EXECUTIVE SUMMARY

For millennia, harvesting resources from the seas, lakes, and rivers has been a source of sustenance and livelihood, and a mainstay of local culture. That is nearly as true today as it was a century ago. Fishing remains key to food security for millions of people, a bulwark of local employment, and a significant factor in the global economy. In fact, about 1 billion people—largely in developing countries—rely on fish as their primary animal protein source and an estimated 35 million people are directly engaged, either full- or part-time, in fishing and aquaculture. In terms of income generation, fisheries are extremely important as well, generating over US$55 billion in international trade.

Yet, the nature of the fishing enterprise and the condition of the marine and freshwater resources it relies on could hardly have changed more radically over the last 100 years. During that time, the increase in the world's population and the need for economic development has brought a rapid expansion of commercial fishing and an overwhelming upsurge in our capacity to exploit fish stocks. In the last half century, a tide of new technology—from diesel engines to driftnets—has swept aside the limits that once kept fishing a mostly coastal and local affair. The result has been a rapid depletion of key stocks, and serious disruption and degradation of the marine and freshwater ecosystems they live in—what many have termed a "global fisheries crisis."

The exploitation pattern in marine fisheries began to change at the close of World War II, when the increased commercial potential of fishing became more obvious as the capacity and range of boats increased. Since 1992, overfishing— the action of fishing beyond the level at which fish stocks can replenish through natural reproduction—has become one of the major natural resource concerns in the industrialized world, and increasingly in developing nations as well. Seventy-five percent of commercially important marine, and most inland water fish stocks are either currently overfished, or are being fished at their biological limit, putting them at risk if fishing pressure increases or the habitat degrades. In marine waters, overharvesting and habitat degradation are the main causes driving fish stock declines, while in inland waters, the principal factors threatening fisheries are habitat loss and environmental degradation.

As ocean catches have dwindled, aquaculture—the practice of farm-raising fish and shellfish—has burgeoned and diversified to take up the slack to meet food and income needs in developing and developed countries. In fact, over the past three decades, aquaculture has become the fastest growing food production sector in the world, accounting for 37.9 million metric tons of fishery products in 2001—nearly 40 percent of the world's total *food* fish supply.

It was once thought that commercial fish species that were widely distributed and abundant were unlikely to be threatened with biological extinction even if heavily fished. But in recent years it has become clear that this is not the case. A small number of commercial fish species have now joined endangered whales and sea turtles on the *IUCN's Red List of Threatened Species*. Scientists warn that when fish populations become severely depressed, a threshold can be breached making recovery questionable even if fishing effort is reduced or stopped. In May 2003, Canadian biologists declared the Atlantic cod an endangered species after concluding that some stocks face imminent extinction—this in spite of the fact that the Canadian cod fishery is closed.

Unfortunately, pressure on fish stocks is primed to increase even as stock conditions continue to worsen. Demand for seafood products has doubled over the last 30 years and is projected to continue growing at 1.5 percent per year through 2020 as global population grows and per capita fish consumption rises. The number of fishers and fish farmers is growing markedly as well, having doubled in the last 20 years with most of the increase occurring in developing countries as people turned to fishing for an alternative or supplemental source of income.

Despite these troubling statistics, most people have little idea of what the "fisheries crisis" is, or what it means to them. From a consumer's point of view—at least in most developed nations—the sad condition of fish stocks is not obvious. There are still plenty of fish available in markets and restaurants, although the types may have changed and the prices may be higher. So are we really running out of fish? Are coastal ecosystems nearing collapse? The answers to these questions are not widely understood outside of the circle of fish experts and others in the fishing industry. That is unfortunate, because solutions to the problem may require decisions to

regulate fishing in politically unpopular ways—measures that will need strong public support to be successfully implemented.

The purpose of *Fishing for Answers: Making Sense of the Global Fish Crisis* is to answer some of these questions and help consumers, environmental organizations, and policy-makers deepen their understanding of the issues surrounding global fisheries and find their potential roles in creating a political and economic environment that will foster sustainability in fishing.

