

Testimony of Steven Gaines
Director of the Marine Science Institute,
Acting Dean of Mathematical, Life and Physical Sciences, and
Professor of Marine Ecology
University of California, Santa Barbara

Before the
Subcommittee on Fisheries, Wildlife and Oceans
Natural Resources Committee
U. S. House of Representatives

Hearing on Reauthorization of the National Marine Sanctuaries Act

Saturday, November 3, 2007
University of California, Santa Barbara

Thank you Chairwoman Bordallo, Representative Capps and the distinguished members of the committee for inviting me to testify today. My name is Steve Gaines, and I am a Professor of Marine Ecology at the University of California, Santa Barbara. I also serve as the Director of the Marine Science Institute, and I am the Acting Dean of the Division of Mathematics, Life and Physical Sciences. I have worked extensively with the National Marine Sanctuary program on marine research and education for more than a decade, and I served on the Science Advisory Panel that helped guide the design for the marine reserve network in the Channel Islands National Marine Sanctuary, just off our shore.

It is a pleasure and an honor to testify in support of the Reauthorization of the National Marine Sanctuary Act (NMSA). In Santa Barbara, the National Marine Sanctuary program has brought widespread public awareness and rigorous science-based management to the unique, productive and beautiful ocean ecosystem just offshore at the Channel Islands. Around the country, Sanctuaries have brought much needed attention to ocean conservation (e.g., Hawaiian Islands Humpback Whale National Marine Sanctuary), water quality (e.g., Monterey Bay National Marine Sanctuary), and cultural heritage (e.g., Monitor National Marine Sanctuary). Our Sanctuaries are national treasures that demand innovative stewardship. I believe they need to play a greatly expanded role in protecting the nation's ocean resources.

Today, I would like to highlight some critical roles that Sanctuaries have played in ocean science and education and to identify how these roles can be expanded in the reauthorization of NMSA. I will focus on four key issues:

- (1) How the National Marine Sanctuary Program has fostered innovative science to inform ecosystem based management and decision-making;
- (2) Why expanded funding for science is essential to the program's future success;

TESTIMONY OF STEVEN D. GAINES

- (3) How strategic investment in research support by the National Marine Sanctuary Program helps to leverage research partnerships;
- (4) How partnerships between the National Marine Sanctuary Program and academic institutions have advanced education about ocean ecosystems.

My views of the Sanctuary program have been shaped by strong interactions with the Channel Islands and the Monterey Bay National Marine Sanctuaries in particular, but I believe the lessons have bearing on the entire national program.

The National Marine Sanctuary Act can foster innovative science on effective ecosystem based management of the ocean.

Resource management agencies commonly seek scientific advice to inform their decisions, but scientists rarely feel that the ultimate decisions were strongly informed by science. I have had some remarkably different experiences working with our local Sanctuary. The NMSA creates some challenges of perception. The name Sanctuary implies far more ecosystem protection in the public's mind than the present act actually mandates and many of the Sanctuaries actually receives. Nevertheless, over the last decade some individual Sanctuaries have successfully led the development of innovative ecosystem based management plans for the sea. Most noteworthy was the effort in the Channel Islands to establish a network of fully protected, no take marine reserves.

This effort was initiated by recreational fishers in response to long-term declines in fish stocks and habitats around the Channel Islands. The Channel Islands National Marine Sanctuary played a critical lead role in implementing a joint state-federal process that incorporated a strong role for scientific guidance and that ultimately stimulated an explosion of scientific research on the impacts of marine reserves and their potential roles in ocean conservation and fisheries management.

I served on the Science Advisory Panel to this process. The Science Advisory Panel was given four tasks by a Marine Reserves Working Group established by the Sanctuary: (1) Conduct a literature review to understand how marine reserves work; (2) Gather data that would be useful for planning marine reserves; (3) Develop ecological guidelines for the design of marine reserves; and (4) Evaluate potential alternatives for a network of marine reserves in the Channel Islands National Marine Sanctuary.

This process stimulated the first global synthesis of the benefits and costs of marine reserves. The results were striking – marine reserves generate consistently large increases in the number and size of fish and invertebrates, as well as substantial increases in the diversity of species. The unexpected insight from this work led to the recommendation from the science panel for substantial closures of the Sanctuary in fully protected marine reserves. As you can imagine, these recommendations were quite controversial. But, they ultimately formed the basis for the network of 11 marine reserves and 2 marine conservation areas, which allow some fishing, that cover approximately 21% of the Sanctuary today. Although this network is somewhat smaller than what was recommended by the science team, it set a new global standard. It was arguably the

TESTIMONY OF STEVEN D. GAINES

world's first ecological network of marine reserves and has stimulated efforts to implement networks around the world.

