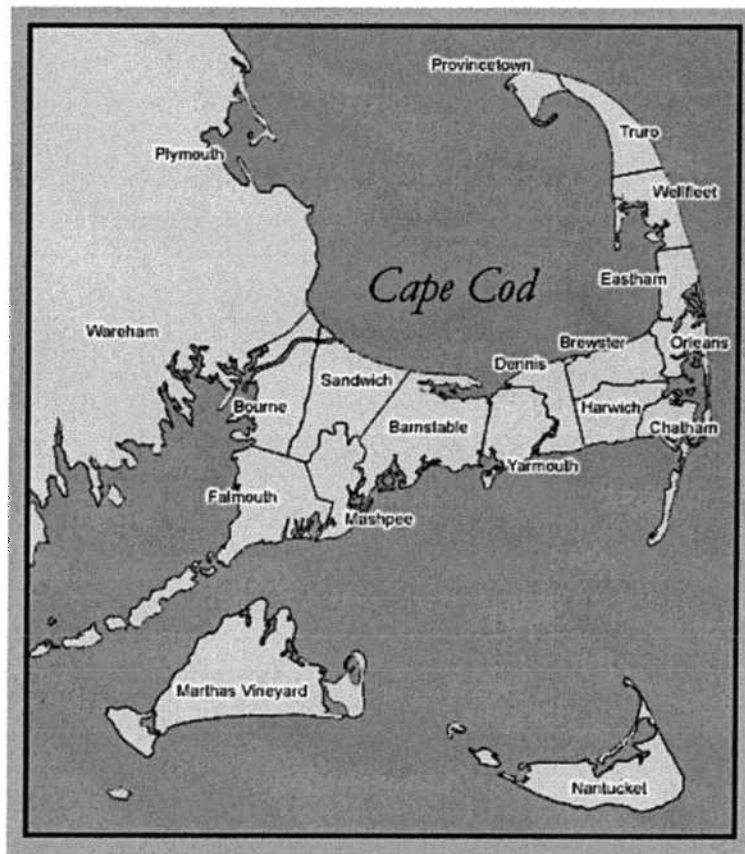


## Appendix E

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# NOAA National Marine Sanctuary Program Site Evaluation List Nantucket Sound/ Shoals and Oceanographer Canyon, Massachusetts

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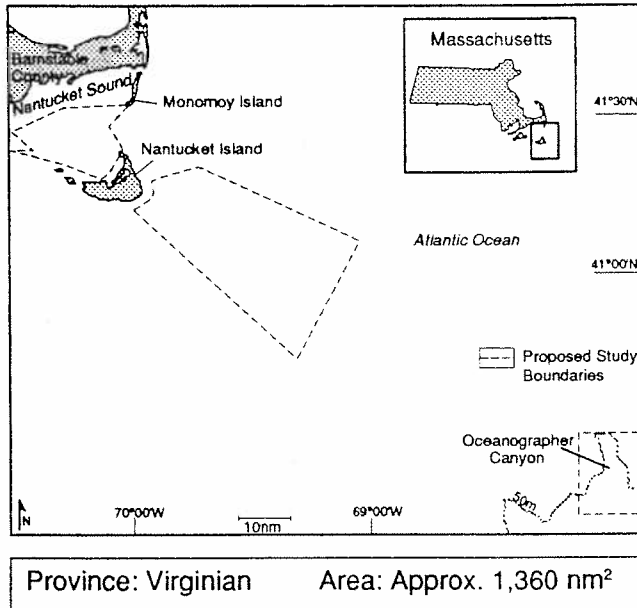


# NOAA National Marine Sanctuary Program

## Site Evaluation List

### Nantucket Sound/Shoals and Oceanographer Canyon, Massachusetts

#### Site Location



#### Rationale for Consideration as a National Marine Sanctuary

- The site provides a variety of coastal and marine habitats and species, and is a unique transition area between the Acadian and Virginian provinces.
- Nantucket Sound/Shoals and Oceanographer Canyon support the valuable commercial and recreational fisheries that make a large contribution to the regional economy.
- Tourism, another large portion of the local economy, is also based on the ecological, recreational, aesthetic, and cultural resources of the area.

