Ocean Exploration and Conservation:
Perspectives on Ocean Exploration from a Conservation Organization
Presented to The President's Ocean Exploration Panel

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On behalf of the Center for Marine Conservation (CMC) and its more than 120,000 members, thank you for opportunity to speak this afternoon. CMC is the largest national nonprofit organization committed solely to protecting ocean environments, and has done so for more than two decades. We salute each of you and your dedication to ocean exploration. In addition to profoundly changing our understanding of the natural world, your work has inspired sense of awe and wonder in a generation and continues to stir our imagination of the ocean's mysteries.

The Known and the Unknown

As Dr. Sylvia Earle has often said, we know more about the back side of the moon than we do about the bottom of the ocean. Indeed, there remains a vast unknown before us about what lies at the depths of the oceans. There remain life forms and ecosystems that lie undiscovered, let alone understood in their function and interconnections. We are just beginning to understand the life histories of deepwater organisms, life around deep-sea thermal vents, or that associated with seamounts.

At the same time, we have gathered vast amounts of data and gained great understanding of many other parts of the marine environment. However, our research has largely focused on what we harvest or extract, with emphasis biologically on target species and their associated habitats in a context of human influence. Thus, even the areas that are "known" are often known only from relatively narrow perspectives, and there remain compelling, basic questions about the function of ocean ecosystems even in the areas we often characterize as well-understood.

Exploration and Conservation are Inseparable

As we enter the 21st century, it is becoming impossible to conduct ocean without also considering ocean conservation. There is now a great sense of urgency to explore ocean ecosystems before they are altered by consumptive activities. We do not yet understand how many oceanic ecosystems function in the absence of human impact. Yet, with increases in technology and ever-greater use of the ocean, time is running out to explore many areas unless we first protect them by employing a precautionary approach.

It has recently been reported that hundreds of new species have been discovered in seamount systems in the Coral Sea and the Tasman Sea between New Caledonia and Tasmania. Some are considered living fossils, believed extinct since the Mesozoic, isolated on specific peaks for millions of years, isolated by the virtual islands they inhabit in the deep ocean. But seamounts are increasingly being targeted by international deepwater trawling operations, driven by the spread of fisheries for orange roughy and other deepwater fish. Such operations are threatening seamount ecosystems before their inhabitants can even be catalogued and understood.

In the U.S. and in a growing number of places throughout the world, marine protected areas (MPAs) are a leading are a leading tool for the comprehensive protection of marine ecosystems. However, it was by pure accident that the area around Cape Canaveral – because of its closure to boat traffic for launch pad security – became an important study area that dramatically advanced our understanding of how such areas function in the absence of human impact.

Thus, the establishment of marine protected areas is key to our exploration of the oceans. If we are to truly understand the oceans we must be able to study their mysteries in the absence of human impacts. We must protect some ocean areas from all human impacts to the extent that this is possible so that we have the opportunity to understand how ocean ecosystems work in our absence. Only with this knowledge will we be able to truly understand how our activities affect these ecosystems.

Marine Protected Areas and the Interconnectivity of Marine Ecosystems

Ocean exploration has already helped us discover and map resources we didn't know were there, setting the stage for needed MPAs. For example, the Sherwood Forest area of the Dry Tortugas was a relatively recent discovery, but its discovery figured prominently in the establishment of the proposed boundaries and management plan for the Dry Tortugas Ecological Preserve.

Additional research is needed to help us develop a better understanding of the impacts of fishing and other consumptive activities on the marine environment and the efficacy of marine reserves toward addressing them. Exploration can help us develop a better understanding of the life histories of imperiled species and their utilization of habitat resources in order to improve conservation efforts. Exploration can also provide a better understand of the impacts of coastal development and water quality impacts on the marine environment. How many other "dead zones" are out there?

From CMC's perspective, one of the most important needs of ocean exploration is providing baseline information on the interconnectivity of various marine habitats. Such information is absolutely essential to allow us to move beyond what might be characterized as a "first generation" of MPAs toward a comprehensive network of MPAs that truly achieves the

protection large-scale ecosystem function. Knowledge about ocean and bottom currents, larval belts, sources and sinks, spawning aggregations, current assemblages or conveyor belts and other such interconnectivity features is essential for the identification of new areas of the ocean requiring protection and identifying where additional protection is needed for existing protected areas.

The most recent issue (August 17, 2000) of the journal, Nature emphasizes the importance of understanding such linkages, citing the work of Paul Barber at Harvard. The article emphasizes the fact that larvae of coral reef species drift great distances on ocean currents, supplying new recruits to distant coral reefs, stabilizing existing populations and colonizing new ones. However, resource managers have only recently considered these important ecological connections and find themselves greatly challenged, as empirical data about the nature of larval dispersal between coral reefs is scarce.

Understanding Life in the Ocean

Life Histories of Marine Mammals, Sea Turtles & Fish

Little is still known about the ocean's most recognized inhabitants – marine mammals and sea turtles. In many cases we are lacking abundance estimates for marine mammal and sea turtle stock, while information on population trends is virtually non-existent.