By seeding these scientific efforts and working cooperatively with the State of California to implement a landmark plan, our understanding of place based ecosystem management of the sea has advanced rapidly. Ironically, after these innovative efforts and implementation of the state waters portion of the network in 2003, the Sanctuary only received the statutory mandate to regulate fisheries within its borders when its designation document was changed earlier this year.

Expanded funding for science is crucial to the success of the National Marine Sanctuary Program.

In 2007, the National Marine Sanctuary Program budget was about \$44 million. The funding is divided among the sanctuary headquarters in Washington, D.C., and 13 national marine sanctuaries throughout the United States for management, resource protection, enforcement, research, education, and outreach. About \$9 million of the sanctuary funds go to science. These levels of funding are at least an order of magnitude below the comparable investment made by the federal government for scientific studies of our terrestrial parks by the National Park Service.

A portion of the funding for science supports Sanctuary research coordinators and their activities. Some of the funding is used to purchase vessels and maintain vessel operations in support of scientific research. Some Sanctuaries also set aside funding for research by outside scientists, e.g., the Channel Islands National Marine Sanctuary sets aside funding for the Collaborative Fisherman's Research Program, which fosters collaboration between fishermen and scientists to answer questions about important research priorities in the sanctuary. Through these activities, the National Marine Sanctuary Program advances our understanding of the ocean, but these contributions are severely constrained by the existing level of funding.

There is a critical need to increase funding for science within the National Marine Sanctuary Program. Compared with other fields, ocean science is particularly expensive because of the enormous investment needed to support and sustain research activities on and under the ocean. Consider what is needed: At a minimum, ocean science requires a seaworthy vessel, in good working order, run by a highly trained captain and crew. Further, durable and sophisticated equipment is needed to monitor physical characteristics of the ocean, such as ocean currents, salinity, pH, and water quality. To meet the needs the Sanctuary program continues to have to rely extensively on enticing scientists to do research within the Sanctuaries. Although the special characteristics of the sanctuaries are a big draw for scientists, meeting the management needs of these special ocean habitats cannot rely so heavily on serendipity and *ad hoc* management based upon information generated primarily by others. Effective stewardship requires far more dedicated funding for science.

Two of the clear science needs for the Sanctuary include:

TESTIMONY OF STEVEN D. GAINES

MARINE PROTECTED AREA MONITORING: Several Sanctuaries have implemented marine protected areas, including the large network in the Channel Islands and the emerging networks in other California sanctuaries as part of California's Marine Life Protection Act. Despite playing a lead role in implementing the Channel Islands process, the Sanctuary has had limited funding to monitor the impacts of these reserves. If it were not for a variety of other biological monitoring efforts, such as the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) and the kelp forest monitoring program of the National Park Service, there would be limited monitoring of the ecological effectiveness of this network. Even greater shortfalls exist in socioeconomic monitoring to evaluate the consequences of management decisions to humans. The Sanctuary program needs to be a leader in adaptive management and monitoring of its spatial management efforts. Moreover, in the face of pending climate change, monitoring of biological, physical and socioeconomic changes are even more critical.

HABITAT MAPPING: Most of the habitats within the National Marine Sanctuaries is not mapped. This creates a daunting management challenge. Seafloor maps have been essential tools for planning marine reserves in the west coast Sanctuaries, but many marine protected areas are being sited on the basis of very limited and inaccurate data. The efficacy of future planning and management efforts would be greatly enhanced by a concerted mapping effort.

Strategic investment facilitates research partnerships.

Despite very constrained funding for science, the Sanctuaries have strategically utilized science funding to facilitate research within the Sanctuaries. In particular, the investment of the National Marine Sanctuary Program in research vessels, even when the Sanctuaries do not have large research staffs, has paid great dividends. In the past several years, sanctuaries at Monterey Bay and the Channel Islands designed and purchased research vessels to help meet program needs, such as resource protection, research, education, and enforcement, and serve the needs of local scientists. Collaboration between scientists and the National Marine Sanctuary Program through use of sanctuary research vessels leads to improved communication and greater access to data, resulting in science-based management and decision-making.

The Channel Islands National Marine Sanctuary's 62' high-speed Teknicraft catamaran, *R/V Shearwater*, is used primarily as a research platform to conduct biological and oceanographic research in the waters of the Santa Barbara Channel. The vessel was designed to support a wide range of ocean research. Scientists can use wet and dry labs for on-board processing of samples and data. Dive operations are supported by onboard facilities and equipment. The vessel was designed with ample berths and stowage to support multiple-day excursions with crews of up to ten scientists. Our research organization PISCO collaborates with the Channel Islands National Marine Sanctuary to conduct shallow subtidal monitoring in and around marine reserves from the *R/V Shearwater*. By allocating days to different research groups, the Sanctuary has leveraged the investment in this vessel many times over by bringing in externally funded research

TESTIMONY OF STEVEN D. GAINES

partners. Such strategic investments in critical research infrastructure is key to the continued scientific study of the Sanctuaries. The *R/V Shearwater* also is used for educational field trips and emergency response in and around the Channel Islands National Marine Sanctuary.

