

# Troubled waters

The oceans around the United States suffer from overfishing and pollution, but current government regulatory structures only hamper attempts to fix these problems. Can two high-level commissions put things right? Mark Schrope investigates.

The complex bureaucracy behind the ocean policies of the United States is positively kafkaesque. The country's most important marine organization — the National Oceanic and Atmospheric Administration (NOAA) — takes much of the responsibility, but countless areas fall outside its remit. Most water-quality issues are handled by the Environmental Protection Agency (EPA), whereas the Department of the Interior handles undersea energy resources. Overall, US oceans are controlled by a morass of nine government agencies, the budgets of which are overseen by 44 congressional committees and subcommittees.

The oceans desperately need a more coordinated approach. Overfishing has sent many fisheries into decline. The populations of some species, such as certain types of west-coast salmon, have already plummeted. Pollution is also taking its toll — some researchers believe that it may be behind the decline of Florida's barrier-reef system, the third largest in the world, parts of which have lost 95% of their coral. But when researchers, environmentalists and state authorities try to address these problems, they often find their attempts mired in an administrative bog.

Fortunately, this approach is set for a shake-up. A government-appointed panel of experts is immersed in an exhaustive review of ocean policies, and a similar, independent group is conducting its own analysis. As their consultations come to an end, the two groups have begun the daunting task of assimilating what they have learned. Their recommendations, when published, will have repercussions from Capitol Hill to the edge of the continental shelf — and could provide a boost for



In the United States, energy resources (above), ocean research (right) and fisheries (below right) are all governed by different bodies.



ocean research. For those concerned about the oceans, the reports can't come soon enough. "If we don't do something about this crisis in the oceans soon," says Roger Rufe, president of The Ocean Conservancy, a Washington-based environmental group, "it's going to be too late."

## Water birth

Reform is certainly long overdue. The last major review on US oceans policy — the Stratton Commission — was delivered in 1969. Named after the panel's chair, Julius Stratton, then chairman of the Ford Foundation charity, the commission called for the creation of a 'wet NASA'. NOAA was born, but the organization has never quite achieved what Stratton intended. President Richard Nixon declined to make the new body independent, partly because the report had been commissioned by his predecessor, Lyndon Johnson. And since its creation, NOAA has grown well beyond what Stratton envisaged. Its \$3-billion budget is now spread between everything from the national weather service to marine fisheries.

But NOAA does not take complete control of US oceans. A complex range of organizations set rules at state and federal level, giving rise to a situation in which fishing vessels, for example, encounter different regulations when they cross from coastal waters — which are under state control — into federal ocean territory. Matters were further complicated in 1983 when US waters were enlarged, mainly to gain control of more off-shore energy



resources. US territory was extended from the edge of the continental shelf, which in some place is less than 10 km from the coast, to 370 km offshore, but no new comprehensive legislation was passed to govern how the oceans should be managed.

Concrete plans to rectify this emerged in 2000, when two reform efforts began life. That May, the Pew Charitable Trusts, a large granting organization based in Philadelphia, announced the creation of the Pew Ocean Commission — a group of 18 experts, including environmentalists, researchers and government officials, led by Leon Panetta, who



**Talking shop:** commission heads Leon Panetta (far left) and James Watkins (above, right) hear from users of the ocean's resources.



had been White House chief of staff earlier in the Bill Clinton administration. Three months later, Clinton signed the Oceans Act into law. The act mandated a review of oceans policy, and in July 2001 the US Commission on Ocean Policy, a 16-member panel headed by James Watkins, secretary of energy under former president George Bush, was born. The Pew commission expects to deliver its recommendations early next year, and Watkins' commission aims for next summer.

### Scope for change

Both groups are charged with creating a blueprint for a new ocean policy, and will have to examine everything from the structure of the agencies that govern the oceans to the problems of coral-reef decline and pollution. But the Watkins Commission's scope is broader, including analyses of commercial activities such as oil-drilling and shipping.

At the top of each commission's to-do list is a reorganization scheme for the agencies that oversee ocean issues, and the main question on the mind of observers is how radical the recommendations will be. "Are they going to suggest minor changes?" asks Michael Orbach, director of the Duke University Marine Lab in Beaufort, North Carolina, who has worked with both commissions. "Or are they going to be really revolutionary and suggest new and different ways to do things?"