The natural history of these animals is still very much a mystery to us, yet these species are critical sentinel organisms that may provide us with a glimpse into the overall health of the marine environment. Scientists know few of the migration routes and the calving, feeding, and breeding habitats for cetaceans. It was only very recently that we learned where right whales breed, an absolutely critical piece of information from a conservation perspective.

This year more than 330 gray whales have died along the U.S. and Mexican Pacific coast. According to symposia held by the International Whaling Commission and the Marine Mammal Commission, in the future, the most serious threats to marine mammals will likely be those associated with environmental change. Thus, we must better understand processes such as toxic algal blooms, climate change, and coastal pollution and how they interact with the life histories of these species.

Even when considering target species, our information is poor. As CMC's recently released Health of the Oceans report indicates, we have insufficient information to gauge the status of more than half the managed fish stocks in the U.S.

Exploring Time as Well as Space

We must continue to expand the spatial and temporal scales in our exploration of the oceans. Satellites and moored instruments are providing ever-better understanding of mesoscale processes, but our understanding of how the biology works at such spatial and temporal scales remains weak. There are very few long-term biological time series at a time when we must drastically improve our understanding of large-scale, interannual processes by ensuring that our eyes of exploration focus not only on unexplored geographical areas of the ocean, but also on its unexplored time scales. For example, the
California Cooperative Offshore Fisheries Investigations (CalCOFI) database is one of the few continuous long-term time-series of zooplankton in the world and has provided important insight into the ecology of the California Current ecosystem.

Understanding Ocean Habitat

We know that the lives of many ocean animals are inextricably linked to the presence and health of certain structures such as coral reefs, kelp forests or hydrothermal vents. In order to ensure that our conservation measures are adequate, we must know more about these relationships. We also need to better understand more about the fascinating and intricate ways by which some animals structure their environments and thus impact the lives of the other organisms that depend on them. For instance, we need to know more about how coral reef fish and other coral reef animals maintain the health of coral reefs. Similarly, we need to know more about how tilefish and other burrowing fish dig and maintain their burrows. Such insight helps us better understand the consequences of altering the population dynamics of a particular ecosystem through selective harvest or other impact.

The Role of a Nongovernmental Conservation Organization in Ocean Exploration

CMC itself undertakes a range of ocean exploration and research activities. As a science-based advocacy organization, such research serves to guide our conservation work, providing baseline data, filling in gaps in our knowledge and improving our understanding of marine ecosystems of special concern. We believe that such work is necessary for true conservation leadership, where conservation policy and advocacy are driven by what we learn through exploration and research. In addition to its own exploration work, CMC also works collaboratively with governmental agencies and other organizations (NGOs).

Public/private partnerships have and can continue to play an important role in ocean exploration. CMC's exploration work – either independently conducted or through direct partnership with governmental agencies – has served to complement public sector research efforts, the results being a healthy collaborative partnership between the NGO community and the public sector. In addition, such collaboration provides a conduit to private funding sources for ocean exploration.

Finally, since CMC is an advocacy organization, expedition work can serve as a highly visible and credible platform from which to advocate, linking research findings to specific issues, policies or legislation.

Specific CMC exploration work includes:
Navassa Island: In collaboration with the National Oceanic and Atmospheric Administration (NOAA), U.S. Geological Survey (USGS) and Smithsonian, CMC has conducted extensive exploration of the uninhabited island of Navassa. (This work was recently featured on Animal Planet.) The systematic cataloguing of both marine and terrestrial species is providing a foundation of knowledge needed for conservation efforts and the establishment of a National Wildlife Refuge.

Dry Tortugas: CMC conducted independent assessment work of the Dry Tortugas – with special emphasis on spawning aggregations in Riley's Hump – to provide baseline information in support of establishing an ecological reserve in the Tortugas region. Although this was an independent CMC effort, efforts were closely coordinated with concurrent research by the Department of Defense and NOAA.

Public Education and Outreach
Ocean exploration has the same potential to generate public excitement and involvement as the space program, and such excitement spans the generations. I remember fondly the children that I taught at Seacamp in the Florida Keys. It was literally a transforming experience for them to learn about and experience the marine environment first hand. The same kind of excitement is present during the Sustainable Seas Expedition's student summits, or in the Jason Project.

Scientists involved in ocean exploration must focus not only research itself, but on how to reserve a virtual seat beside them on a ship or in a submersible. Public involvement is critical not only to sustain our exploration work, but also to advance the conservation of our ocean environment. One reason why marine sanctuaries are successful and popular is because the public has become engaged in the process. For example, recent progress with the ecological reserve at Dry Tortugas owes its success to strong public participation.

Thus, it is critical that the federal government, when determining its priorities for ocean exploration, set aside a percentage of funding for outreach and education to ensure that the public is there with us to experience the wonder of discovery, understand the importance of conservation, and become involved.