#### National Significance

The site contains an array of rich habitats and species that displays circulation and migration patterns unique to the Georges Bank area. It also provides important economic and historical resources to both the local community and country. The opportunity for a Federal-State partnership in ocean resource protection is provided.

#### Current Status

Nantucket Shoals and Oceanographer Canyon appeared on the List of Recommended Areas (LRA) in 1979, as nominated by the U.S. Fish and Wildlife Service. Nantucket Sound/Shoals and Oceanographer Canyon was nominated as a single site by the North Atlantic Regional Evaluation Team in 1983 for placement on the Site Evaluation List (SEL); NOAA concurred and its status remains unchanged.

- The prestigious Woods Hole Oceanographic Institute is located near the site.
- The maritime tradition of Nantucket Sound makes an important contribution to the marine heritage of the country.
- The site provides a unique opportunity to integrate State and Federal marine protected areas, since the site lies adjacent to waters protected by Massachusetts' Ocean Sanctuary Act.

## Summary of Significant Resources

Category	Status/Concerns						Comments
	Unique/Rare	Threatened	Protected Species	Biological Importance	Commercial Importance	Recreational Importance	
Habitats							
Open bay				●	●		Important recreation area
Open waters				●			Recreation/commercial area
Shoals			●				Nursery habitat
Submarine canyon	●						Located on continental shelf edge
Species							
Plants							
Invertebrates				●	●		Lobster, clam, scallops, oyster
Fish				●	●		Cod, haddock, flounder, tuna
Reptiles			●				Several sea turtle species present
Birds			●				Peregrine falcon, terns, waterfowl
Marine mammals			●				Gray seals, humpback whales
Aesthetic Resources				●			Important draw to tourism industry
Recreation Resources				●			Concentration of activities
Education Resources	●						Woods Hole is located nearby
Research Resources	●						Strong research history
Cultural Resources	●						Strong maritime heritage

### The National Marine Sanctuary Program

Authorized by the Marine Protection, Research, and Sanctuaries Act of 1972, the National Marine Sanctuary Program was created to identify, designate, and manage nationally significant marine and Great Lake waters. National significance is based on the conservation, ecological, aesthetic, recreational, historical, research, and/or educational value of the site.

The Site Evaluation List (SEL) is the pool of sites from which future National Marine Sanctuaries are chosen. In order for a site to be placed on the SEL, it must be judged to be of special national significance. Being on the SEL does not guarantee a site will become a Sanctuary, but it is the necessary first step. The site may then be selected as an Active Candidate, based on factors including available staff and resources, biogeographic and resource representation, and relative costs and benefits of designa-

tion. The designation process includes the preparation of an Environmental Impact Statement/Management Plan, consultation with governmental bodies, and public meetings. With the approval of Congress (and the concurrence of the Governor where state waters are included), the Secretary of Commerce designates the site as a National Marine Sanctuary.

### Contact

For more information about Nantucket Sound/Shoals and Oceanographer Canyon, the Site Evaluation List, or the National Marine Sanctuary Program, please contact the Sanctuaries and Reserves Division at:

Sanctuaries and Reserves Division  
 National Oceanic and Atmospheric Administration  
 1825 Connecticut Avenue, N.W., Suite 714  
 Washington, D.C. 20235  
 (202) 606-4126

# Nantucket Sound/Shoals and Oceanographer Canyon, Massachusetts

## Site Location

### Latitude and Longitude

The three components of the site are bound by 1) 41°29.8'N x 70°30.5'W to 41°27.0'N x 70°26.1'W to 41°20.6'N x 70°22.9'W to 41°23.5'N x 70°17.6'W to 41°20.7'N x 70°8.8'W to 41°21.3'N x 70°6.0'W to 41°26.5'N x 70°3.3'W to 41°27.8'N x 70°3.3'W to 41°30.6'N x 70°7.7'W to 41°36.0'N x 70°4.2'W to 41°34.3'N x 70°18.8'W (Nantucket Sound to the State water line); 2) 41°13.8'N x 70°0.0'W to 41°18.9'N x 69°55.9'W to 41°20.3'N x 69°43.4'W to 41°6.0'N x 69°4.0'W to 40°44.4'N x 69°19.2'W (Nantucket Shoals); and 3) 40°15.0'N x 68°15.0'W to 40°15.0'N x 68°0.0'W to 40°30.0'N x 68°0.0'W to 40°30.0'N x 68°15.0'W (Oceanographer Canyon).

