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Contact: Jessica Brown, #202-497-8375



National Ocean Commissioners and Leading Scientists Call for Overhaul of Ocean Policies and Management

Ocean Recovery Requires "Holistic" Ecosystem-based Approach say Experts

At a AAAS press conference in Seattle on February 14th, at 12:00 noon PT, leaders from both the U.S. Commission on Ocean Policy and the Pew Oceans Commission will come together for the first time to discuss their findings on our nation's oceans. The Pew Ocean Commission released its report last June. Now, the long-awaited draft report from the U.S. Commission is slated for release to state governors for their review in early March. Both reports call for major changes in the governance of U.S. oceans and coastal resources. Ocean policies and laws in the U.S. have not been comprehensively reviewed for over 30 years and now lag dangerously behind our scientific understanding of what we need to do to address the present crises in our seas.

“For a long time, we have been asleep at the wheel,” says Boris Worm, a marine ecologist from Dalhousie University who coauthored the 2003 *Nature* paper showing that only 10% of large predatory fish are left in the global ocean. “Oceanographers have mostly studied ecosystems minus the fish. Fishery scientists have mostly studied fish minus the ecosystems. Society has not thought much at all of fish, or ocean ecosystems, except as a commodity. This is changing and changing rapidly. We now understand how we have been altering the ocean on a global scale, how our own well-being is linked to this largest system on earth, and what we need to do to protect and restore its health.”

National Ocean Commissioners **William Ruckelshaus** and **Andrew Rosenberg** will be joined by **Leon Panetta**, Chairman of the Pew Oceans Commission, and marine ecologist **Boris Worm** to highlight the need for reform of U.S. federal and state ocean policies in order to protect and restore ocean life and preserve the ecological, economic and social benefits the oceans provide. The commissioners and scientists will provide a vision of how to implement policies that reverse destructive changes to the oceans and restore the richness and resilience of our seas. Reports from these two commissions are the first “top to bottom” review of our ocean policy since the Stratton Commission's report to Congress in 1969.

“It is our responsibility to now bring U.S. ocean management into the 21st century,” says Leon Panetta, Chairman of the Pew Ocean Commission and former White House chief of staff. “We are calling for policy makers to update this country's laws and policies to reflect our new understanding and the new research and scientific evidence that show we are squandering the

ocean's richness through neglect and mismanagement. While allocating dollars to further our understanding of Mars is admirable, we should first be allocating dollars to protect life on this planet. The oceans are crucial to our own lives.”

Presently in the U.S., over 10 federal agencies and 28 coastal states and territories have jurisdiction over the oceans. Historically ocean management decisions have focused on species of commercial interest such as salmon, cod or tuna. Fundamental to transforming ocean policy and restoring ocean health is shifting from single-species management and fragmented governance to an integrated approach called ecosystem-based management.

“Ecosystem-based management means taking a holistic approach to the care of the oceans,” said Jane Lubchenco, a marine ecologist, Pew Ocean Commissioner and former president of AAAS. “In the same way that a physician considers the whole person, including medical history and current medications, in prescribing a cure for a specific ailment, ocean managers must learn to think about the interconnectedness of an ecosystem. Just as the heart is connected to the lungs and brain, so too are different species connected within an ecosystem. When managers try to address the problems that face a single species they must examine how it interacts with other living and non-living portions of the system and consider the implications of management decisions —to the entire ocean ecosystem.” The current practice of managing with a focus on a single species can undermine the very ecosystem upon which that species and many others depend.

Ecosystem-based management uses ecology to evaluate how policy decisions and actions interact across species, habitats, land and sea, and from one type of human activity to another. Although this approach may sound logical and obvious, implementing it has proven elusive.

In the Pacific Northwest, salmon have suffered because of piecemeal management. Conservation of salmon species requires an understanding of the ecosystems and resources they share with many other living things, including humans. Historically, decisions about fisheries, pollution, endangered species, mining, oil extraction and coastal development have been made independently of one another. Likewise, a maze of political and legal boundaries has made it difficult to ensure that the entire life cycles of these fish are protected. Ecosystem-based management provides a new framework to take a step back and comprehensively consider the multiple factors affecting a system.

“At first look ecosystem-based management may seem enormously complicated but it actually provides a means of simplifying management in some significant ways,” says Andrew Rosenberg, Dean of Science at the University of New Hampshire, a Federal Ocean Commissioner and former Deputy Director of the National Marine Fisheries Service (NMFS). “Considering interactions between activities up front can reduce the conflicts between management actions and negative effects that inevitably arise when activities are considered one by one in isolation.”