Achieving sustainable fishing practices and maintaining healthy fish stocks will not be easy. It will require action at many levels: changes in national economic development plans and structural government reforms; changes in how fishing rights are allocated to both small-scale fishers and industrial fleets; changes in international cooperation and international trade negotiations; and better compliance with international norms. It will also require a more concerted effort by nations to address the management and monitoring of small-scale and inland fisheries sectors, which are largely unregulated and ignored today.

But the fishing sector is far too important to allow its continued downward spiral through inaction, particularly when some initial steps toward sustainability are possible today. Here we summarize some of these key measures and highlight some known trends in global fisheries.

Who Are the Key Players?

Prior to the 1950s, only a handful of countries had industrial fishing fleets harvesting more than 1 million metric tons of fish per year. Today, more than 20 countries regularly exceed this quantity and more of the top fish-producing nations are from the developing world. In fact, developing nations now produce more than 70 percent of the fish we consume. In 2001, the top ten producers were Chile, China, the European Union, India, Indonesia, Japan, Peru, the Russian Federation, Thailand, and the United States. The main markets are the European Union, Japan, and the United States, who together consume about 80 percent of all the fishery products traded internationally. Developing countries consume about one third of all fish imports by quantity, but these are often lower-priced items, so they only account for 17 percent of the total value of the international fish trade.

The Forgotten Fisheries: Freshwater and Small-Scale Fishing

Small-scale fishing—characterized by small-capacity fishing craft with non-mechanized propulsion, or low-horsepower engines—is by far the dominant form of fishing in the world today, at least in terms of the number of people involved. But small-scale, and especially freshwater fisheries have been historically marginalized and routinely ignored when multiple development demands and conflicting interests compete over the use of water bodies and coastal resources. Dam construction, water withdrawal for irrigation, land conversion, and the presence of industrial fleets in coastal areas can have tremendous impact on small-scale coastal and freshwater fishers. Large industrial trawlers that fish the waters close to shore, for example, often degrade the sea bottom habitat and change the species composition of coastal ecosystems to a point where the local fish catch can drop precipitously. Such conflicts between foreign industrial fleets and small-scale coastal fishers are becoming increasingly prevalent in Asia and Africa, with small-scale fishers gradually losing ground.

This lack of attention puts small-scale fishers at a disadvantage compared to industrial fleets, and leaves the inshore and freshwater bodies they frequent inadequately managed. Policies aimed at developing management programs that involve fishing communities in the decision-making process would go a long way in incorporating this sector into national development plans. Co-management programs that devolve control over certain fishing grounds to local communities not only give local people a stake in maintaining the resource in the long-term, but can also contribute to poverty alleviation. However, this control must be integrated into the wider coastal and basin management regimes and coordinated with industrial fishing and other development activities such as irrigation and tourism.

The Role of Aquaculture: Can it Save Wild Fisheries?

Aquaculture is the fastest growing food production sector in the world. It has become so by expanding, diversifying, and intensifying its operations. But the heavy dependence of intensive systems on human inputs—water, energy, chemicals—and on wild fish for feed and seed, as well as the effects on ecosystems and species are major constraints to the sustainability and future growth of this industry.

In general, aquaculture products fall into two distinct groups: high-valued species that mainly target export markets, and low-valued species that are primarily consumed locally. Most large-scale, intensive aquaculture operations target high-value species, such as shrimp and salmon, which are commercialized in developed countries—mainly Europe, Japan, and the United States—and require large capital investments. Extensive or rural aquaculture on the other hand usually targets low-valued species, such as carp, requires low capital investment, and often provides affordable fish for local consumption.

Although much of the world's aquaculture production comes from small- and medium-scale operations, the tendency is toward intensification and higher reliance on wild fish for fishmeal and seed fish. The wild juveniles used as seed in aquaculture are largely unaccounted for in capture statistics, and are therefore not taken into consideration in management decisions, such as setting catch limits or assessing stocks, making the management of wild fisheries even more challenging. Furthermore, the last few years have seen an unprecedented trend in the transfer of wild-caught juvenile fish, especially high-valued tuna, to open-ocean pens for fattening without these individuals being reported as part of the catch. This practice can seriously hinder stock assessment and misinform the setting of harvest quotas, with grave consequences for some already depleted wild stocks.

