

Ocean Sciences in the FY 2002 Budget

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HIGHLIGHTS

- **National Oceanic and Atmospheric Administration (NOAA):** Although overall NOAA funding would decrease by \$60.8 million (1.9 percent) under the FY 2002 budget request, funding levels for NOAA's ocean research funding programs remain stable, and programs such as Climate Observations and Services receive significant increases (up 50 percent).
- **National Science Foundation (NSF):** Funding for the Geosciences Directorate (GEO) would drop to \$558.5 million (down 0.6 percent), and the Ocean Sciences Division would see a decrease of 1.0 percent for a total of \$255.3 million in FY 2002 (see Table II-7). GEO funding includes \$23.0 million of the \$58.1 million provided for the Biocomplexity in the Environment initiative.
- **Department of the Navy:** While specific funding levels for Navy programs are not yet available, funding for Navy "6.1" basic research is expected to increase less than the anticipated rate of inflation.
- **National Aeronautics and Space Administration (NASA):** Earth Science at NASA would decrease 11.7 percent from FY 2001 funding levels, from \$1.7 billion to \$1.5 billion. Funding for the Earth Observing System would drop \$42.2 million to \$371.9 million (down 10.2 percent), while Earth Science Program

Jennie Kopelson

Science would increase by \$6.8 million to total \$357.4 million in FY 2002 (up 1.9 percent; see Table II-12).

- **U.S. Geological Survey (USGS):** USGS proposes a \$69.4 million (7.9 percent) cut for the agency, bringing its funding back to FY 2000 level. The Geologic Hazards, Resources, and Processes account, which funds coastal and resource studies, would decrease by \$11.5 million (down 5.1 percent) for a total of \$213.8 million (see Table II-16).

INTRODUCTION AND POLITICAL ENVIRONMENT

Oceans cover nearly three-quarters of our Earth's surface, and are the primary driver of weather and climate for every person on Earth. The oceans also are a vital part of U.S. national security and a critical element in international trade and economic development. In addition, more than half of the world's population currently live where the ocean meets the land, an area that comprises less than two percent of the Earth's surface. These fertile coastal zones provide food, recreation, and natural resources.

Today, there is increasing concern about the health of the oceans. Bellwether marine ecosystems, such as coral atolls, kelp forests, and estuaries are threatened, and many important fisheries around the world are in decline. In order to address these emerging issues, protect our ocean resources, and better understand important climate phenomena such as El Niño, more information is needed about the processes active in the oceans.

U.S. research programs conducted individually by over a dozen Federal agencies, including NOAA, NSF, NASA, and the Navy, contribute toward an understanding of marine environmental systems in both the coastal and deep ocean environments. Currently, new approaches are being developed to coordinate efforts among all the agencies involved in ocean research. This coordinated effort, directed through the National Oceanographic Partnership Program (NOPP), has resulted in the development of implementation plans for an integrated ocean observing system, and the establishment of an interagency office, OCEAN.US, which is tasked to develop a national capability for integrating and

OCEAN SCIENCES IN THE FY 2002 BUDGET

sustaining ocean observations and predictions. The ocean observation system will allow researchers to collect biological, chemical, physical, and geological oceanographic data necessary to detect and predict climate variability, facilitate safe and efficient marine operations, ensure national security, manage living resources, preserve and restore healthy marine ecosystems, mitigate natural hazards, and ensure public health.

NATIONAL SCIENCE FOUNDATION (NSF)

The FY 2001 appropriation for NSF, which represented a 17 percent increase over the previous year's funding, set the agency on a track to double its budget within five years. Rather than continue this doubling trend in the NSF budget, the FY 2002 request for NSF, \$4.5 billion, represents only a 1.3 percent increase over the FY 2001 funding level, and funding for the Research and Related Activities account actually would decrease by \$15.6 million to \$3.3 billion (see Table II-7).

While this has implications for the broader research community, the impact of the budget request on the ocean sciences is of particular concern. NSF is the largest supporter of basic ocean science in the United States, funding major programs as well as individual investigator-initiated projects. The FY 2002 budget request for the Ocean Sciences Division totals \$255.2 million, a decrease of \$2.8 million or 1.0 percent from FY 2001.

Within the Ocean Sciences Division (OCE), funding would decline \$1.5 million (1.5 percent) for the Ocean Section for a total of \$96.1 million. This funding will support individual investigator research in areas such as marine biocomplexity, data assimilation and modeling for ocean circulation, carbon cycling, and sustained observations of deep ocean and coastal systems. The Integrative Programs Section would receive \$82.8 million (down 0.5 percent). Of this amount, \$59.9 million is slated to support ship operations and the academic research fleet. The \$59.9 million represents a 4.7 percent increase of \$2.7 million over FY 2001. This Section also funds new technology development, participation in the National Oceanographic Partnership Program (NOPP), and development of a Center for Ocean Sciences Education Excellence (COSEE). The Marine Geosciences Section would receive \$76.3 million of the OCE funding request, including \$51.4 million for the Ocean Drilling Program.