“Our government is not currently structured to do this,” said Federal Ocean Commissioner William Ruckelshaus. “Thus, one of the first orders of business according to the Federal Commission would be to create a National Ocean Council to assist states and local governments

to develop regional councils along ecosystem lines.” At the press conference, Ruckelshaus, who also chairs Washington State’s Pacific Salmon Recovery Funding Board, will provide perspectives on enlightened governance and the challenges of incorporating science into policy-making. He will also explain how taking an ecosystem-based approach could help save the remaining salmon species in the Pacific Northwest. “A healthy ecosystem has healthy fish stocks,” says Ruckelshaus. “When the ecosystem can no longer support spawning salmon, the effect on the fish is obvious—but no less real are the effects on the economics of commercial and sport fishing.”

Manage for Long-Term Gains from Diversity Not for Short-Term Yields from a Few Stocks

Historically, fisheries management has focused on trying to maintain maximum sustainable yields of commercially targeted species. This involves using models to adjust catches and attempting to keep populations near 50% of their estimated “unfished” levels. Ecosystem-based management recognizes that there is a great deal of uncertainty in predicting natural fluctuations in populations, communities and physical oceanographic conditions. Therefore the goal is not a precise state but to retain a diverse system that maintains its own resilience in the face of change.

For example, University of Washington researcher Ray Hilborn and colleagues have shown that in Bristol Bay Alaska record catches of sockeye salmon over the last 20 years can be attributed to a prototype of an ecosystem-based management approach: a single accountable management agency made sure that instead of focusing only on the most productive runs, they protected a range of different stocks with diverse life histories and different timing of breeding, spawning and rearing. Over the past two decades, as environmental conditions have changed in utterly unpredictable ways, different stocks have flourished or declined, providing unique stability and sustainability to the fishery. This is not unlike a balanced approach to financial investing to reduce overall risk.

By contrast, in the Pacific Northwest, managers focused on maximizing the catch from hatcheries, neglecting to protect and subsequently losing many natural populations that were devastated by dams or over harvesting. In pursuit of maximum sustainable yield, often the single best producer was protected while ignoring the need to protect diverse stocks for the future. When conditions changed there were no other healthy stocks to compensate for decreases in the major populations. This was the case in British Columbia where most efforts at salmon management focused almost exclusively on the Fraser River salmon runs, which subsequently collapsed. By then, the natural diversity of salmon runs along the BC coast had been largely lost.

Factor in Time Lags, Unforeseen Connections and Chronic Effects

A recent study (in *Science*, December 2003) of the long-term and integrated ecosystem response to the Exxon Valdez oil spill by Charles Peterson et al. demonstrated the need for management to look at long-term consequences and links among species. Previously, managers had assumed that impacts to populations from oil were typically acute and short-lived. But when researchers took a longer view they found that even 14 years after the initial spill, oil toxins were still affecting the health and survival of local wildlife. Unexpected persistence of toxic oils, long-term sub-lethal

exposure, and transfer of these toxins through food chains resulted in increased mortality and decreased reproduction of salmon, seabirds and sea otters.

This ecosystem approach reveals that current practices for assessing the ecological risk of oil in the ocean – whether it be from massive oil spills or daily ooze from land-based pollution – are inadequate. Ironically, the Exxon study points out the importance of addressing smaller sub-lethal amounts of oil in the environment such as land-based run-off, ballast water pumping and other non-point sources. Only by understanding the links between different species and identifying the danger of daily, sub-lethal doses could scientists reveal the true impact of seemingly innocuous decisions to allow oil to reach the oceans. An ecosystem-based management framework would take a long-term approach to safeguard the ability of ocean life to grow and reproduce.

Protect Key Habitats from Exploitation and Habitat Destruction

Critical habitats—spawning grounds, nursery areas and newly discovered hotspots of biodiversity —should be protected to allow recovery and maintenance of communities of large predators such as sharks, ground fish, tuna, sea turtles, whales and seabirds. Just like keeping a savings account in case of emergency, these areas can buffer against unforeseen management mistakes or natural perturbations. By leaving some areas protected from human impacts we can build resilience into the system.

The increasing impact of humans on the oceans is pervasive. “Currently – through our collective impacts, we’re conducting a gigantic, global ocean experiment but with little ecosystem monitoring and no controls,” says Boris Worm. “We require a network of high seas marine reserves as experimental controls and insurance against our ignorance and failures. Ecosystem-based management offers much-needed hope.”

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A scientific session will follow the press conference from 2:30–5:30 pm Pacific Time. **Oceans Renaissance: Harnessing Nature’s Resilience Through Ecosystem-based Management.** The speakers will include: Jane Lubchenco, Leon Panetta, William Ruckelshaus, Brian Walker, Boris Worm, Anne Guerry, and Andrew Rosenberg.

Andrew Rosenberg
University of New Hampshire
Phone: 603-862-2020
Cell: 603-767-9501
andy.rosenberg@unh.edu

The presenters will address how science can help in the transition from single species management to ecosystem based management, drawing upon new research, real world policy experience and lessons from the land.