Developing more sustainable aquaculture practices, and streamlining the monitoring and reporting of new sea-farming methods in order to avoid negative impacts on wild stocks are key steps to achieving sustainability in the sector. In recent years, some aquaculture practices have achieved significant results in increased production and efficiency. However, most operations still have a long way to go to reach the environmental standards being set by numerous national authorities and international aquaculture associations. In addition, regulatory structures need to progress in parallel with rapidly developing technological advances before widespread adoption of these technologies takes place. Developing countries in particular face enormous challenges to support responsible aquaculture practices because of lack of financial resources and many times, local capacity.

International Trade Increasingly Influences Fishing

Trade has become a driving force in the global fishing enterprise, influencing the species of fish targeted and farmed, the intensity of fishing pressure, and, in many cases, the incentives for fishing either sustainably or destructively. Whether trade encourages overfishing or is part of its solution can't be answered with certainty. However, it is likely that trade simply magnifies the environmental effects of existing fishing practices. Where those practices are harmful, the effects of trade will be compounded by for example, expanding the market for fish caught in this way, or by providing easier market access to illegally harvested products.

Part of the problem is that the World Trade Organization (WTO) trade rules are often in conflict with trade restrictions that aim to promote sustainable fishing practices. Some steps to reconcile environment and trade rules would require granting observer status at the WTO to the UN Environment Programme and to the secretariats of international environmental treaties, incorporating the precautionary approach into WTO and other trade rules, and reducing environmentally harmful fisheries subsidies through negotiations within the WTO and other trade bodies.

Another important and damaging feature of the growing international trade is the rise in illegal, unreported, and unregulated (IUU) fishing, which is especially prevalent in fisheries of high commercial value, such as sashimi-grade tuna. The products are often exported to Europe, Japan, and the United

States. Responsible fishing nations should no longer keep open registers for fishing vessels, which too often are used to facilitate illegal and irresponsible fishing. The increased use of other measures such as "blacklisting" (disallowing known illegal vessels from landing their catch), and "white-listing" (allowing only registered and compliant vessels to land their catch) are also good ways to combat IUU fishing.

Sustaining Ecosystems is Key to Fisheries Management

The harm that fishing can cause to target fish is substantial, but the damage does not end there. The world's fleets harvest a large number of fish and other animals besides the particular species being targeted—animals that are generally referred to as bycatch. Some of this bycatch is retained for sale, but a portion of it—often a large portion—is returned to the sea, usually dead or dying (so-called "discards"). Bycatch and discards, and the associated high mortality of species, such as marine turtles, present one of the major challenges facing sustainable fisheries today. The latest FAO estimate of total marine discards is at least 10 million metric tons of animals—but this figure underestimates the number of marine mammals, turtles, and seabirds caught as bycatch, which can be substantial in certain fisheries.

Ecosystems can also be damaged physically, either by some fishing practices or by particular fishing gear. Bottom trawling, in which a trawling rig is dragged across the seafloor, for example, is a significant source of pressure on the biodiversity of sea bottom ecosystems. In inland waters, the introduction of non-native fish species for aquaculture or for re-stocking lakes and rivers also causes damage by displacing and threatening native species. Together, this sums to major ecosystem change and impact—impact so severe that it jeopardizes the very resource base upon which the fishing community depends.

Conventional management approaches have focused on individual stocks rather than maintaining the health of marine and freshwater ecosystems—the basis for current and future production. Only recently have governments officially recognized the breadth of the problem, and the necessity to look beyond individual fish stocks as they address fisheries management. The idea of an ecosystem approach to fisheries management has been gaining ground slowly. At its heart, it calls for limiting fishing's impact on ecosystems as much as possible and sustaining the ecological relationships between the species being fished and other ecosystem inhabitants. Therefore reorienting fisheries management to account for ecosystem interactions and damages is a key step in achieving sustainable fisheries.

