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Thank you. It is a pleasure to be here today to speak to the distinguished members of this Commission about NSF's role in ocean research. As many of you know, my roots in, and passion for, ocean science run deep.

Admiral Watkins, you and the other Commissioners have a unique opportunity to focus attention on the ocean, including ocean research, education, and infrastructure.

The Commission meets at a time when technological and computational advances, as well as fundamental discoveries, are transforming the ocean sciences.

Furthermore, the significance of our oceans to the economy, to public health, and to the environment is becoming increasingly evident. The changes in our world since September 11 must not deter us from our pursuit of knowledge but challenge us to consider how this knowledge may be used in the service of our nation.

The National Science Foundation contributes 70% of federal funding for basic academic research in ocean sciences.

NSF supports a very broad ocean research agenda ranging from small, exploratory research grants awarded to individual investigators to large programs such as the Ocean Drilling Program and components of the U.S. Global Change Research Program.

You received a copy of the report "Ocean Sciences at the New Millennium." It was based on extensive community input and identifies promising opportunities for discovery and new understanding in this decade and beyond.

Today I will highlight some of the priorities that may be of particular interest to the Commission. We welcome your thoughts on these.

I will speak briefly about our Ocean Observatories Initiative and our efforts to develop a long-range renewal plan for the academic research fleet.

I'll also address NSF's programs in ocean education and two possibilities for future research emphasis -- "oceans and human health", and research related to ecosystem-based management of fisheries.

Our written statement has more information on these topics.

Ocean observations, both for research and operations, is a theme we'll likely will hear much about today and over the coming months. Many of the most important discoveries today are coming from measurements made at the same location over sustained time periods.

The availability of lon time-series data extending over several decades -- which allows us to "explore-in-time" -- is now recognized as a key element for managing living resources, understanding ocean ecosystems and for resolving uncertainties about the role of the oceans in climate change.

NSF is working with the academic community and other Federal agencies to provide a new type of infrastructure for gaining access to the oceans – both along the coasts and in the open sea.

This begins with an integrated network of ocean observatories, incorporating advanced sensors for chemical and biological measurements.

We'll be able to collect time-series data to understand the dynamics of biological, chemical, geological and physical processes. NSF's proposed contribution to the effort, the Ocean Observatories Initiative, has three elements:

- a lithospheric plate-scale observatory. This consists of interconnected sites on the seafloor that encompass several geological and oceanographic features and processes.

- several relocatable deep-sea observatories based around a system of buoys.

- and an expanded network of coastal observatories.

Just as NSF supports the academic research vessel fleet for the "spatial" exploration of our oceans, the ocean observatories will facilitate "temporal" exploration.

The products of this research, and the new tools to come, will eventually be incorporated into operational observing systems. In turn, operational systems will feed back information that stimulates new research.

We look forward to hearing your perspective on the value of this approach.

Ocean observatories will complement, not replace, research vessels. Ships outfitted with state-of-the-art technology provide unique access to the ocean.

NSF has worked closely with other members of the Federal Oceanographic Facilities Committee (FOFC) to develop a long-range renewal plan for the academic research fleet.

The draft plan incorporates many suggestions from the oceanographic community. The final version will be presented to the National Oceanographic Research Leadership Council in December for endorsement.

This ambitious plan calls for a mix of new global, ocean, regional and local class ships over the next two decades to replace an aging academic fleet.

Implementing the plan will require close coordination and cooperation among NSF, ONR and other federal agencies. I hope the Commission will follow the process over the coming months.

New research directions require new observing systems, as well as more traditional access to the sea. I will focus here on just two research areas that may be of special relevance -- an ecosystem approach to fisheries, and oceans and human health.

The success of the Global Ocean Ecosystems Dynamics program, in which we work jointly with NOAA, demonstrates the utility of doing basic science with an explicit link to commercially harvested species.

The United States is moving inexorably towards a more "ecosystem-based" approach to fisheries management. However, we currently lack the basic ecological and oceanographic knowledge for successful implementation.

The new observing systems and other platforms will help provide the data to develop a new management approach for fisheries.

NSF is the primary agency funding ecological and oceanographic research in the academic community, so it is in a unique position to help develop the scientific principles for ecosystem-based fisheries management strategies of the future.

The powerful connection between oceans and human health is becoming ever clearer. Advances in molecular marine biology, biotechnology and the new field of marine genomics enable better understanding of the relation between human health and pathogenic organisms and contaminants in the marine environment.

Recent research is developing the potential for pharmaceutical applications of novel marine products. For example, scientists from the University of Delaware and Amersham Biosciences, Inc. working on *Alvin* and the *Atlantis* last week conducted the first ever DNA-sequencing experiments at sea.

This team carried out a pioneering environmental genomic study of the organisms inhabiting hydrothermal vents located nearly two miles deep in the Pacific. The microbes, tubeworms, and other vent dwellers are of great interest to industry, because they may yield a range of new products and applications.

NSF is presently developing a collaborative research initiative on oceans and human health with the National Institute of Environmental Health Sciences.

We all know that ocean research offers wonderful opportunities to convey the excitement of discovery and the process of scientific research to the classroom and the general public.

Human interest in the oceans, the interdisciplinary nature of the field, and new real-time capabilities to observe ocean processes and to connect researchers and educators all make this an exceptional time to expand our education efforts.

Some of these efforts will target the general public, such as an IMAX film on hydrothermal vents that is currently in production with NSF support (and I can say from an early viewing that the footage is stunning!).

Others will focus on formal education. NSF recently issued an announcement for proposals to develop Centers for Ocean Science Education Excellence.

These centers will foster the integration of ocean research into high quality educational materials. In addition, they will provide educators with an enhanced capacity to understand and deliver high-quality educational programs in the ocean sciences. We're very excited by the potential of these centers – they're an excellent start.

Virtually all of NSF's activities involve partnerships with the academic community, many involve partnerships with other agencies, and a growing number involve collaboration with the international community.

One of the important recent developments in coordinating and funding ocean research is the National Ocean Partnership Program (NOPP).

In its first few years, NOPP proved an effective vehicle for interagency and cross-sector coordination and collaboration to develop an integrated ocean observing system, ocean technology, methods for data handling, and initiatives for ocean education.

NOPP brings together the many players in the ocean community – government, academia, industry, and others. We look forward to continuing to participate in the leadership of the program.

I will close by acknowledging that our nation faces many new challenges in the short-term, but many opportunities over the long-term.

We must not lose sight of the value of long-term investment in scientific research -- including the ocean sciences.

Investment in ideas, people and tools leads to discovery, and discovery brings economic and social benefits that help keep our nation strong and prosperous.

I thank the Commission members for undertaking the review of our nation's ocean policy. We all look forward to working with you.