Jennie Kopelson

For FY 2002, the budget request includes \$58.1 million for the Biocomplexity in the Environment Initiative, an increase of 5.9 percent over the FY 2001 level. Of this funding, \$23 million is slated to go to the Geosciences Division, a \$1.8 million increase over FY 2001. This bodes well for projects in the ocean sciences that were awarded 50 percent of the Geosciences' biocomplexity funding in FY 2001. (For more information on NSF, please see Chapter 7.)

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

NOAA's FY 2002 budget request totals \$3.1 billion, a decrease of \$60.8 million or 1.9 percent from FY 2001 funding levels. Budget realignments would still allow for \$270.0 million in program increases. In addition, NOAA received a large bump up last year for ocean and coastal programs as a result of funding that was provided through the Conservation and Reinvestment Act (CARA), and much of this funding is maintained in the FY 2002 budget request.

Oceanic and Atmospheric Research (OAR): The budget request for OAR, which funds the bulk of NOAA research, would decrease by \$9.6 million to total \$340.8 million in FY 2002, although portions of the budget supporting climate services and ocean exploration would increase.

Significant increases are included for the Climate and Air Quality Research account, which would receive \$158.5 million, an increase of \$14.4 million over FY 2001. The Climate Observations and Services account would increase by 50 percent, and provide funding for the following initiatives: Regional Assessments, Education, and Outreach, \$1.9 million; Climate Change Assessments, \$0.7 million; Weather-Climate Connection, \$0.9 million; Carbon Cycle, \$2.3 million; and Ocean System for Improved Climate Services, \$7.3 million.

The Ocean System for Improved Climate Services line item is an important next step in NOAA efforts to implement a global operational ocean observing system. Funding would be used to support the NOPP program and the new OCEANS.US office, as well as purchase and deploy additional ARGO floats (\$3.2 million); expand the number of ocean reference station moorings (\$0.9 million); add new sensors to volunteer observing ships (\$0.5 million); add autonomous carbon-dioxide

OCEAN SCIENCES IN THE FY 2002 BUDGET

sampling instruments to moored arrays (\$0.9 million); deploy moorings in the Arctic to quantify Arctic Ocean fluxes (\$0.5 million); and expand current data management and assimilation efforts through participation in programs such as the Global Ocean Data Assimilation Experiment.

Also included in the OAR budget is funding for a second year of ocean exploration activities. Last year for the first time, \$4 million was provided in NOAA's budget to begin planning for a national program of ocean exploration. In the FY 2002 budget request, NOAA has requested \$14 million to fund partnerships with public and private institutions to promote ocean exploration and research. Funds will be used to search for new ocean resources, assess and explain the diversity of marine organisms, study ocean acoustics, and support educational efforts and outreach.

In addition, the OAR budget includes \$62.4 million for the National Sea Grant College program, an amount equal to the FY 2001 funded level, \$13.8 million for the National Undersea Research Program (NURP), and \$22.6 million for Marine Environmental Research. The Marine Environmental Research program will fund reactivation field measurements by the Atlantic Oceanographic and Meteorological Laboratory's Remote Sensing Division and restore the ocean measurements program of the Pacific Marine Environmental Laboratory's Fisheries Oceanography program.

National Ocean Service (NOS): The funding request for NOS totals \$394.6 million for FY 2002, a decrease of \$199.1 million from FY 2001 levels. While the primary mission of NOS is coastal stewardship, NOS' budget would support approximately \$64 million of R&D activities in FY 2002 (see Table II-14).

The request includes \$18.4 million for the Coastal Ocean Program, which supports peer-reviewed, multi-disciplinary research to assess three national issues: coastal ecosystem oceanography, cumulative coastal impacts, and harmful algal blooms/eutrophication. The NOS budget request also includes funding for the Ocean Resources Conservation and Assessment program, which directs research programs to provide scientific information to policymakers on the protection and sustainable use of ocean and coastal areas. Included in this program is \$72.1 million for the Ocean Assessment Program, \$5.8 million for the Cooperative

Jennie Kopelson

Institute for Coastal and Estuarine Environmental Technology, and \$2 million for coral reef studies in Hawaii and the Southeast.

In addition, the NOS budget requests \$16.4 million for Estuarine Research Reserves and \$36.0 million for the Marine Sanctuary Program. An additional \$3 million has been requested to inventory and assess existing Marine Protected Areas.

