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Balancing Resource Utilization with Resource Protection: The Flower Garden Banks Marine Sanctuary—A Success Story

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ing the restrictions that do exist in sanctuaries can be difficult because of large areas and small budgets, and funding for the National Marine Sanctuary Program has remained too low to meet all of its obligations. Clearly, many marine protected areas provide little protection and cannot provide scientists and managers with valuable baseline information about ecosystem functioning in the absence of human use.

Flower Garden Banks National Marine Sanctuary presents an interesting case study of compatible use in marine protected areas. With thoughtful foresight, benthic cover and coral growth studies were initiated in the mid-70s, before hydrocarbon production began to provide a baseline against which future data could be compared and from which conclusions about the effects of these activities could be reached. Conscientious research and monitoring have continued over the years, and the data suggest that the coral reefs remain healthy. Moreover, these data have specifically been used to manage oil and gas activities in the area in order to reduce the impact on the reefs, and no-activity zones surround the banks. The oil and gas industry has cooperated and has supported these activities in the Sanctuary in a way we can only wish all industries would, given the numerous threats to the biosphere from human activities. In an ideal world, we would have such informed and coordinated management in all our resource extraction and consumption activities.

And yet clearly this is not a pristine system. Fishing has profound effects on marine ecosystems, and fishing for snappers and groupers occurs throughout much of the Sanctuary. Pre-fishing baseline data on targeted fish populations and other marine life caught as bycatch do not exist, and so fishing effects are difficult (if not impossible) to determine. Even when we have better information, such as we do with oil and gas activities, uncertainty remains. Given how little we truly understand about these systems, are there ways in which oil and gas or other human uses are altering the ecosystem that we have not yet detected? How much certainty do we have that all species associated with the reefs remain unaffected by the human activities allowed within the Sanctuary? And given the tremendous other stresses that these species face outside of the Sanctuary, can we fully understand the cumulative effects of global pollution, habitat loss, overfishing, and bycatch on Sanctuary marine life and how Sanctuary activities might add stresses to already diminished populations? There is also the ulti-

mate uncertainty: accidents. Wherever human activities occur, the potential for unexpected errors with disastrous implications and results exists.

Despite better conservation within sanctuaries than without, inadequate management throughout most of the world and our poor understanding of the marine environment in general suggest that we need some areas in which no human activities are allowed as an insurance policy against ignorance and bad management. Could species like endangered sea turtles, threatened by loss of nesting areas, diseases, fish trawls, and marine debris, benefit from substantial oil and gas-free zones or no-take areas free from fishing? Common sense suggests the answer is yes; reducing the overall stresses that these fragile species face should help them recover. But in what cases and for what species are "no activity" or "no-take" zones effective? Where should we place these zones? How much area should they encompass? Increased marine conservation biology research and monitoring, not just in Flower Garden Banks but throughout the world, can help us answer these questions and can help us design and manage more effective marine protected areas.

We have a lot to learn to improve our management in most of the marine environment. This knowledge—often gleaned from our National Marine Sanctuaries and other protected areas—will help us both sustain and use those living marine resources that we need for economic, ecological, cultural, aesthetic, and other reasons. But given the complexities of natural systems, we will never know it all. A certain amount of uncertainty will always be with us, and hence the need to have some areas that we simply leave alone.

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BALANCING RESOURCE UTILIZATION WITH RESOURCE PROTECTION: THE FLOWER GARDEN BANKS MARINE SANCTUARY—A SUCCESS STORY.—The Gulf of Mexico is an incredibly rich resource, providing the nation with food, energy, transporta-

tion, recreation, revenue, and jobs, and accounting for billions of dollars of economic activity annually.

Almost one-half of the nation's export and import shipping tonnage moves through Gulf ports. The Gulf of Mexico accounts for approximately 20% of the commercial fish yield in the U.S.A. and nearly one-third of U.S. recreational fishery. The Gulf is also an essential source of fuel. It provides almost one-fifth of the crude oil produced in the United States and close to 30% of the natural gas, giving us the freedom to drive where we want when we want, to heat and cool our homes, and to run our schools and offices. In addition, it provides the raw materials from which countless products, such as medications, paints, plastics, and almost everything else we use on a daily basis, are made.

