

Ocean Policies for the New Millennium

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by

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Humans long thought of the oceans' bounty as limitless, and of the oceans' capacity to absorb waste as infinite. We were wrong. Today, the oceans are in serious trouble, and that trouble is mostly traceable to human abuse.

In a nutshell, we have been taking far too many good things out of the ocean, and we have been putting too many bad things into it.

This sorry state of affairs has elicited little attention from the general public because it is hidden from view. As the rock group, America, sang in *A Horse with No Name*, "The ocean is a desert with its life underground, and the perfect disguise above." Aside from my good friend, Sylvia Earle, few of us spend much of our time submerged where all the action is.

As a result, we tend not to know what's going on in the coastal areas and reefs, much less in the deep ocean. And we thus tend not to appreciate the central role that healthy oceans play in human wellbeing.

Some oceanic benefits are obvious, and even appear in national income accounts. Worldwide, humans obtain 16 percent of their animal protein from fish, and the vast majority of the commercial catch is from the ocean. Nearly one billion people, mostly in Asia, get most of their animal protein from fish. More than half of all world trade travels by ship. One fourth of all oil and gas production now comes from ocean deposits.

But the greatest benefits are ignored by those who calculate GDP.

Robert Costanza and his colleagues estimate that the seas supply ecological goods and services worth some \$21 trillion per year.² Their refereed study was published in *Nature*, and immediately became the core of a fierce academic debate over how to calculate the actual number. However, there is universal agreement that the number is *gigantic*.

¹ These remarks represent the witness's personal views and are not necessarily the position of the Bullitt Foundation. In particular, the Bullitt Foundation takes no stand with regard to any proposed legislation.

² Robert Costanza et al., "The Value of the World's Ecosystem Services and Natural Capital," *Nature*, 15 May 1997.

What do I mean by ecological goods and services? The ordinary functioning of nature that keeps the planet habitable. Evaporation, which purifies water and replenishes the hydrological cycle. The vast currents that moderate and distribute heat around the planet. Reefs that protect the shorelines where so much of the human population is concentrated. Photosynthesis, which converts solar energy to food that forms the foundation of the great oceanic pyramid of life – a far greater variety of animal phyla than inhabit all the Earth's lands. (Thirty-two out of the 33 animal phyla are found in marine habitats – only insects are missing. Fifteen of these are exclusively marine phyla, and five more are predominantly marine.)

Indeed, for three billion years, *all* life on Earth was marine. Like other terrestrial critters, we humans still carry the sea with us. Our tears, our sweat, and our blood recapitulate our salty origins.

In January, 1998, 1600 marine scientists, fishery biologists, and oceanographers authored a joint statement that the ocean was in trouble and that the most pressing threats were caused by human activity. We have overexploited native species and introduced alien species. We have degraded habitat and poured rivers of pollutants off the land. We are changing the climate in ways that could fundamentally alter ocean conditions for the worse, in ways that may be irreversible on any time scale of relevance to humans.

This Commission is addressing issues of enormous importance and great urgency. Because the oceans are an interconnected global commons, many of the problems are far beyond your capacity for direct influence. The United States cannot govern the ocean dumping of nuclear waste by Russia or the use of cyanide in the South Pacific. The United States is unlikely to install sewage treatment facilities in South America or limit the use of the destructive bottom trawling of 4500-year-old cold water corals off the coasts of Scotland, Ireland, and Norway (although Norway has already lost more than half its coral.)

Your influence will be closer to home. The United States is no paragon in the realm of ocean policy. But it should be. At a minimum, our global role should be leadership through example, as we did with our quick ratification of the U.N. Fish Stocks Agreement.

Other speakers today and tomorrow will address specific issues relating to the Pacific Northwest, such as the complex threats to salmon and orcas, and the need for a dedicated rescue tug in Puget Sound. I am going to speak more broadly, of issues with regional implications but that are global in scope.

Let's Get Serious About Saving Wild Marine Fauna. The oceans have seen an appalling global disappearance of whales, manatees, monk seals, sea turtles, swordfish, giant sturgeon, sharks, and other creatures at or near the tops of their food chains. When coupled with our removal of whole lower layers of food chains, this has been a principal driver of most current marine ecosystem collapses.³ Sorting through the data in the wake of the recent global fish catch reporting scandals involving China and some other significant marine nations, it appears clear that a majority of the world's most important commercial fisheries are now in serious decline.

- Congress should pass and the President should sign the Fisheries Recovery act, HR 2570. It would, among other things, make important improvements by prohibiting overfishing with a precautionary approach to fishery management, reducing bycatch, protecting habitat, and assuring adequate observers on fishing boats.

Stop "Clearcutting" the Ocean Floor. Bottom trawling in complex habitats is comparable in its effects to clear cutting an ancient forest.⁴ It utterly destroys a complex, stable ecosystem. There are, however, two differences. First, bottom trawling is invisible to anyone who is not hundreds of yards under the surface of the ocean, so there are no protestors sitting in trees or chaining themselves to bulldozers. Second, the scope of bottom trawling is vastly greater than that of clear cutting. Each year, trawling disrupts 150 times as much land area as is clear-cut annually.⁵ Advances in fishing technology (rockhopper gear, global positioning systems, fish finders) have essentially eliminated what were once de facto refuges from trawling.

