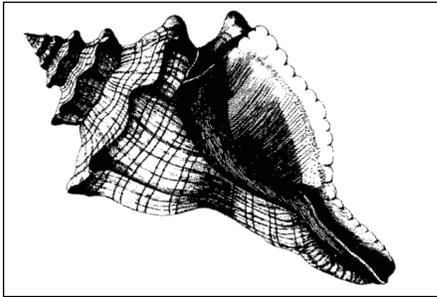


# FLORIDA KEYS NATIONAL MARINE SANCTUARY



### Situation

With the Florida Keys ecosystem threatened by point and non-point source pollution, alternative management strategies outlined in the Florida Keys National Marine Sanctuary Plan have focused on the cost-effectiveness of different issues or activities for achieving sustainable use of the Florida Keys National Marine Sanctuary: boating, fishing, recreation, land use, water quality, zoning, and education. This case study focuses on different strategies of zoning.

### Background

The marine ecosystem of the Florida Keys is the only complete tropical marine ecosystem in the continental United States. It includes extensive aquatic habitats such as coral reefs and seagrass beds. Ninety percent of the region's commercially important species use these habitats for shelter, food, or nurseries during at least one stage of their life history. Several species of threatened and endangered sea turtles are found in the Keys, including hawksbill, loggerhead, leatherback, green, and Kemp's ridley. In addition, dolphins and endangered manatees frequent the area, as well as countless species of sea and shore birds. Another aspect of the area's marine environment is the submerged cultural and historic resources, for example, submerged Paleo-Indian sites, nationally registered lighthouses, and wrecked ships going back several hundred years.

The Keys ecosystem is threatened by impacts from a number of different sources, indirect and direct. Indirect impacts contributing to the decline of the reefs and seagrass beds include polluted runoff from over-developed islands; heavy metals and other toxins which contaminate the reefs; excess nutrients from human sewage, fertilizers, detergents, and animal wastes which create algal blooms; pesticides; offshore oil and mineral mining; and saltwater/freshwater imbalances. Direct impacts include vessel

groundings, diver damage to coral, and boating traffic (anchor and prop dredging) which destroys seagrass beds, and destructive fishing methods.

To protect the Keys marine ecosystem, Congress enacted the Florida Keys National Marine Sanctuary and Protection Act of 1990.<sup>1</sup> The legislation to provide comprehensive protection to the Keys' marine environment was prompted by recognition in the late 1980s of human impacts that threatened sanctuary resources. The sanctuary area extends approximately 220 miles southwest from the southern tip of the Florida peninsula and encompasses a 2,600-square nautical mile area of submerged lands and water surrounding Monroe County, Florida.

Protected areas and marine sanctuaries are not new to the Florida Keys area. The Key Largo and Looe Key Marine Sanctuaries were established in 1975 and 1981, respectively, and according to the Act, they will be incorporated into the new Florida Keys Sanctuary when the management plan is adopted. Numerous State and Federal parks and reserves are also located within the boundaries of the Sanctuary.

The existing regulations of current jurisdictional responsibilities allow sport and commercial fishing with hook and line; taking of spiny lobsters and stone crabs in accordance with the fishery management plan; and swimming, snorkeling, scuba diving, photography, and recreational boating. Regulations prohibit removing or damaging natural features, non-permitted marine life, or archaeological and historical resources; dredging, filling, excavating, and building; anchoring in a manner that damages coral; discharging harmful substances into the water; spear fishing or using wire fish traps; and handling or standing on coral formations. Specific regulations already in place as a result of the Florida National Marine Sanctuary Protection Act prohibit all oil drilling and exploration within the Sanctuary and the operation of tank ships or other vessels greater than 50 meters in Areas To Be Avoided, which were designated in response to the region's many historical groundings.

In addition to creating one of the largest national marine sanctuaries, the Act also requires the National Oceanic and Atmospheric Administration (NOAA), which administers the National Marine Sanctuaries program, to prepare an environmental impact statement and a comprehensive management plan for the Sanctuary with implementing regulations to govern the overall management of the Sanctuary and to protect Sanctuary resources and qualities.

## The Local Economy

The Florida Keys economy is dependent on a healthy ecosystem. In 1991, Florida Keys' and Monroe County's gross earnings were \$853 million. The activities that contributed most to those earnings were recreation and tourism, commercial fishing, and retirement communities. These activities combined make up more than 80 percent of the local economy. Over three million tourists visit the Keys annually, participating principally in water related sports such as fishing, diving, boating, and other ecotourism activities. In fact, 61 percent of the recreation and tourist activities are water-related — the Keys have been hailed as the most important dive destination in the world. In addition, multi-million dollar fisheries for spiny lobster, stone crab, grouper, and snapper have supported local and regional economies for generations. Commercial fishing is the fourth-

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<sup>1</sup> The information presented in this case study was obtained from existing sources, primarily from NOAA's Florida Keys National Marine Sanctuary, Draft Management Plan/Environmental Impact Statement. While the Draft Management Plan/EIS examines several issues, this case study gives particular emphasis specifically to zoning issues and de-emphasizes other issues that were addressed in the Draft Management Plan/EIS.

largest industry in the Florida Keys region and represents 9 percent of Monroe County’s private-sector employment. Case Table 3.1 provides more information about the value of specific services provided by the ecosystem and economic impacts.