The National Marine Sanctuary Program's *R/V Fulmar*, docked in the Monterey Bay National Marine Sanctuary, supports collaborative research, education and resource protection in national marine sanctuaries in central and northern California to inform and implement sanctuary management. The primary function of the *R/V Fulmar* is research and monitoring; the vessel is used for monitoring animals on the ocean bottom, as well as marine mammals and sea birds. Other research projects include mark and recapture of focal species, oceanographic monitoring, and archeological/cultural research. The research vessel is used by scientists to gather data to address emerging management issues, such as marine reserves and invasive species. The *R/V Fulmar* also serves as a platform for teacher workshops and other education and outreach activities.

Another asset for research and monitoring is the National Marine Sanctuary Program's aircraft that serves the Channel Islands and Monterey Bay sanctuaries. The aircraft makes weekly trips over each sanctuary, weather permitting. The aircraft enables personnel to monitor activity and resources, survey sanctuary users, conduct vessel traffic studies, observe the effects of shore runoff, perform aerial surveys during oil spill emergencies, and collect data on marine mammals and kelp forests. Special onboard equipment includes a Global Positioning System and laptop computer. Position information can be downloaded instantly to register the location of vessels and other objects in sanctuary waters. The aircraft has been used to survey commercial and recreational vessels in the Channel Islands National Marine Sanctuary since 1998. This fall, data from the Sanctuary Aerial Monitoring and Spatial Analysis Program (SAMSAP) will be used to evaluate changes in the numbers and distribution of vessels before and after marine reserves were established. This aerial monitoring program fulfills one of the top priorities identified for monitoring marine reserves and the National Marine Sanctuary Program should strive to continue aerial surveys to maintain consistency and provide valuable data for science-based management and decision-making.

The National Marine Sanctuary Program partners effectively with academic scientists to advance education about ocean ecosystems.

The National Marine Sanctuary Program has fostered a strong link between education and science. Education and volunteer coordinators at each sanctuary use scientific information about the ocean to develop educational programs and curricula. In our region, the Channel Islands National Marine Sanctuary works with local schools to increase the use of marine science to meet California teaching standards. The sanctuary sponsors an adult education course and "From Shore to Sea," a series of public lectures by scientists. Local scientists also give lectures during training for the Sanctuary Naturalist Corps, a group of volunteers who interact with the public on the Channel Islands and on wildlife watching vessels in the Santa Barbara Channel.

TESTIMONY OF STEVEN D. GAINES

To strengthen the connection between the sanctuary and the University of California, Santa Barbara, leaders from NOAA and the university have developed a plan to bring the Channel Islands National Marine Sanctuary administration, education, and research programs to the university campus. With funding from a federal grant and the National Marine Sanctuary Program, the university will build an office and education center on campus. Administrative offices of the Channel Islands National Marine Sanctuary will be housed at the center, which will be next to the Marine Science Research Building. The education center, known as the Outreach Center for Teaching Ocean Science (OCTOS), will house aquaria, exhibits, and an immersion theatre designed to link students of all ages to ocean ecosystems. It will highlight the unique habitats and innovative research being done within the nation's Sanctuaries. The facility will accommodate up to 180 schoolchildren per day.

The National Marine Sanctuary Program will thrive in this environment. Just as the Sanctuary's research partnerships have been quite successful in leveraging Sanctuary funds and extending its scientific reach, the Sanctuary's education program will have opportunities to work with teacher training programs at the university, student interns who are enrolled at the university and thousands of students who attend or visit the university. The Sanctuary's research program will have access to cutting-edge science conducted at the Marine Science Institute and opportunities to partner with graduate and undergraduate students on research in the Channel Islands National Marine Sanctuary. The sanctuary's administration will have opportunities to interact with university scientists to learn about new advances in science, leading to informed and science-based management. I see great opportunities to expand these Sanctuary University partnerships around the country to further enhance ocean education.

Conclusion

As you evaluate the reauthorization of the National Marine Sanctuary Program, I urge you to consider its important role in marine science and education. In cases such as the process to establish the Channel Islands marine reserves, the sanctuaries have incorporated science into education and outreach, planning and implementation, monitoring and evaluation. Some of the Sanctuaries have done this in very innovative ways that need to be expanded across the system and defined more explicitly as a mandate within the NMSA. The sanctuaries have provided funding, staff, vessels and aircraft to promote the role of science in management and decision-making that is critical to promoting healthy ocean ecosystems. However, current funding to science within the National Marine Sanctuary Program will not sustain this fundamental monitoring and research. Strong partnerships between the National Marine Sanctuary Program and the academic research community must be cultivated and maintained to address the need for science in resource management, education and outreach to students, stakeholders and other citizens of our blue planet.

Thank you again for inviting me to testify here today.