The Gulf is also a significant environmental resource, bordering approximately one-half of the total wetland area of the continental United States. It also provides a critical habitat for large populations of finfish, shellfish, shorebirds, and colonial nesting birds as well as 75% of the migratory waterfowl traversing the nation.

Given that growing amounts of pressure and competing demands will be placed on these diverse and valuable Gulf resources, it is imperative that we employ resource utilization and conservation practices that are environmentally sound without diminishing our quality of life. While accomplishing this is no easy task, success in this area will ensure a balance between our demands and expectations of the Gulf's resources and the ability of those resources to meet the demands of this and future generations.

FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY

The Flower Garden Banks National Marine Sanctuary, located about 110 miles south of Galveston, TX, comprises the northernmost extension of typically Caribbean coral reefs on the Atlantic continental shelf. It is also an area of particular geologic value. Hydrocarbon resources found in the flanks of salt domes that form the base of the East and West Flower Garden Banks led to the offshore energy business's interest in the area in the early 1970s. Today, the Sanctuary serves as a standard by which other marine areas should be managed. The Flower Garden Banks National Marine Sanctuary offers a prime example of how unique marine resources can and should be

effectively managed and how resource utilization and environmental conservation can co-exist.

MULTIPLE USE OF SANCTUARY RESOURCES

More so than any of the 12 national marine sanctuaries, the Flower Garden Sanctuary embodies the concept of "multiple use" within its management plan. The concept, required by the National Marine Sanctuary Program, allows for commercial activities so long as they are not detrimental in any significant way to Sanctuary resources, implying the use of sound science in making such policy decisions. While the Flower Garden management plan seeks to prevent adverse effects on the reefs, it recognizes that commercial activity is occurring in and near the Sanctuary's boundaries.

Commercial diving charters, vessel traffic, and oil and gas operations all occur within or near the area. The Sanctuary managers recognized the value of these multiple uses and sought to involve each as a partner in efforts to protect the reef system. Here, the Sanctuary chose to involve stakeholders rather than seek management options to control or limit their activities.

It was in 1973 that the first Flower Garden "multiple use" meeting was held by the Department of the Interior. It featured discussion on plans for a long-term research and monitoring of the coral reef system as well as the development of stipulations to protect the bank from possible impacts (Bright et al., 1985).

This meeting became the forerunner of future meetings, during which the offshore oil and gas business, federal agencies, and the academic community worked together to craft solutions that ensured both protection for the sensitive coral reef communities and opportunities for continued commercial activity.

These discussions led to the establishment in 1978 of an extensive research and monitoring program to observe critical aspects of the reef system. The result has been a sustained, long-term, and standardized data collection effort that has offered significant benefits to the scientific, business, and regulatory communities (Deslarzes, 1998).

INNOVATIVE MANAGEMENT APPROACHES AND PARTNERSHIPS

Much has changed in the oil and gas business since the early 1970s. In 1981, a production platform was placed within 1.5 miles of

the eastern bank of the Flower Garden Sanctuary, and in 1988, a platform was placed within 4 miles of the western bank, and as a result of industry's presence near the Sanctuary, a new partnership was forged.

The remote location of the Sanctuary presented a logistical barrier to detailed research, a barrier that the offshore oil and gas business has helped researchers and scientists to overcome. The Sanctuary monitoring and research programs continued and were expanded during this phase of resource development.

Mobil's natural gas platform on High-Island A389 and the Union facility placed near the west bank provided both the Sanctuary program and other scientists with a research "platform" for staging and conducting scientific studies of the reef systems. Through the assistance of these energy companies and with the active support of the Sanctuary management team, we now have a better understanding of one of the most unique and biologically diverse areas of the Gulf, an understanding that will undoubtedly aid in its preservation.

Today, this cooperative research and monitoring program has grown to include other federal agencies, academic institutions, and Sanctuary user groups. The result is an innovative management regime that provides resource protection while recognizing the societal demands of resource development and commercial activities in the marine environment.

This partnership arrangement has raised the level of communication and trust between the energy business and the Sanctuary program. It is a relationship that has afforded the Sanctuary management team an opportunity to learn more about the oil and gas operations, projects, technologies, and programs being undertaken throughout the Gulf, as they may have application to future activities occurring within or near the Sanctuary.