**Case Table 3.1. Overview of Economic Situation.**

Economic Value of Florida Keys		Economic Impacts	
Service	Value	Activity	Impact
Annual non-market user value of water-related activities	\$660 million	Gross earning provided by tourism industry	35% (\$309 million)
Asset vlue of the Keys for water related activities (1990 dollars)	\$22 billion	Gross earnings provided by retail trade	18.7% (\$160 million)
1990 ex-vessel value of commercial fishing in sanctuary	\$46 million	Population with jobs that either directly or indirectly support outdoor recreation	51%
1986 ex-vessel value of Monroe County’s seafood landings	\$27.4 million	Monies provided by commercial fishing	\$17 million
Value of seafood landings at the harvesting, wholesale, retail and restaurant levels	\$14.8 million		

## NOAA’s Proposed Alternative Management Plans

In fulfillment of the mandate to prepare an environmental impact statement and a comprehensive management plan for the Sanctuary, NOAA developed and assessed five alternative management plans. These plans represent different levels of regulatory control over Sanctuary resources and restriction of uses, with Alternative I being the most restrictive (total restriction of uses, except for research) and Alternative V the least restrictive (no action). The purpose of NOAA’s proposed Alternative Management Plans is to ensure the sustainable use of the Key’s marine environment by achieving a balance between comprehensive resource protection and multiple, compatible uses of those resources.

Each of the five alternative plans are comprised of a series of management strategies that focus on the pertinent issues or activities considered to have potential resource impacts, positive or negative. These issues or activities include:

1. Boating
2. Commercial and Recreational Fishing
3. Recreation
4. Land Use
5. Water Quality
6. Zoning
7. Education

For each issue, the potential impact themes of habitats, species, use and users, and water quality were examined.

## Economic Impact Assessment

The purpose of the of the Florida Keys National Marine Sanctuary and Protection Act is to provide for multiple uses of the Sanctuary as well as to ensure that its natural resources are protected for the future.<sup>2</sup> However, due to the implementation of management strategies, such as zoning, the Act may also result in the displacement of some Sanctuary users and consumers.

Because the numerous users, consumers, and administrators of the Sanctuary have diverse and sometimes contradictory interests, a thorough examination and comparison of the Management Plans under consideration is essential. NEPA requires the assessment of environmental impacts in an Environmental Impact Statement. An analysis of the economic impacts, costs, and benefits of the proposed plans is an important part of this assessment, especially in light of the Keys' economic dependence on revenue generated from marine-related activities, and the value of the services provided by the ecosystem.

An economic impact assessment was conducted as part of the Draft Management Plan/Environmental Impact Statement. However, a net economic benefit analysis, examining the socio-economic implications of proposed actions by comparing economic costs and benefits, was not conducted. The economic impact assessment summarizes the potential impacts of proposed management strategies on various user groups and the local economy, for example, sales, employment, income. The socioeconomic impacts associated with the management strategies were assessed by issue, as outlined above and discussed in qualitative terms. The key strategies within each issue were assessed in terms of impact on user groups and expected socioeconomic costs and benefits.

Cost information for the analysis was based on negative impacts such as expected losses in user values, income, or employment. The cost information used in this assessment was provided by federal, state, and local officials with responsibilities in the Keys. Low- and high-range estimates were given for both capital and annual operating costs and costs for each proposed manage-

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<sup>2</sup> The Coral Reef Coalition. Inside the New Florida Keys National Marine Sanctuary.

ment strategy. Information on the effects of proposed actions on human activities was also derived as part of the process to develop a Sanctuary resource protection zoning scheme.

## Resource Protection Zones — Zoning Categories

This section describes the findings of the assessment of social and economic implications for zoning strategies proposed in the Alternative Management Plans. Zoning, as noted in the previous section, is one of the issues that has potential resource impacts.

The development of a management plan, then, provides the opportunity to establish different regulations for separate areas within the Sanctuary. Thus, one of NOAA's tasks under the Act is to consider temporal and geographic zoning to ensure protection of Sanctuary resources.

