local Management



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Boards (LMBs) as the basic units of the management hierarchy. Issues of broader geographic scope would be then referred to Regional Co-ordinating Councils, consisting of representatives from all the LMBs in a given region. These Councils would support the development of the local management boards and assist in resolving disputes between different fisheries, gear types or regions.

The proposals contained in *Writing the Rules* "challenge the conventions of centralised federal power, the ideology of economic efficiency and resource privatisation, and the doctrine that fishing communities are irrelevant as economic and social entities". If they are eventually implemented in the Bay of Fundy then "fisheries management would look considerably different than it does today". The BFFC has embarked on a number of pilot projects in various parts of the Bay to promote and further develop the framework for the evolving concept of community-based management.

Charting a New Course

After more than a decade of intense public criticism, DFO has also reached the conclusion that major changes in fisheries management are long overdue. For some time now it has been slowly charting a new course "to modernise the management of fisheries." In an early effort to make the Department's decision-making processes more open and transparent the Minister of Fisheries created the Fisheries Resource Conservation Council (FRCC) in 1993. This group of 15 members is drawn from both the scientific and fishing communities and appointed by the Minister. Its

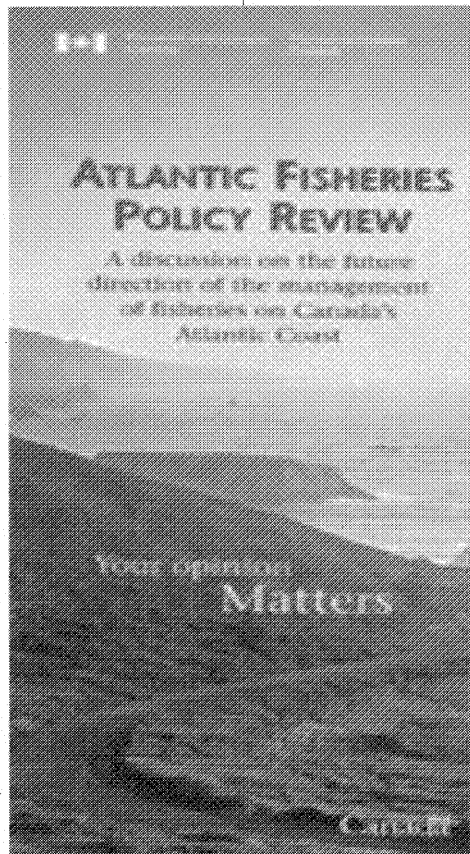
principal role is to review available fisheries information and make recommendations to the Minister on TACs and fisheries conservation measures.

"those who exploit and benefit from the resource have little say in its management and insufficient incentive to use it sustainably."

During the 1990s DFO also implemented a Regional Advisory Process (RAP) and an Integrated Fisheries Management

Planning (IFMP) process to encourage greater input by fishermen into stock assessment and management planning decisions. The Department has also experimented with the concept of co-management of fisheries resources since the early 1970s, but it was mainly in the 1990s that progress was made in sharing management responsibilities for some fisheries, particularly through the IFMP process. DFO is now contemplating even more sweeping changes. In early 2001, it released "The Management of Fisheries on Canada's Atlantic

Coast: A Discussion Paper on Policy Directions and Principles". This is intended as "a springboard for public discussion and debate". Community groups will be encouraged to hear the admission that "the traditional approach to fisheries management in Canada is too paternalistic", and that "those who exploit and benefit from the resource have little say in its management and insufficient incentive to use it sustainably." The document continues with the frank acknowledgement that "Canada's approach to fisheries management has always cast DFO as the lone guardian of Canada's fisheries resources with little involvement by others" and it concludes that "this top-down approach to conservation is destined for failure." Clearly DFO must retain responsibilities in several specific areas and it should focus its attention on these in the future. The provi-



DFO seeks public input on developing new approaches to managing Canada's Fisheries.

sion of sound scientific advice about fish stocks and gaining a better understanding of how the ecosystem functions is a key role for the Department. It must also continue to be involved in establishing conservation goals, determining the best use of fisheries resources and negotiating international fisheries agreements.

There should be opportunities during this review process for fully exploring the concept of community management. It appears that there are areas of general agreement in the FFGC's *Writing the Rules* and in DFO's *Policy Discussion Paper*. For example, the discussion paper suggests that there may be room for fish harvesters to assume responsibility for "specific tasks and activities", and that DFO "could delegate some decision-making authority and responsibilities to particular groups." Even more encouraging is the recommendation that DFO "support initiatives to build management capabilities among license holders and other resource users through their professional organisations". It also recognises that a viable management process has to provide for inputs from individuals who may not be resource harvesters, but reflect the wider public interest in the marine ecosystem. However, the development of a truly co-operative and effective fisheries management framework is going to take a lot of trust, hard work and good will on all sides.

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Further Reading

Writing the Rules of Ecological Fisheries

Management in the Bay of Fundy. Arthur Bull, David Coon and Maria Recchia. Bay of Fundy Fisheries Council, Bay of Fundy Marine Resource Centre and Conservation Council of New Brunswick. 30 pages. (May 2000).

Property Rights in the Defense of Nature. Elizabeth Brubaker. Earthscan, Toronto. 328 pages. (1995).

Beyond Crisis in the Fisheries: A Proposal for Community-based Ecological Fisheries

Management. Janice Harvey and David Coon. Conservation Council of New Brunswick, Fredericton, N.B. 59 pages. (1997).

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Management on the Atlantic Coast. Brian Lee Crowley (Editor). Atlantic Institute for Market Studies. 323 pages. (1996).

The Ocean Commons and Community.

Bonnie J. McCay. Dalhousie Review, Dalhousie University Press, Halifax, N.S. Pages 310 to 338. (Fall/Winter 1994-95).

The Tragedy of the Commons. Garrett Hardin. Science. Volume 162, pages 1243 to 1248. (1968).

Lament for an Ocean: The Collapse of the Atlantic

Cod Fishery: A True Crime Story. Michael Harris. McClelland and Stewart Inc. Toronto, Ontario. 389 pages. (1999).

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Atlantic Fisheries Policy Review. Ottawa, Ontario. xi+69 pages. (February, 2001). Also available on: <http://www.dfo-mpo.gc.ca/afpr-rppa>

Scaring the Fish: A Critique of the NRCs Justification for Individual Transferable Quotas (ITQs) and a 'Systems Analysis' of Their Likely Effects

(Abridged Version). Frederic B. Jennings, Jr. Centre for Ecological, Economic and Ethical Education. A Report Submitted to Greenpeace. iv+92 pages. (December 1999).

The Fundy Issues Series is an initiative of the Bay of Fundy Ecosystem Partnership. These publications describe our present scientific understanding of some of the environmental issues confronting the Bay. We hope that they will enhance your understanding of the biological richness and complexity of this unique marine area and the problems confronting it. Such awareness may encourage you to help in protecting it for the use and enjoyment of all, so that future generations may also share and appreciate its bounty and rare beauty.