National Marine Fisheries Service (NMFS): The total budget request for NMFS for FY 2002 is \$734.2 million, a decrease of \$36 million from the FY 2001 funded level. However, R&D funding within NMFS would increase 6.0 percent (see Table II-14). \$273.8 million would be provided for Information Collection and Analysis of biological, ecological, economic and social aspects of living marine resources. Additional funding would be provided for research involving specific fisheries, including West Coast groundfish, red snapper, Southeastern sea turtles, Steller sea lions, Pacific migratory species, and Chesapeake Bay research. Funds totaling \$1.5 million are also provided for fisheries oceanography studies on the impact of long-term environmental factors on fish stocks.

National Environmental Satellite, Data, and Information Service (NESDIS): In FY 2002 NESDIS would receive a total of \$738.0 million, a decrease of \$36 million from the FY 2001 funded level. Funding of \$156.6 million is included in the budget request for continuation of the National Polar Orbiting Environmental Satellite System (NPOESS), an increase of \$83.4 million over the FY 2001 enacted level. Enhancements to this system, which is jointly funded with the Department of Defense and NASA, will test new instruments and data utilization systems, improving the availability of such data to researchers. NESDIS funding is also requested for coral reef monitoring (\$0.8 million), fisheries oceanography (\$0.5 million), Ocean Remote Sensing (\$4.0 million), and habitat characterization (\$0.3 million). (For additional information on NOAA, please see Chapter 15.)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

For the second year in a row the budget request has included an increase for NASA. In FY 2002, the request totals \$14.5 billion, an increase of \$258.4 million over the FY 2001 level. Earth Science, however, would

OCEAN SCIENCES IN THE FY 2002 BUDGET

decrease from \$1.7 billion to \$1.5 billion in FY 2002 (see Table II-12; figures are adjusted to reflect the inclusion of mission support costs within Earth Science). Requested funding for the Earth Observing System (EOS) is \$371.9 million in FY 2002. EOS is a program of multiple spacecraft, which observe the major interactions of the land, oceans, atmosphere, ice, and life, and interdisciplinary science investigations that together provide data needed to understand global climate change. EOS missions that are under development include: Jason, which will study ocean topography; Aqua, which will examine atmospheric temperature and humidity, clouds, and sea surface temperature; and SeaWinds, which is the ocean winds successor to QuikSCAT.

The Earth Explorers funding request is \$84.6 million. This program uses data collected by the Shuttle Radar Topography Mission (SRTM) to create a high-resolution digital topographic map of the world, data from which will be used by scientists to study the terrain for basic research in the areas of ecology, geology, geodynamics, hydrology and atmospheric modeling.

The request for the EOS Data Information System, which operates the EOS satellites now in orbit, and retrieves and converts flight data to useful scientific information, is \$252.7 million in FY 2002, and the Earth Science Program Science request is \$357.5 million. (For more information on NASA, please see Chapter 10.)

U.S. GEOLOGICAL SURVEY (USGS)

The budget request for the Interior Department's U.S. Geological Survey (USGS) in FY 2002 is \$813.4 million, a \$69.4 million decrease from FY 2001 enacted funding. Reductions include one-time projects, congressional add-ons, and program expansions that were funded in FY 2001, taking the agency's budget back to the FY 2000 level.

Within USGS, funding for Geologic Hazards, Resources, and Processes, which funds coastal and resource studies, would decrease by \$11.5 million (down 5.1 percent) for a total of \$213.8 million (see Table II-16). Budget cuts include a \$3 million reduction in global change research on sediments and glaciers; a \$0.5 million decrease in the Earth Surface Dynamics program for the Central Great Lakes Geologic Mapping

Jennie Kopelson

Coalition; and a \$1.0 million reduction terminating the eastern Gulf of Mexico coastal pilot program. (For more information on USGS, please see Chapters 17 and 18.)

OTHER AGENCIES

Department of Energy (DOE): The DOE Office of Science request for FY 2002 includes a total of \$443.0 million for Biological and Environmental Research, a decrease of \$39.5 million from the FY 2001 funding level. Included in the total request is \$129.5 million for DOE support for the U.S. Global Change Research Program (USGCRP; see Chapter 15).

Environmental Protection Agency (EPA): The budget request for the EPA totals \$7.3 billion, a decrease of \$494 million from FY 2001 funding levels (see Table II-17). EPA's Strategic Goal entitled Sound Science, Improved Understanding of Environmental Risk, and Greater Innovation to Address Environmental Problems is funded at a level of \$307.2 million, a decrease of \$27.1 million from FY 2001 funding levels. Within this goal, decreased funding of \$14.9 million (down \$3.3 million) is provided for Research for Ecosystem Assessment and Restoration, which funds the national coastal monitoring program. Funding in FY 2002 for this program will focus on analysis and reporting of data resulting from an initial round of estuarine sampling. (Please see Chapter 12 for more information on EPA.)