

A group of orcas swimming in the ocean. The water is a deep blue, and the orcas are dark with white underbellies. One orca in the foreground is breaching, creating a splash of white water. The background shows several other orcas swimming in a line.

PROTECTING LIFE IN THE SEA

Unrestrained impact of human activity is imposing fundamental, perhaps irreversible, changes on the world's oceans.



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Today, more than half the world's population lives with 40 miles of the coast, and this figure is expected to increase to 75 percent by mid-century.

The Problem

Oceans cover 71 percent of the earth's surface. They generate most of the oxygen in our atmosphere, detoxify and recycle much of our pollution, and absorb vast quantities of carbon dioxide, which is a major greenhouse gas. Oceans also play a vital role in other geochemical processes that regulate the world's climate and sustain life on earth.

The oceans and their resources are of fundamental importance to the global economy. Over half of the world's population lives within 40 miles of the coast, and this figure is expected to increase to 75 percent by mid-century. Coastal tourism and recreation generate an estimated £282 billion each year, accounting for more than 230 million jobs worldwide. In addition, tens of millions of people depend either directly or indirectly on fishing for their livelihood. The fish they catch contribute roughly 16 percent of the animal protein consumed in the world.

Despite the critical importance of the sea to human society and the health of our environment, the world's oceans are being managed as if there were no tomorrow. The growing and, in many regions, unrestrained human activity is imposing fundamental, perhaps irreversible, changes on the world's marine environment. Quite simply, the health of the oceans, once perceived as impervious to human intervention, is declining rapidly, with significant adverse consequences for both people and nature. Unless we stop that decline, the livelihood of hundreds of millions of people will be at risk, as will the quality of life of billions of people worldwide.

Collectively, overfishing, chemical and nutrient pollution, habitat destruction, exotic species, and global climate change imperil the rich biological diversity of our oceans.

The Causes

There are many causes of the deteriorating health of the world's oceans, including overfishing, chemical and nutrient pollution, habitat alteration, introduction of exotic species, and global climate change. Collectively, these threats imperil the rich biological diversity of life in the sea. However, the effect of destructive fishing practices overshadows them all.

Each year, global fishing fleets, now numbering over 1.3 million vessels, remove in excess of 85 million metric tons (188 billion pounds) of fish and invertebrates from the world's oceans. Many scientists believe that such a staggering amount is beyond the limits of what the marine environment can sustain. In addition, destructive fishing gear deployed by many vessels causes tremendous long-term damage to essential breeding, nursery and feeding habitat for fish and other marine life. Deep-sea bottom trawls, for example, are still used extensively throughout the world despite the havoc they wreak on the marine environment. Dragging nets the size of football fields that are weighted down by massive steel doors and often attached to heavy rollers weighing five tons or more, bottom trawls frequently crush everything in their path. This destroys the delicate structures of seamounts and deep-water corals that provide critical habitat for fish and other marine life.

Similarly, boats targeting swordfish, tuna and other species leave a deadly wake. Armed with monofilament lines up to 40 miles long that are baited with hundreds or even thousands of hooks, these fishing vessels indiscriminately strip life from the sea.





In addition to the species they seek, seabirds, sea turtles, sharks, whales and many undersize fish are caught and killed.

These ruinous fishing methods destroy habitat and add to the problem of overfishing by killing massive amounts of fish, invertebrates, birds and marine mammals that are inadvertently caught and thrown back, dead and dying, into the sea, a phenomenon referred to as bycatch.

