Remarks to the Ocean Commission.

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I will touch on some main themes of ocean management as they apply to the living ocean, but will focus mostly on fishing.

All management of human activities pertaining to the ocean must ask: "How will this affect the great storehouse of life in the sea?" The world ocean contains most of the living habitat on Earth, and harbors most of Earth's biological diversity.

Yet in the last decade we have come to recognize that life in the oceans has been in decline for many years, that these declines are human in origin and result both directly and indirectly from our activities, and that millions of people are suffering the effects of declining life in the sea. It is also apparent that at least some of these problems are reversible, and in the few cases where the problems have been seriously addressed, the majority have shown improvements, sometimes dramatic.

Oceans connect the human world because their waters touch all shores. Jst as economic and political isolationism cannot work for us, because no country is an island, ecological isolationism is likewise doomed to fail. While many solutions are possible within the confines of one watershed or one nation, thinking about the ocean must be done in a global context, recognizing the fluidity of water.

Underlying all ecological problems and all world tension is the fact that human population pressure is causing increasing competition for the most basic resources of land, water, food, and dignity, and therefore exacerbates each problem we face, from the purely ecological to the purely ideological.

Management of human activities pertaining to the ocean must account for at least the following four factors: The land-sea connection, the air-sea connection, transport in water, and‹foremost‹direct exploitation.

The land-sea connection is predicated mostly on gravity and the simple fact that water flows downhill to the sea. In doing so, water connects the ocean to the effects of human activities far inland. Silt runoff from bad logging, particularly clear-cutting, harms our fish and has proven particularly devastating to salmon and to coral reefs. The downhill flow of water also connects the sea to bad agriculture, which has 3 principle dangers: more silt, pesticide runoff, and the polluting effects of over-fertilization from excessive fertilizer use and unchecked farm-animal sewage. Two of the many examples of these problems are the spreading dead-zone in the Gulf of Mexico that is the direct result of heartland farming via the Mississippi River, and the problems of North Carolina's coastal

sounds, which appear related to the awful mess caused by the explosion of pig farming there. Human sewage is of course a major source of pollution in many areas, and it appears to be a major stressor of coral reefs in areas of dense human population.

The air-sea connection takes three main forms: Transport and deposition of pollutants, changes in atmospheric chemistry, and warming. Plagues now killing certain Caribbean corals have recently been shown to have their origins in the deposition of fungal spores carried aloft in dust from the increasingly desertified region of sub-Saharan Africa and deposited on the western side of the Atlantic. Increased ultraviolet radiation from ozone destruction is, among other things, killing plankton at the base of the food chain, significantly reducing the productivity of the Southern Ocean. Warming is doing everything from melting ice caps to killing coral reefs to causing major declines in productivity of certain temperate and sub-arctic areas such as the eastern north Pacific. For the above reasons, anyone managing oceans must work to manage activities on land as well.

Of course, many of the problems we cause in the sea originate in waterborne activities such as oil drilling, shipping, and fishing. While oil is relatively less a problem than many people think, it is clear that this country and the world must break our oil addiction and that any energy strategy focused mainly on oil is a fossil in itself. Quite simply, we need new and diverse sources of energy, and this country should be leading in their research, development, and marketing.

Shipping unintendedly moves thousands of species around the world in ship ballast, and this has brought disastrous introductions of plants and animals here and worldwide, most infamously in the U.S. the zebra mussel. Ways must be found to sterilize ballast water. Coastal habitats worldwide are under siege, and the United States must re-energize its commitment to restoring and preserving our coastal wetlands. The policy of "no net loss" inevitably results in loss, because wetland creation as a mitigation strategy is rarely, if ever, successfully or even seriously attempted.

This brings us to seafood production, which is widely regarded as the most profound way that human activities have changed the ocean. Fishing has one main goal: to kill fish in large numbers. Fishing is very good at what it does. Fishery management has two goals: to develop fishing and to maximize the yield over the long term by limiting the catch to sustainable levels. Fishery management is very bad at what it does. Its failures are causing ecological disruption, social dislocation, and the losses of many billions of dollars in economic value.