Zoning schemes were developed to ensure the protection of Sanctuary resources. The intent was to reduce both damage to those resources and threats to environmental quality, while allowing uses that are compatible with resource protection. The zones are intended to protect habitats and species by limiting consumptive and/or conflicting user activities, thus enabling resources to evolve in a natural state with minimal human influence.<sup>3</sup> Zoning will permit customary activities to continue in some areas, while other areas will be designated for preservation, research, or restoration. The resource protection zoning scheme proposes five types of resource protection zones (these are then described briefly):

1. Wildlife Management Zones
2. Sanctuary Preservation Areas (SPAS)
3. Existing Management Zones
4. Special-Use Zones
5. Replenishment Reserves

**WILDLIFE MANAGEMENT ZONES.** This strategy would affect user groups participating in wildlife observation or seeking access to these areas. Users participating in wildlife observation would see a small socio-economic benefit due to greater assurances of continued wildlife and habitat protection. However, most of these zones are already within national wildlife refuges and are under restrictions established by the U.S. Fish and Wildlife Service. As a result, the strategy is likely to have minimal socio-economic impacts on Sanctuary users.

**REPLENISHMENT RESERVES.** These reserves will encompass large diverse habitats and are intended to provide genetic protection for marine life. The goal is to increase the productivity in adjacent marine areas and enhance biodiversity. Sanctuary regulations will strictly limit resource use and consumption in these habitats. Some users, such as commercial lobster fishers, sport fishers, and tropical fish collectors will be displaced. However, compatible recreational activities will be permitted. Although these zones would prohibit commercial and recreational fishing, they are expected to have an overall benefit by protecting spawning and recruitment stocks from overfish-

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<sup>3</sup> National Oceanic and Atmospheric Administration. (December 1994). Florida Keys National Marine Sanctuary, Draft Management Plan/Environmental Impact Statement. V2, pp. 194.

ing, promoting genetic diversity within the fishery, producing “spill-over” benefits to other non-protected areas through the migration of organisms across boundaries, and providing important baseline data for use in managing fisheries in other areas. The zones become slightly larger and/or more numerous moving from Alternative IV to Alternative II.

**SANCTUARY PRESERVATION AREAS (SPAS).** These zones will focus on the protection of shallow, heavily used reefs where user conflicts occur and where concentrated visitor activity leads to resource degradation. As with Replenishment Reserves, the groups that will benefit are those that value an abundance and diversity of marine wildlife, including commercial and recreational fishers and participants in water-related recreation activities. However, tropical fish collectors, lobster fishermen, recreational fishers and spear fishers displaced from these areas will be negatively impacted.

**EXISTING MANAGEMENT AREAS.** Because these areas are already established by federal, state, or local authorities with competent jurisdiction in the Sanctuary, this strategy will have minimal socio-economic impact.

**SPECIAL-USE ZONES.** This strategy will have negligible socio-economic impacts on users because only a small number of areas will be established. Academic and scientific communities will be the primary beneficiaries of this zone type.

The socio-economic information generated by this analysis was used along with the environmental impact assessment data in the selection of a Preferred Management Alternative.<sup>4</sup>

## Exercise

While an economic impact assessment does provide some useful information in the evaluation of management alternatives, it does not provide more comprehensive information about the overall result of a given project or policy change. All of the proposed management strategies assessed in the NOAA plan affect some aspect of Sanctuary resources, either directly or indirectly.

Sanctuary resources (both natural and historic) can be considered assets that produce a flow of goods and services with both market and non-market values to users and non-users. The concept of non-market value is significant to the Keys and its economy. The area’s natural resources are considered public resources, not common property or privately owned. Tradeoffs between the effects of strategy implementation on economic values and economic impact are also pertinent to the Keys. Restrictions may increase the costs of consumptive use; however, protecting a resource may not only increase its quality and value but also have a long-term economic benefit to both consumptive and non-consumptive users.

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<sup>4</sup> Alternative III was chosen as the Preferred Management Plan. Volume I of the Florida Keys National Marine Sanctuary, Draft Management Plan/Environmental Impact Statement provides a description of the strategies recommended in the Management Plan. According to the selection committee, the positive environmental impacts and associated beneficial economic impacts of the Preferred Alternative (Alternative III) outweigh any potential negative impacts. Of the five alternatives, the one selected most closely meets the resource protection goals, while facilitating current Sanctuary users and user activities.

Some of the proposed Sanctuary Preservation Areas will displace current commercial and recreational fishers as well as tropical fish collection to non-zoned areas. This displacement may result in increased costs to fishers and consumers as well as decreased sales, employment, income, and tax revenues for the local economy dependent on this activity. However, the protection provided to these areas may have economic value to non-consumptive users. Furthermore, if resource degradation can be halted or reversed, there may be long-term benefits for consumptive users. While the existing economic assessment attempted to take these types of tradeoffs into account for each management strategy, it would be more informative to carefully consider how such an analysis is in fact operationalized. Such a consideration is one to examine in this exercise.

Reread this case study noting the economic values and costs that could be compared in a benefit-cost analysis.

1. What techniques would you recommend be used to measure the value of services identified above?
2. What types of resource values are missing?
3. What data would you need to conduct these studies?
4. Give particular attention to the effects on displaced fishers versus fishers who are not displaced, as well as to the various other tradeoffs that are made.
5. How does this information differ from the impact assessment on Resource Protection Zones provided by NOAA?