The FAO Code of Conduct provides the key principles for sustainable fishing and is being used by many nations to introduce hundreds of management plans. Nonetheless, the Code's potential is far from being realized, partly because of its relatively recent adoption and because nations have implemented its guidelines in a piecemeal fashion. New incentives and support mechanisms for countries to fully implement and enforce the principles set forth in the Code of Conduct and the associated International Plans of Action are urgently needed.

Can Fisheries Be Managed Sustainably?

The net effect of the UN Convention on the Law of the Sea (UNCLOS) has been that the rich resources of coastal waters—where some 90 percent of commercial fish are harvested—are now controlled by national governments, who may restrict or sell off fishing rights within these waters as they choose. This puts the responsibility to sustainably manage coastal fisheries squarely in the hands of coastal nations. Managing straddling stocks and safeguarding them from overfishing, however, requires the collaboration of all the relevant nations. Effective bilateral and multilateral agreements on how to manage shared fish stocks are still the exception rather than the rule and the regional fisheries bodies, which have historically dealt with management of shared stocks, frequently suffer from inadequate mandates, funding and staffing difficulties, and lack of political commitment by its members.

Although the conventional measures to control fishing pressure are useful, they do not eliminate the underlying cause that leads to overfishing: the innate desire to catch more and higher-valued fish before others do. The bottom line is that there are too many fishers trying to catch too few fish. Even if some were to give up fishing, those who remain can develop additional capacity by buying new vessels

or upgrading existing ones, and others who leave one fishery may simply move on to another one that is also depleted.

There is no question that the world's fisheries can be managed to produce a significant harvest of fish without depletion. But how large this harvest can be, and how fishing operations must be managed to produce this harvest sustainably is still a topic of much debate and experimentation in most parts of the world. Some exceptions do exist—some fisheries are being managed sustainably today, and these numbers are slowly growing. The ecosystem approach to fisheries management put forward by the FAO and supported by many countries provides the framework and principles needed to achieve the goal of sustainability in the fisheries sector. As mentioned above, it aims to reduce the impact of fishing activities on aquatic ecosystems and maintain the ecological relationships between the species being harvested and other inhabitants of the ecosystem, trying not to disturb the relative balance of species by overharvesting a given stock. Protecting the coastal and inland water environments from other human-induced threats, such as pollution and infrastructure development, is another key element of this approach.

Using an ecosystem approach also has a socioeconomic dimension. It starts from the assumption that fisheries management should not only sustain the fishery resource itself, but should contribute to the sustainable development of communities and nations, including food security and economic growth. It therefore realizes that managing fisheries must do more than just satisfy the commercial fishing industry, it must also accommodate the wide array of economic and social benefits that people derive from marine and freshwater ecosystems, such as recreation, livelihoods, cultural identity, and so on. The practical effect of this is that it widens the group of users who have a legitimate say in how fisheries should be managed. Setting up appropriate institutional structures and legal frameworks that will allow wider stakeholder participation in resource management is therefore essential for the successful implementation of more concrete management strategies.

Of course, translating the ecosystem approach into concrete management policies is not easy. There is no "one-size-fits-all" management approach suitable to all nations and fish stocks. However, there are a variety of strategies that, when combined, can clearly contribute to more sustainable fishing practices. These include such steps as:

- improving licensing and monitoring regimes;
- developing refined fishing gears that reduce damaging impacts and unintended catches;
- establishing marine protected areas that act as refuges for recovery of fish stocks;
- managing river basins as integrated units with water allocation schemes to sustain river flows and the natural ecosystem functions and processes;
- supporting better stock assessments that yield more accurate catch quotas;
- pursuing stricter enforcement of fishing regulations and tighter international cooperation to improve compliance with international fishing treaties;
- establishing new institutional arrangements that can adopt an integrated or ecosystem approach to resource management;
- creating national policies that incorporate fisheries into development and poverty reduction strategies; and
- putting in place economic policies that give fishers incentives to reduce fleet sizes and that reward responsible fishing practices.

All of these strategies are currently being applied in various nations and with various stocks, but the specifics and the level of coordination are what count. Finally, a sustained political commitment to reorient fisheries subsidies will also be needed to shift our current way of managing fisheries to a more holistic and ecosystem-based approach.