- Congress should pass and the President should sign the Ocean Habitat Protection Act, HR 4003, which would ban the largest roller and rockhopper trawls. Bottom trawls without rollers or rockhoppers cannot be used on the rough ocean bottoms and reefs that we wish to protect because fishers don't want to rip their nets. The Ocean Habitat Protection Act would limit rollers and rockhoppers to 8-inches in diameter in all U.S. federal waters, a size that has been shown to protect the coral and sponges that are typically reduced to rubble by current technologies.

³Jeremy B. C. Jackson, et al. "Historical Overfishing and the Recent Collapse of Coastal Ecosystems," *Science*, 27 July 2001. To take one dramatic example, Jeremy Jackson argues on the basis of paleoecological evidence that before Columbus the sea turtle population in the Caribbean outweighed the biomass of all large animals in East Africa. Those turtle populations today are on the brink of extinction.

⁴Midwater trawling removes target populations and bycatch, but it causes no lasting habitat disturbance. However, most trawling (and all dredging, when heavy chain-rigged or hydraulic suction devices are used) occurs on the seabed, where the destruction can be enormous. Bottom trawling, obviously, is used for populations that live there, such as Atlantic cod, shrimps, and scallops.

⁵Les Watling and Elliott Norse, *Disturbance of the Seabed by Mobile Fishing Gear: A Comparison with Forest Clear-Cutting*

The Sea Needs Wilderness Areas, Too. Submerged lands under U.S. jurisdiction occupy more than 4.4 million square miles – much more than the nation’s land area. From Maine to Guam, from Alaska to Puerto Rico, these regions encompass far more marine diversity than any other nation. Although America led the world in the development of terrestrial parks and protected areas, we have lagged badly in the marine world. President Clinton’s Executive Order two years ago establishing a network of Marine Protected Areas is a small step in the right direction. But, lacking Congressional support and funding, it is more a signpost than a path.

- Let me add my voice to the environmental chorus calling for new legislation creating a system of marine reserves that fully protect rich samples of all the major ecosystems in the nation’s biogeographic regions. The reserves must be of sufficient size to be biologically tenable, and allow the recovery and permanent protection of broad swaths of biological diversity, providing refuge for species throughout their life cycles. We are lagging behind some other parts of the world in this field – notably Oceania – to our disadvantage. Such reserves provide unique opportunities for research, and many of them will yield surplus populations of commercial species which will migrate to surrounding areas to be caught.⁶ But their principle purpose, just as with terrestrial wilderness areas, is to exist because humans – with our awesome powers – also have a stewardship mission that is recognized in every major religion and every significant code of ethics.

Enforce the Clean Water Act. For 30 years, whenever there was a serious environmental crisis, America has had a simple solution – send Bill Ruckelshaus back to the EPA. But Bill has now settled very nicely into Seattle, and we need to work on some institutional solutions that will outlive him.

The landmark Clean Water Act was passed in 1972. Everyone knew that these difficult problems would not be cured overnight. But the law will enjoy its 30th birthday this year, and it is long past time to get serious about enforcing some of the hard parts.

- Non-point sources are admittedly difficult to control, but we barely even pretend to try. A vast flood of fertilizer, feed-lot run-off, pesticides, and industrial pollutants courses down the Mississippi every day from a drainage basin that touches nearly every state from the Rockies to the Appalachians. It has created a “dead zone” in the Gulf of Mexico that, at its normal summer peak, is about the size of New Jersey. Lacking oxygen, any organism in this zone must flee or die. If a 8,006-square-mile “dead zone” had popped up in the middle of Illinois last summer, it would have been fixed in a year. We need a similar level of stewardship in the seas. An important first step will be buffer zones along every stream in the region. We’ve just enacted the largest farm bill in history, and most of its richest benefits adhere to the midwestern

⁶ Because current commercial fishing practices routinely decimate populations before they reach their peak breeding years, marine reserves could become an enormously important source of commercial fish.

agribusiness interests behind this problem. It is not too much to ask in return that they farm responsibly. Although the Gulf is the worst case, it is far from unique. According to Don Scavia, director of NOAA's Coastal Ocean Program, more than half of all estuaries in the country experience some oxygen depletion during the summer, and a third experience a complete loss of oxygen.⁷

- All the uncontrolled run-off isn't coming from agriculture. Urban run-off is also difficult to control, because of its intensely episodic nature, but 30 years is ample time for our major cities to have begun removing oil, heavy metals, pharmaceuticals, hormones, and other biologically disruptive substances from their stormwater before discharging it into the environment.
- Approximately three dozen sewage treatment facilities are still granted 301(h) waivers that permit them to dump partially treated sewage in the ocean. The 301(h) waivers should be abolished and these facilities should be brought into compliance within three years. This would increase our leverage with other nations, including our neighbor to the north, which dumps huge volumes of untreated sewage into the Salish Sea.