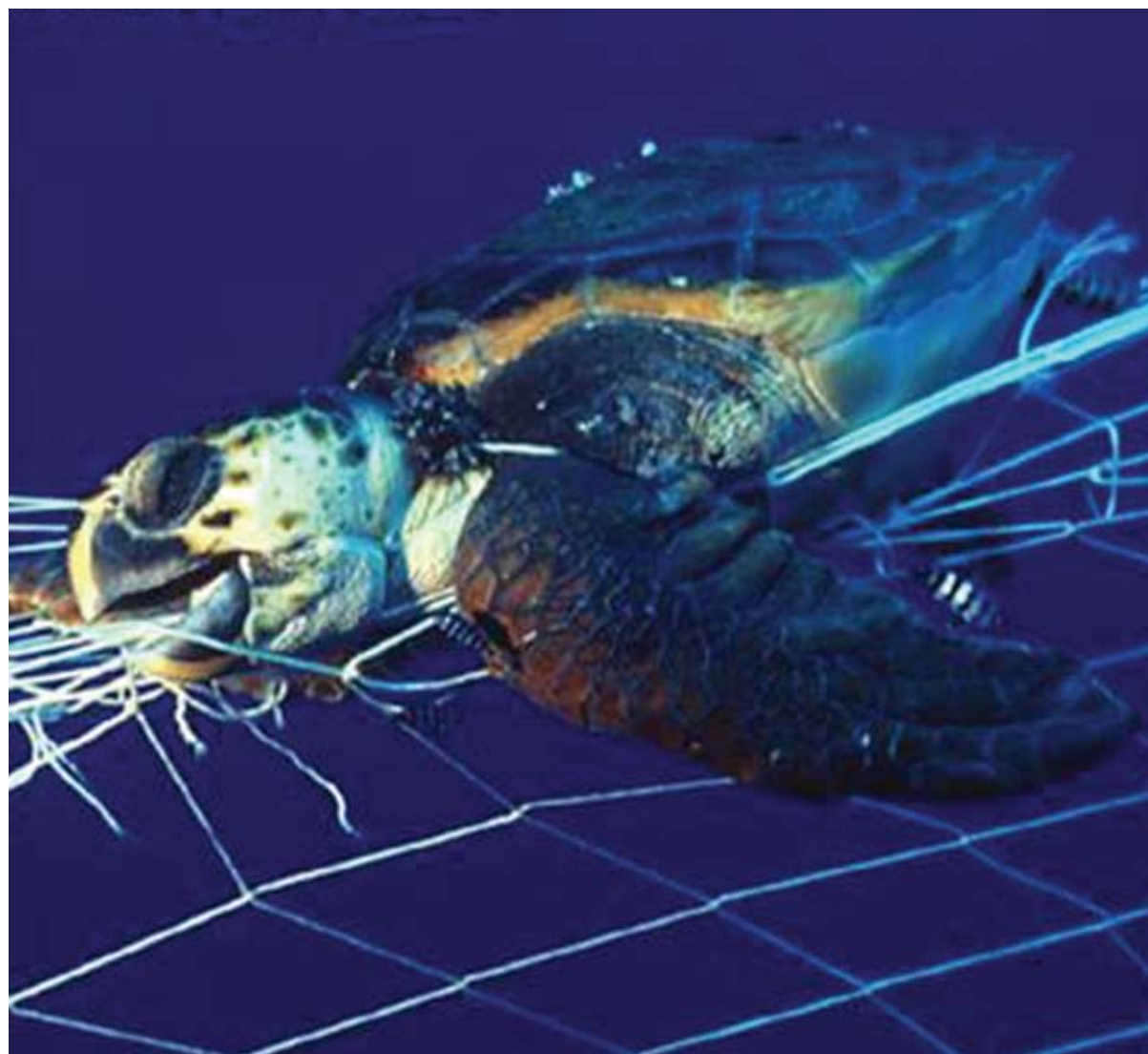
The overall impact of these practices on ocean life is staggering, and has grown steadily worse over the past 50 years. Increasing numbers of boats, using more sophisticated technology, chase an ever dwindling supply of fish. In many regions of the world, there is no effective management regime to impose limits on how many fish can be taken from the sea. And even regions with a skeletal management system lack adequate enforcement to ensure that regulations are actually implemented. This is particularly true for the world's high seas, that area outside the 200-mile limit from shore and the jurisdiction of any single country except for

loose regulation by the United Nations and international treaties. These waters, covering an area larger than all of the world's continents combined, exemplify the tragedy of the global commons: exploited by all, but protected by none.