Fishing has three main problems: overfishing, unintended catch, and habitat degradation. Overfishing is evident everywhere in the world, and has done more to change the living communities of the sea, and the ability of the ocean to support people, than any other factor. In the U.S., nearly half our commercially important species are overfished, and these include some of the most important and familiar ones: cod, several flounders, most groupers, swordfish, sharks, marlin, several tunas, several snappers, abalones, and so on. What the early commercial ventures did to whales and sea turtles‹chasing them

relentlessly, farther and farther afield, depleting or exterminating populations, in what Herman Melville famously called “so remorseless a havoc”‹represents a mind-set that is still reflected in some fishing operations. Some people who claim to represent the fishing industry continue to say that the problems are imagined or inflated. But the numbers‹the growing federal list of overfished species, the millions spent on federal bailouts, the boats now idled in communities that had relied on fishing for centuries‹speak for themselves. Additionally to the direct overkill is an enormous unintended, unwanted, and discarded catch totaling a third of everything caught in the sea. This by-kill ranges from billions of juvenile fishes that would otherwise support commercial fisheries, to highly endangered seabirds and marine mammals.

Additional to creatures caught is the damage fishing does to habitat. Half of all sea life caught is taken with nets dragged along the bottom. These bottom trawls scour, break up, disturb, and flatten the sea floor and its living communities, thus degrading the fish habitat as they work, making the sea less able to produce the desired fish. An analogy would be harvesting corn with bulldozers, taking some of the topsoil with them. In other countries, destruction of habitat during fishing is sometimes even more blatant, and includes the use of explosives and the very widespread use of cyanide poison to stun fish across an enormous area of the Indo-Pacific. These activities are tremendously damaging to corals, causing major reef damage.

Related to the failures of fishery management and population policy is the rise of fish farming or aquaculture. In saltwater, where virtually everything grown (i.e. fishes and shrimps) is carnivorous, aquaculture often yields a net loss of edible fish, because more pounds of fish must be caught from the ocean for use as feed than is actually raised in the fish farm. Further, fish farming is a major cause of coastal habitat loss. This habitat effect is less true in the U.S. than in many other countries, but the U.S. market is a major driver of aquaculture elsewhere. (Exceptions to the preceding problems include certain kinds of growing operations for certain kinds of shellfish.) Aquaculture often causes the movement of alien species and diseases, and degrades water quality. And even when farmed seafood is a major fraction of the trade, for example for salmon or shrimps, where almost half the products in trade are farmed, there is no less pressure on wild populations; fishing for wild salmon and shrimp is as intensive as ever. In fact, farmed salmon pose major threats to the viability of wild salmon populations, particularly through disease.

Solutions

Fishery management has an inherent major flaw: the conflict between the archaic mission of trying to increase the number of fish caught, and the modern need to limit fishing and rebuild depleted populations. Fishery management must stop viewing fish as mere commodities, as though fish were just an inventory in a warehouse‹like brown shoes‹and must approach its task with full recognition that fish are wild animals and that fishery management must be wildlife management, or it fails. In U.S. marine waters, a comprehensive management framework exists in the form of the fishery management councils. However, the mandate and makeup of these councils must be changed. A quarter century of mostly failure proves what everyone knows about human nature on land: It is simply unrealistic to expect people to police themselves and their friends.

Fishing limits‹how many fish of what sizes can be caught‹should be determined by scientists and wildlife managers representing long-term societal interests. Fishery management councils must be required, in practice not just in law, to rebuild fish and to avoid overfishing, and there must be attention-getting penalties built into the system if they fail to meet these mandates. People who fish or represent fishing interests and who sit on the councils must represent a broad spectrum of users. They should debate and decide who gets to catch the allotted fish, but not how many fish will be allotted overall. The short-term personal financial interests of users and extractors cannot be allowed to guide how many fish are caught; it doesn't work.