The creation of a cabinet-level Oceans Department would be one possible revolution. Ocean-related segments of other bodies, such as NOAA and the EPA, would be encompassed by the new department. Its head — the oceans secretary — would have access to the president and direct involvement in high-level budget planning. A more minor reorganization would involve the reform of NOAA so that it focuses solely on ocean issues. Either course would provide a more focused approach to ocean management — but persuading administrators to let go of responsibility may be difficult. Any significant redistribution of duties would "be a very, very, very — and maybe that's not enough verys — difficult thing to make happen", says Bruce Molnia, the House of Representatives staffer who coordinates the Oceans Caucus, a bipartisan group

of representatives that monitors ocean issues.

A milder reform would be the creation of bodies to oversee ocean issues across different agencies. Such a body could be effective if it was given substantial "teeth", such as control over funds and the power to dole out responsibilities to the various agencies, says Ken Brink, a physical oceanographer at the Woods Hole Oceanographic Institution in Massachusetts and member of the Watkins Commission's science advisory panel. One such body — the interagency National Ocean Research Leadership Council — already does this for a subset of ocean issues.

Reaching a consensus is clearly going to be difficult. "It's not apparent to me that there is one predestined solution that everyone will agree to," says NOAA administrator Conrad Lautenbacher. "If it were that easy it would have been done a long time ago." But although the answer is far from clear, both commissions are at least considering signifi-

cant reforms. "The cry for new structures and management techniques has been coming in from everybody," says Watkins.

### Pollution problems

As well as grappling with the fate of ocean policy, the two commissions are considering how to integrate land issues, such as reducing farm run-off, into the ocean-management process. "Land-based, non-point-source pollution is probably the biggest threat we have to coastal and nearshore environments," says Watkins. He cites the example of the Gulf of Mexico, which receives run-off laden with nutrients from fertilizers from 31 states and 2 Canadian provinces through the Mississippi River. This supports the growth of algae, the decomposition of which reduces oxygen levels to almost zero in bottom waters as far as 85 km from the Mississippi Delta. Marine life is killed or forced out of a huge 'dead zone', which can grow to the size of Massachusetts. But despite the scale of the problem, there is no system that allows effective cooperation between researchers, state and federal environmental bodies and the various agricultural agencies involved.

The concerned parties could look north-east to Chesapeake Bay for a solution. In 1983, federal, state and environmental bodies got together with the aim of protecting and restoring the plant and animal life of the bay, which straddles Maryland and Virginia. It was soon clear that changes in the bay itself were not enough, so the scheme — called the Chesapeake Bay Program and based in Annapolis, Maryland — was extended in 1992 to include states with tributaries that feed the bay.

Researchers from several local institutions and government agencies have played an active role in the programme. For example, models of water flow into the bay, the creators



**Tried and tested:** modelling of water flow into Chesapeake Bay (left) is helping local authorities to protect the area's ecosystem. Can a similar analysis be applied to the Mississippi Delta (right)?

of which say are the most advanced simulations of any estuary, are being used to set the water-quality standards that each state needs to achieve if the bay is to be removed from the EPA's list of impaired waters (L. C. Linker, G. W. Shenk, R. L. Dennis & J. S. Sweeney *Water Quality and Ecosystem Modeling* 1, 91–122; 2000). Lewis Linker, the programme's modelling coordinator and an EPA employee, says that the programme's final targets should be agreed upon by early next year.

**Fishy story**

Fisheries are another hot topic for the commissions. There are, for example, big holes in the data on fish stocks. The federal government lacks good information on the population size and health of around 68% of the stocks that it manages, and for those stocks whose status is known, 33% are overfished, according to a report published this year by the National Marine Fisheries Service (NMFS), a division of NOAA.

Fisheries management also gives cause for concern. Catch quotas are set by the NMFS, together with regional fishing councils. Stocks are managed one species at a time, often with little regard to other species, particularly those that are not commercially exploited. "You'll never have ecosystems management come to reality one species at a time because everything you do to one affects another," says Pew Commission member Pat White, a former executive director of the Maine Lobstermen's Association, based in York, Maine.