Not surprisingly, the absence of effective management regimes to ensure that fish and other ocean resources are not overexploited has taken a huge toll on the world's fisheries. Of the nearly 600 species groups monitored by the United Nation's Food and Agricultural Organization, only 23 percent are not fully overexploited. Many fisheries scientists consider even this estimate to be optimistic. Recent studies suggest that 90 percent of the world's large fish have disappeared, that close to one-third of the world's commercial fisheries have collapsed, and that, unless current trends are reversed, all of the world's remaining commercial fisheries are likely to collapse by 2048.

The picture in the United States is similarly troubling. Only 14 percent of the fisheries under federal management are considered healthy. The other 86 percent are either subject to overfishing at unsustainably high levels or their status is "unknown." Even those fish populations deemed "healthy" are not managed in ways that take into account the needs of their broader ecosystems. Removal of these fish can have potentially negative impacts on other species within those systems.

Compared to damage to terrestrial systems, which is relatively visible and easy to portray to the public, the ongoing destruction of the oceans is far more difficult to communicate. Most of the marine environment is remote, inaccessible and largely beyond the scope of human sensory experience. As a result, the public is far less aware of the crisis affecting the world's oceans than of problems affecting land-based systems. Equally if not more troubling, most people are unaware of the importance of the sea to all life on Earth, the profoundly damaging impacts that human beings are having on the ocean environment, and the potential consequences to both people and nature if these problems continue to be ignored.



Sound ocean policy needs to be guided by good science. Bad policy often occurs when we ignore what the science tells us.

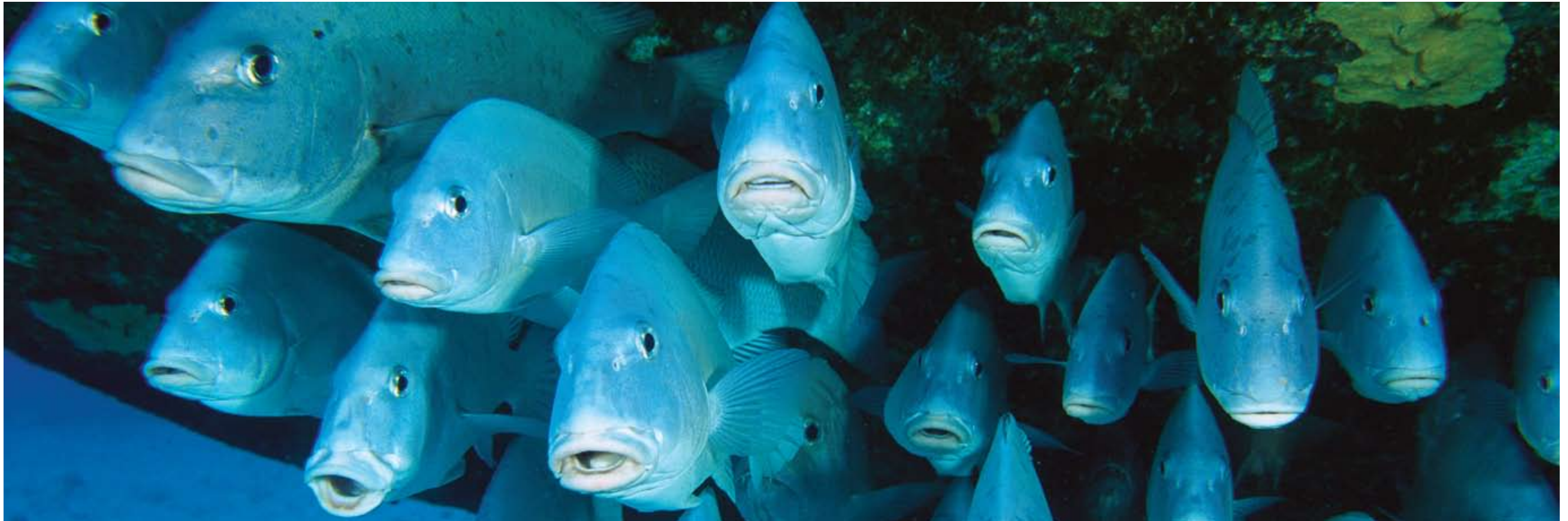
Focus

Recognizing the magnitude and seriousness of the crisis affecting the world's oceans, and the relative lack of attention being paid to the Earth's largest environmental system, Pew initiated a major effort, beginning in the early 1990s, both to increase public awareness about the causes and consequences of problems affecting the sea, and to promote solutions to these problems.