Halt Abusive Operations on Fish Farms. Aquaculture yielded some of the most impressive economic growth in the 1990s – and in the 1990s, that was really saying something. From the mid-1980s to 2000, global aquaculture grew from 7 million metric tons to 36 million metric tons. This is no longer an infant industry that needs nurturing and protection. Fish farms now produce about 40 percent as much tonnage as all commercial fishing vessels. It is long past time to shine a public policy spotlight on fish farms, and to demand treatment of their massive untreated sewage and contain their escapement.

Although most international attention has focused on the destruction of fragile, exotic ecosystems, e.g. Asian mangrove forests to produce ever more shrimp for export, salmon farming in this region is one of the fastest-growing sectors of the industry. For example, although there are currently only 88 open net cages in BC waters, the proposed lifting of the moratorium on new installations will lead to hundreds of new fish farms between Vancouver Island and southeast Alaska over the next few years. The combination of escaping exotic Atlantic Salmon, and the introduction of diseases into pristine waters, will have a proven detrimental effect on wild Pacific Salmon stocks. The environmental implications are profound and underscore the need for international cooperation in marine stewardship.

Begin Reversing the Processes of Climate Change. Some of you will feel this political hot potato is best avoided. But addressing ocean issues while ignoring climate change is like discussing urban design without mentioning the automobile. You will be ignoring something that will dwarf and subsume the other factors you choose to address.

⁷Carol Kaesuk Yoon, "A 'Dead Zone' Grows in the Gulf of Mexico," *New York Times*, 1998

Why is climate change of special relevance to the oceans? Let me count the ways.

- With their huge volume, density, and fluid mixing, the oceans act as a thermal governor for the planet's climate. The oceans store about 1,000 times more heat than does the atmosphere. If there were not these huge, slow, oceanic thermal processes, climate change would occur much more quickly – and it would also be vastly easier to reverse.
- At some point – we don't know how soon – global warming will shut down the North Atlantic Current. Historically, this shut down has taken about ten years to accomplish, and millennia to reverse. The North Atlantic Current, with the flow of a hundred Amazon Rivers, is a conveyor belt carrying heat from the tropics that makes Europe habitable. When it stops, much of Europe is covered with a thick sheet of ice. (I should add parenthetically that most people think of climate change as a slow process of gradual incrementalism. Historically, however, most climate change has consisted of abrupt transitions as conditions pass key thresholds. A small example from earlier this year: the Larson B ice shelf in Antarctica – a 600-foot-thick block of ice the size of Rhode Island – totally collapsed into a sea of icebergs in just 31 days. The ice shelf was 12,000 years old. No one had anticipated its overnight collapse.)
- Methane hydrates are tiny, crystalline cages of ice containing methane molecules. They are found over much of the deep ocean floor. Methane hydrates contain twice as much carbon as all the coal, oil, and conventional natural gas on earth, combined. At some point, if the temperatures in the deep ocean rise, these hydrates will begin to melt, which in turn will release vast quantities of methane, dramatically increasing the rate and scale of climate change. Once again, we have no idea when the tipping point will be reached.
- At some point – the International Panel on Climate Change estimates it could happen within 80 years – the world's oceans will have risen by one meter. At that level, we lose much of New York City, and Florida, and coastal Louisiana, including New Orleans. Much of the Netherlands and Bangladesh and the rice-producing river deltas of East Asia and whole Pacific Island nations will disappear.

I could go on and on, from coral bleaching to more intense tropical hurricanes, from changing rainfall patterns to the collapse of the (comparatively unstable) West Antarctic Ice Sheet, which would cause the world's oceans to rise by as much as 20 feet. Here in the Northwest, changes in winter snowpack are likely to have traumatic impacts on the rates and quantities of freshwater flows to coastal water, and potentially disastrous consequences for Pacific salmon stocks.

The future of the world's oceans is intimately bound up in the future of the world's climate.

We have to change direction. And as the consumer, last year, of 43 percent of the world's gasoline, America has a special responsibility.

There are myriad ways to get started. Apparently President Bush feels about Kyoto the way the Pope feels about women priests – we might be going there eventually, but not on his watch. So let's go somewhere else.

There is no nation on earth better positioned than the United States to capitalize on a shift away from fossil fuels. Oil production peaked out here in 1970! We have the scientific excellence, entrepreneurial talent, and capital markets to capture a huge global market in solar photovoltaics & photoelectrochemistry, hydrogen fuel cells, Stirling engines, super-capacitors, hydrogen storage and transport, and the other elements of an energy revolution.

This Commission has a responsibility to make clear that the President must do more than “read the bureaucrats' reports” about climate change. One hundred years from now, historians will focus vastly more attention on how the United States responded to climate change than how it responded to some twisted, two-bit terrorists. To date, in Democratic and Republican Administrations alike, America has flunked the climate test, and – among other things – that is placing the world's oceans at enormous peril.