Perhaps the most important, most manageable change in ocean governance would be to re-orient fishery management from a principle focus on extraction to one of rebuilding and stewardship. While fishery management has mainly failed, its few spectacular successes are very instructive. When fishery managers have focused on the main goal of allowing a depleted species to recover, we have indeed seen recovery in such important species as striped bass, redfish, summer flounder, and weakfish. Those examples show that success can come simply; when you kill fish slower than they reproduce, they can often recover and repopulate within a decade. All fishery management should be oriented primarily to allowing fish the opportunity to breed before they are caught.
Fishing is now managed by the Department of Commerce. No person will ever be named Secretary of Commerce for their expertise in managing living resources for sustainable yield. The Fisheries Service has been in the wrong agency since President Nixon put it there, and its years of greatest failure are the same years it has been in Commerce. Fishery management must be moved to the Department of Interior, whose mandate, culture, experience, and expertise center mainly around managing wild living resources for sustainable use‹which is what fishery management is supposed to be all about.
The fishing industry receives perverse subsidies that encourage overfishing and distort market economics. These perverse subsidies should be removed. If any subsidies are directed to the fishing industry, they should instead be applied to learning how to fish more sustainably. We need incentives that help scientists and fishers work better together and better understand and trust one another. And we need financial incentives for developing fishing gear that better selects the intended catch and minimizes bycatch. Where bycatch solutions are known, such as how to keep albatrosses off longlines, these should be mandated in the U.S. (as are devices that keep turtles out of shrimp nets), and trade incentives should be applied to foster their use elsewhere and to keep American fishers on equal footing in the global community.

Fish farming or aquaculture is growing rapidly. But U.S. waterways are already fully utilized by public and private interests and activities. They are not the places for a new homesteading mentality in the form of expanding aquaculture. If fish farming is to produce benefits‹and it can‹then it must be encouraged to do several things that are already proving feasible. It must not destroy or occupy any more habitat in productive natural waterways already used and relied upon by other people and by wildlife. It should be encouraged to mesh with on-land agricultural systems (in at least one existing system, the agriculture produces a vegetable crop that is also used as the food for vegetarian fish, and the offal from those fish also raises shrimp‹three crops from one

system, with no waste). Whenever possible, fish farms should be sited indoors where escapes and water quality can be better controlled.

The well-established concept of zoning must be moved off the land and into the sea. We need to zone an array of uses and use intensities, to minimize conflicts, encourage solutions, provide people with a more secure sense of what to expect, and help foster recovery and replenishment. We need to establish zones for bottom trawling and trawl-free zones. We need to establish zones for fixed-gear fishing using traps and set nets, zones for hook-and-line fishing, and zones where sea creatures are simply left alone to live and breed and repopulate and send their progeny forth. We have long recognized the need to have different areas zoned for different activities on land, and it is time to move this concept underwater.

Finally, management should also serve the demand side. Demand drives extraction, and the public increasingly wants information about seafood. The strongest public expression of interest in the way seafood is produced has resulted in the "dolphin safe" policy, requiring that all tuna sold in the U.S. conform to a federal definition of "dolphin safe." Nutrition labeling on most food has been enormously beneficial. Currently, it is almost impossible for interested consumers to learn where their seafood comes from. Fish are often given commercial trade names that differ from their real names, and even sellers are often unsure where their product is from and how it was produced. I believe the public would like to see labeling on seafood indicating how it was caught or raised, and its country of origin.

Most people's most direct interaction with the sea is through the seafood they eat. Fishing has done more to change the sea than anything else, and ocean management should first and foremost seek to solve the problem of depletion and bring about recovery. But no ocean is an island, and management of the air and the land, and our place in the international community, must all be part of a comprehensive approach to the ocean.

Thank you for the opportunity to share these thoughts.