For more than 15 years, the oceans work of the Pew Environment Group has encompassed three categories of activity: scientific research, public education, and the promotion of strong conservation policies.

ADVANCING SCIENTIFIC RESEARCH AND UNDERSTANDING

Sound ocean policy needs to be guided by good science. Bad policy is often the result of decision makers ignoring what the science tells us, or erring in favor of economic considerations in the face of incomplete or inconclusive evidence of environmental impacts. To ensure that our work on oceans is firmly grounded in the most up-to-date and accurate scientific information, Pew sponsors applied research to inform the policy debate regarding how certain problems affecting the marine environment should be addressed and managed. These studies, conducted independently by scientists from universities and research institutions throughout the world, are subject to peer review and published in leading scientific journals. Their findings are then communicated to policymakers, resource management agencies and regulatory bodies to help enhance government decision making.



EDUCATING THE PUBLIC AND POLICYMAKERS

A great challenge for ocean conservation is that the overwhelming majority of the public have so little contact with the marine environment, and no way to visualize or experience changes that are taking place to living systems under the surface of the water. As a result, relatively few people have any real understanding of the causes, consequences and solutions to problems affecting the sea. In the absence of such understanding, it is difficult to engage the public in efforts to protect the world's oceans. To address this problem, the Pew Environment Group is involved in a long-term effort to build broader awareness among policymakers, the media and the public of the problems affecting the world's oceans, their consequences to human society and the steps that need to be taken to address them. This effort involves:

- encouraging greater attention to the marine environment by the media, including newspapers, television, radio and the internet;
- communicating continuously with editorial boards and

crafting and placing opinion columns in state, regional and national newspapers; and

- advertising and disseminating educational materials to specialized audiences.

PROMOTING POLICY SOLUTIONS

Many of the major decisions affecting the world's marine environment are made by government bodies. Recognizing this, the Pew Environment Group focuses primarily on encouraging the design of science-based ocean policies at the regional, national and international levels of government to safeguard the global marine environment and to promote the adoption and enforcement of these policies through targeted campaigns. Some of these campaigns we undertake alone, using our extensive team of policy experts and field personnel in the United States and internationally. Others involve coalitions comprised of multiple organizations that are linked together and staffed by a central team of professionals employed and managed by the Pew Environment Group.



For 15 years, the Pew Environment Group has played a leadership role in improving fisheries management and marine conservation in the United States.

Results

Over the past 15 years, the Pew Environment Group has built one of the largest and most influential ocean conservation programs in the world. We have played a leadership role in bringing about many of the improvements in fisheries management and marine conservation in the United States and, in recent years, have begun to expand our work to other regions of the world's oceans, including the high seas. We have helped secure passage of the strongest conservation measures ever enacted to protect U.S. marine fisheries. In addition, we have helped secure:

- the adoption of rebuilding plans for dozens of species of fish;
- a federal ban on shark finning in U.S. waters;
- judicial decisions to check destructive fishing practices in millions of square miles of federal waters;
- effective restrictions on bottom trawling in roughly 25 percent of the world's high seas;
- the first comprehensive assessment of U.S. marine policy since the late 1960s; and
- successful establishment of the world's largest marine reserve in the Northwestern Hawaiian Islands.

Pew has also sponsored much of the groundbreaking research published over the last decade in leading scientific journals such as *Science* and *Nature* that has shed new light on the crisis facing the global marine environment. These studies have vastly increased the level of attention paid to ocean issues by policy-makers, the media and the public.