Other benefits include the energy business's sense of ownership and involvement in the future of the marine resource. In working near the site, energy companies have been present to report actions that affect the reefs, including anchoring damage from large cargo vessels or smaller charter boats. The companies have assisted the Sanctuary by offering on-site education to these and other users on the measures and precautions that should be taken to protect the marine area.

COMPATIBILITY OF RESOURCE PROTECTION AND DEVELOPMENT

The level of effectiveness and success of the Sanctuary's resource protection program can

best be measured by the amount of ecosystem change observed. Since the monitoring first began, over 14 yr before the designation of the site as a marine sanctuary, no statistically significant changes have been documented that might be attributed to increasing hydrocarbon development in the vicinity of the banks (Gittings, 1992). In fact, coral growth rates have remained "enviable," even by tropical standards.

Potential industrial effects caused by offshore development have been monitored but have never been detected, nor have any long-term water-quality changes. The Sanctuary monitoring data suggest that existing regulation of offshore oil and gas operations has effectively eliminated environmental effects on the reefs.

A SCIENTIFIC BASIS FOR MARINE AREA MANAGEMENT

The Sanctuary managers have ensured that virtually all of the Sanctuary's regulations, boundary determinations, and policy decisions are justified on the basis of previous or on-going objective scientific research. The Sanctuary has utilized the science developed through the monitoring program to determine the legitimacy of perceived impacts to Sanctuary resources and to develop appropriate responses, where they are necessary.

From the energy perspective, the Sanctuary management plan has done little to affect the normal operations associated with oil and gas production, having incorporated lease and operational stipulations established as a result of the first "multiple use" meetings. From a Sanctuary manager's perspective, the reliance upon science for formulating policy decisions has resulted in few questions or complaints from either commercial or other regulatory interests.

UNIQUE MARINE AREAS—SIZE DOES MATTER

Unlike the nation's other protected marine sites, the Flower Garden Sanctuary extends no further than needed to effectively protect the banks from the identified, legitimate threats to their health. At 143 km², the Flower Garden Sanctuary is not the smallest sanctuary in the national system, but it is the only sanctuary to use science and the reach of the area's unique reef community to prescribe its boundaries.

We have witnessed the creation of large marine sanctuaries with boundaries extended so as to encompass perceived threatening human impacts on marine areas. The large marine

sanctuaries on the West Coast offer examples in this regard. As this extended jurisdiction is intended to control uses rather than to protect unique marine resources, the sanctuary's association with nationally significant resources is undermined, and it finds itself answering to political rather than to scientific opinion. The result is an unmanageable marine area, both in terms of financial and human resources but also in terms of meeting the objectives of protecting unique marine resources.

If a sanctuary is to adequately manage and protect the resources it encompasses, it must be able to characterize the area's health and biodiversity so that it can implement an appropriate management regime. Small sanctuaries make the job of site characterization a lot easier, as witnessed by the health of the Flower Garden coral reefs. The Flower Garden Banks National Marine Sanctuary is the right fit.

BALANCING RESOURCE PROTECTION WITH RESOURCE DEVELOPMENT

Whether we can achieve long-term marine resource protection while at the same time continuing to develop and utilize marine resources is a question that is not always debated in a sensible manner. Too often the question of the compatibility of these two objectives is subject to the arguments of politics and emotion rather than to science and cooperative dialogue.

The Flower Garden Banks National Marine Sanctuary offers an example of a program that has utilized science and partnerships to achieve the multiple use goals of a healthy marine ecosystem and continued opportunities for resource development. It has done so through a number of innovative approaches,

each offering considerable benefits to the program, the private sector, and, ultimately, to the health of the Flower Garden Banks.

Its effective resource protection and sanctuary management has been successful mainly because of the Sanctuary's efforts to seek out the involvement of and to partner with Sanctuary user groups and resource managers. It has developed a management approach that recognizes the full suite of commercial activities occurring outside its boundaries and has established program policies built upon on-going objective scientific research.

On the basis of these management initiatives and the long-term partnership established to monitor the reefs, the question of compatibility between development and resource protection was best summarized by a former Flower Garden Banks Sanctuary program manager this way—"properly regulated, development can proceed in some sensitive environments."

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