Any commitment to gaining more data and moving towards an ecosystem-level approach to fisheries management will mean more work for scientists. In Chesapeake Bay, for example, a government ruling on the use of shrimp nets outside the bay, created with the aim of reducing the number of other species that are caught in the nets, led indirectly to a reduction in the bay's population of blue crabs. Researchers think that one cause may be levels of croaker fish, a natural predator of the crab and a victim of shrimp nets, which increased after the new regulations were introduced. Croaker populations inside the bay may also have risen, triggering a fall in crab numbers. Effects such as these have prompted



All aboard: oceanographers hope to be given access to an enhanced fleet of research vessels.

NOAA to fund the creation of a detailed model of the bay's ecosystem, and better management of fisheries is likely to require similar models for other areas. "I think what we're developing is going to demand an even larger role for scientists than they have today," says Panetta.

**Mobilizing the fleet**

The commissions also have the power to give considerable boosts to other areas of ocean research, and dozens of scientists have testified at the commission's regional meetings. Ocean researchers will, for example, be hoping that the Watkins Commission backs infrastructure funding. Many scientists say that new research vessels are required, and parts of the existing academic fleet will need overhauling. A schedule to do this has been put together by the organization that manages the fleet — the University-National Oceanographic Laboratory System, based in Moss Landing, California — but it is unclear where the money will come from.

Others would like to see the commission lend support to endeavours such as the NEPTUNE project, a \$250-million plan to wire a tectonic plate off the west coast of the United States with an array of sensors and equipment to monitor its geology, biology and chemistry. And most researchers are lobbying for the Integrated Ocean Observing System, a network of buoys, satellites and ships that would provide a comprehensive source of ocean data (see *Nature* 416, 253; 2002), and which Watkins describes as one of the projects he expects his commission to support.

Advocates of ocean-exploration projects, which aim to study areas of interest rather than pursuing well-formed hypotheses (see *Nature* 412, 672–673; 2001), are also hoping for support from Watkins' commission. Last autumn, NOAA's Office of Ocean Exploration, which was formed in 2001, launched one of its first missions — a three-leg voyage that included studies of deep-sea corals and methane deposits. Advocates of ocean exploration have a long list of other projects, including missions to produce maps of the ocean floor detailing marine life, mineral resources and geological hazards such as

earthquakes. NOAA only has \$14 million to fund exploratory projects — well short of the \$75-million multi-agency projects that advocates have called for — but the approval of one or both commissions might help to persuade politicians to rectify this.

If any of these goals is to be achieved, the commissions will have to make sure their messages lead to sufficient political action. The two groups have met together, and expect that, with few if any exceptions, their recommendations will be complementary, thus amplifying their effects. The Oceans Act also requires the Watkins Commission to present its report directly to the White House, and the government to act on it. The Pew Commission, by contrast, will have to fight for legislative attention with the wave of reports produced each year by non-profit organizations.

Representatives on the Oceans Caucus say they will help to publicize the commissions' findings and to formulate the legislation needed to enact them. There is bipartisan support in both the House and the Senate for many ocean issues, so the recommendations should receive significant attention. But the commissions know that not all of their results will necessarily be implemented. Molnia warns that the Watkins report may lose some of its impact because the commission was mandated by the Clinton administration, although its members were selected by Bush.

Despite these uncertainties, those involved are confident that the reports will be catalysts for change, even if the scale of that change remains unclear. "Whether we will go all the way to a Department of the Oceans I don't know," says Rufe. "But I hope we'll end up with something more substantial than just a rearrangement of the deckchairs." ■

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**Stratton report**

♦ [www.lib.noaa.gov/edocs/stratton/title.html](http://www.lib.noaa.gov/edocs/stratton/title.html)

**Watkins Commission**

♦ [www.oceancommission.gov](http://www.oceancommission.gov)

**Pew Oceans Commission**

♦ [www.pewoceans.org](http://www.pewoceans.org)

**NMFS report 2002**

♦ [www.nmfs.noaa.gov/sfa/reg\\_svcs/statusostocks/Stock\\_status01.htm](http://www.nmfs.noaa.gov/sfa/reg_svcs/statusostocks/Stock_status01.htm)

NOAA



A 'wet NASA': the Maryland home of the National Oceanic and Atmospheric Administration.