Goals for 2008–2012

The Period Ahead

While other human activities can be significant or even pre-dominant in specific areas, large-scale commercial fishing continues to have the greatest detrimental impact on marine ecosystems worldwide. In light of this, the work of the Pew Environment Group over the five-year period beginning in 2008 will continue to focus heavily on problems of industrial-scale fishing, with a particular emphasis on overfishing, destruction of critical marine habitat, and the inadvertent killing and waste of large quantities of fish, seabirds, marine mammals, turtles and other marine life.

Specifically, we have set 10 goals:

1. END OVERFISHING IN THE UNITED STATES

Recent reforms of the nation's principal marine fisheries law, the Magnuson-Stevens Act, mandate an end to overfishing of marine fisheries and the rebuilding of depleted fish populations. Analysis from fisheries experts on the Pew staff indicate that most sanctioned overfishing of fish populations managed exclusively by the U.S. federal government can be eliminated as a matter of policy within five years.

The Pew Environment Group will mount comprehensive public education and advocacy campaigns in select regional fishery councils with the goal of ensuring that overfishing is ended in federally managed fisheries by 2012.

2. RESTRICT THE CATCH OF KEY U.S. FORAGE FISH TO LEVELS THAT ENSURE THE COMPLETE FUNCTIONING OF MARINE ECOSYSTEMS

Forage fish are mostly small, oily fish, such as menhaden and herring, that live in immense schools and are a staple in the diet of many larger fish, as well as seabirds and marine mammals. Unfortunately, conventional fisheries management does not take into account the critical role forage fish play in the marine



environment. As a result, species that are not considered depleted in the traditional sense may be caught in such large quantities that there is insufficient food left in the ocean for other marine wildlife that depend on them for survival.

The Pew Environment Group will develop management standards for forage fisheries and mount a series of campaigns to ensure that catch levels for select fisheries are set in ways that leave adequate food in the ocean for other fish, birds and marine mammals.

3. IMPROVE INTERNATIONAL GOVERNANCE OF HIGH SEAS FISHERIES

For many species in the world's oceans that are fished commercially, there is no management system whatsoever. Even in those areas that are under the jurisdiction of an international entity, many species fare poorly. In some instances this is due to weak regulations and agreements, while in others it is the result of lax



or non-existent enforcement. The result of this “tragedy of the commons” is the serial destruction of critical marine habitat containing unique species, along with the wholesale destruction of sharks, tunas, billfish, turtles and many other pelagic marine creatures that spend a portion of their life in international waters.

The Pew Environment Group will seek to establish a more unified and effective governance system for fishing on the high seas.

We anticipate that this effort will take a decade to complete.

The first five years will be devoted to securing agreements on rigorous and transparent enforcement regimes, with additional actions to conserve some of the world’s most imperiled pelagic species such as tunas, sharks and sea turtles.

4. CREATE A MINIMUM OF FOUR LARGE-SCALE MARINE RESERVES IN THE WORLD’S OCEANS

For well over a century, terrestrial parks have been viewed as a principal way to protect some of the world’s most treasured natural places. Today, there is an urgent need to create parks in



the sea where fishing and other forms of extractive activity that deplete marine life and alter the natural ocean environment are prohibited. Marine reserves are an important tool for protecting special places in the sea where unique species and important marine landscapes can be sheltered from direct human activity. In addition, they enable scientists to develop a better understanding of how marine ecosystems function when they are left relatively undisturbed.

Over the next five years, the Pew Environment Group will mount efforts to establish a minimum of four large-scale, fully-protected marine reserves in the South and Western Pacific and the Indian Ocean, as well as a number of smaller protected areas along the west coast of North America.

5. LESSEN THE DETRIMENTAL IMPACTS OF MARINE AQUACULTURE

More than 40 percent of the fish consumed in the world is farmed, and the aquaculture industry is growing rapidly.



Unbeknownst to most consumers, the farming of marine fish, particularly carnivorous fish like salmon, can be highly detrimental to the ocean environment. Among the environmental problems caused by farming marine fish are: localized pollution from large numbers of fish concentrated in small net pens; the spread of parasites and disease from farmed to wild fish; the potential weakening of native gene pools from the interbreeding of wild fish with farmed fish; and the need for three or more pounds of wild forage fish to make enough fish meal and oil to produce one pound of farmed fish such as salmon.

Over the next five years, the Pew Environment Group will work with scientific experts to develop a series of model standards for marine aquaculture, and will use those standards to encourage governments and the aquaculture industry to reduce the environmental impacts of farming marine fish.

6. PROTECT THE MARINE FOOD WEB IN ANTARCTICA

Antarctica harbors one of the most extreme, yet bountiful, environments on Earth, supporting vast populations of penguins, seals, whales, fish and seabirds that flourish in its frigid waters and icebound shores. These and dozens of other marine species are sustained by krill, small shrimp-like animals that are the basis of Antarctica's food chain. Until recently, Antarctica's krill were not heavily fished. In the last decade, however, a growing number of large factory trawlers have begun taking increasing quantities of krill from Antarctica's waters each year to be processed into fish oil and meal for the aquaculture industry, as well as for dietary supplements and cosmetics.

Leading a diverse coalition of organizations from 15 countries, the Pew Environment Group is promoting the adoption of a science-based management system that ensures sufficient krill for other Antarctic creatures.

7. INCREASE PROTECTIONS FOR WHALES

In 1986, when the International Whaling Commission (IWC) issued a moratorium on commercial whaling, the public breathed a sigh of relief, believing that whales had been saved from the relentless killing that had driven many species to the brink of extinction. Unfortunately, the moratorium did not put an end to the hunting of whales. Today, Japan and Norway continue to kill over 2,000 whales each year under loopholes in the moratorium. Moreover, many pro-whaling nations continue to work aggressively to repeal the moratorium and to introduce new mechanisms to increase whale hunting.

To prevent the killing of whales, the Pew Environment Group is engaged in a major effort to reverse the momentum of attempts by pro-whaling nations to weaken the international moratorium on whaling by promoting lasting reforms that will provide greater protection for whales in the world's oceans.

8. PROTECT SIGNIFICANT AREAS OF SENSITIVE OCEAN HABITAT FROM DESTRUCTIVE FISHING PRACTICES SUCH AS BOTTOM TRAWLING

Deep-sea bottom trawling is among the most destructive activities affecting the world's oceans. Consisting of nets the size of football fields that can reach down more than a mile beneath the ocean surface, and that are weighted down by massive steel doors that are often attached to heavy rollers, these trawls frequently crush everything in their path. Not only do they break up the delicate structure of seamounts and deep-water corals that provide critical habitat to countless species of fish and other marine life that inhabit the ocean floor, but they also contribute to the serial depletion of deep-sea fisheries.

The Pew Environment Group will work to secure permanent protections from destructive deep-sea trawling for sensitive bottom habitat within large areas of the world's high seas.





9. STRENGTHEN FISHERIES CONSERVATION IN THE EUROPEAN UNION

The European Union (EU) is the largest importer and exporter of fish products in the world. EU vessels catch about twice as much fish as those of the United States, and roughly 60 percent of that is taken from waters outside of the European Union. Fisheries management and regulations in the EU are guided by its Common Fisheries Policy, which was revised significantly in 2003. As of June 2007, however, about 80 percent of EU fish stocks were below safe biological limits, a number that has remained essentially unchanged since 2003.

To strengthen the management of fisheries in waters under EU jurisdiction, as well as in other areas of the world where EU vessels operate, the Pew Environment Group will launch a major effort to improve EU fisheries management focusing on: curbing illegal fishing and improving controls on the activities of EU Member States; constraining overfishing; promoting science-based decision making; and reducing excess capacity of EU fishing fleets.

10. SPONSOR APPLIED MARINE RESEARCH

Over the next five years, the Pew Environment Group will sponsor 30 to 50 major peer-reviewed research studies designed to better inform and guide the decisions of policymakers regarding management of the world's fisheries and other living marine resources. These studies will have two essential objectives: first, to identify the causes, consequences and solutions to problems facing the global marine environment; and second, to generate information and insights that can educate policymakers and resource managers in the design and implementation of effective conservation policies.



Partners

We work with many organizations to complement our efforts.

We do not work alone. We work with and look to numerous other organizations to complement our efforts and provide needed skills, services or entrée to particular people and places where we lack a presence or the specialized expertise needed to achieve specific objectives.

Our science-based work is conducted in association with leading universities and research institutions around the world, and through a major partnership with the Lenfest Foundation, for whom we manage a global program in applied marine science. Similarly, much of our marine policy work is undertaken with other conservation organizations that recognize, as we do, that multiple organizations working together can accomplish far more than any one group on its own. This is true both domestically and internationally, where ocean management bodies are often comprised of numerous countries that frequently respond best to their own local constituencies. As a result, the work of the Pew Environment Group is frequently done in coalition with other conservation organizations spread out over numerous countries and geographical regions.

Finally, much of our oceans work is supported by multiple donors, including individuals, philanthropies and other conservation organizations that share common goals and are interested in the potential for pooling their funds in pursuit of conservation outcomes that surpass the ability of any one organization to achieve. Many of our financial partners are attracted by the leverage opportunities that we typically offer, which enable them to obtain matches of up to \$3 for every \$1 they provide. With the exception of special programs that we manage on behalf of specific donors, and which carry their name, we do not request donor funds for any campaign or initiative that we are not prepared to make sizable investments in ourselves.

We must help people understand that if we take the future of our oceans for granted, they will not survive.

The Future

For most of human history, people have invested little thought or effort in protecting the world's oceans. Indeed, over the centuries, most people simply assumed that the oceans were so vast, and their resources so limitless, as to make them impervious to human activity. We now know this is not true. We are rapidly transforming and depleting life in the sea. It is not too late to reverse the course we are on. But unless we heed the warning signs and develop a fundamentally different relationship with the ocean, one based on sound science and a commitment to conservation, these resources will vanish.

Changes are occurring in the global marine environment at breakneck speed. They are the consequence of our rapidly accelerating ability to navigate the world's oceans and extract fish and other life from the sea, the Earth's burgeoning population and corresponding resource needs, and our seeming inability to perceive and value life as a continuum of responsibility in which each generation bears an obligation to protect the natural world for those who follow.

One of the greatest challenges of ocean conservation is to foster that perspective of continuity and responsibility. We must help people understand that we cannot simply take the future for granted. The oceans will not survive human indifference. Unless nations act now to maintain and protect the global marine environment, we will certainly transform it in ways that will fundamentally impair its ability to support life, not simply life in the sea, but our own as well.



The solutions are well within our grasp. We have the ability to lessen our impact on the sea and to manage our marine resources in ways that can restore much of the ocean's former bounty. Ultimately, the global community must be willing to consider the future in the decisions it makes about the present. We can no longer allow short-term economic interests to outweigh the long-term health of the world's oceans and the life they contain.

We stand at a crossroads with respect to our relationship with the sea. One way leads us further down the path we are now on, one in which we continue to plunder the world's oceans with little concern for their ability to reproduce what we remove.

That road is a short one, with a predictable and unfortunate end. The other road takes us in a very different direction, one that requires restraint and a disciplined and measured approach to balancing what we take from the sea with what it can sustain over time. That road is both long and productive. We have a choice to make, but the window of time in which we have that choice is closing. Our job is to ensure that the path we choose is the right one, both for people and the sea.



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Design

Ashton Design, Baltimore MD

Photography

Cover: Hiroya Minakuchi/Minden Pictures
Inside front cover: Jeffrey L. Rotman Photography
Page 1: Brandon Cole/www.brandoncole.com
Page 2: Emory Kristof/National Geographic Image Collection
Page 5: James P. Blair/National Geographic Image Collection
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