### Biogeographic Representation

**Province:** Virginian

**Representativeness:** This site occupies a unique position as a transition zone between the Acadian and Virginian coastal provinces, and displays migration and circulation patterns unique to the Georges Bank region.

**Other Representation in Province:** Norfolk Canyon National Marine Sanctuary (proposed) and three other SEL sites are also found in this province.

### Boundary Alternatives

The site is formed by three biological components of diverse habitat types (Nantucket Sound, Nantucket Shoals, and Oceanographer Canyon). The total area of the site is 1,360 nm<sup>2</sup> and contains both State and Federal waters.

### Site Description

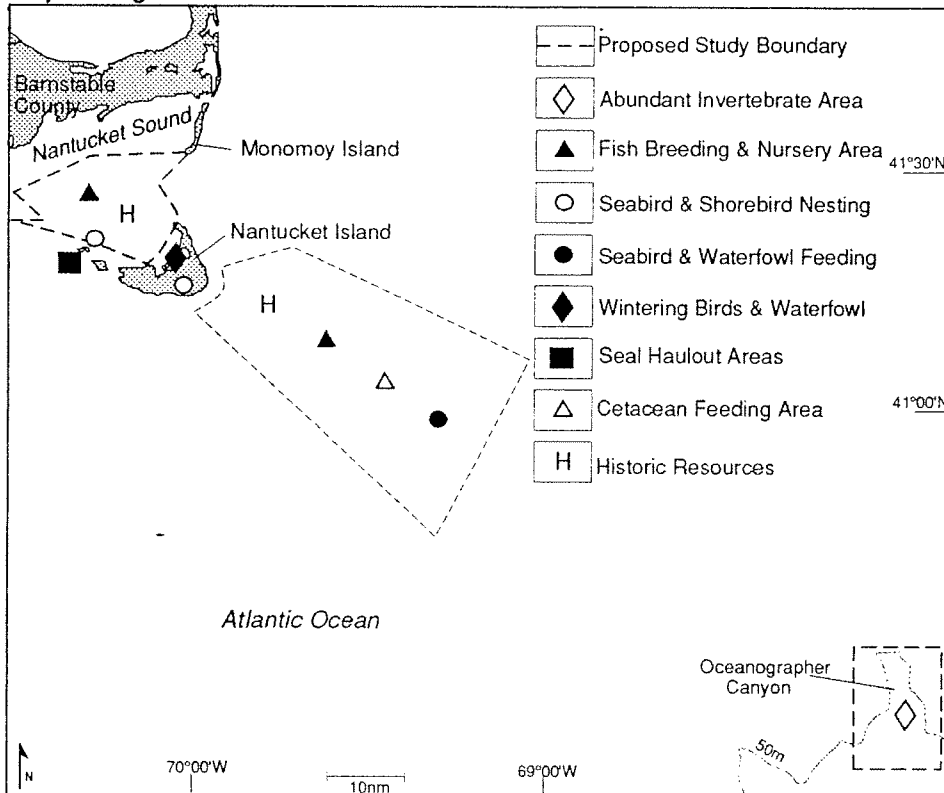
#### Natural Resource Values

**Ecosystem Features/Community Representation:** The three components of the site provide a variety of coastal and marine habitats, including open bay, open waters, shoals, and a shelf-edge submarine canyon (Map 1). The richness and variety of these natural communities, partially as a result of the transitional character, provide not only high productivity but ecological stability as well. Oceanographer Canyon, situated on the edge of the continental shelf, serves as a conduit for the transport of material from the shelf into the abyss.

**Biological Productivity:** An area of upwelling along the eastern edge of the Nantucket shoals supports the high productivity noted in this area.

**Biodiversity/Species Representation:** The site displays a rich biotic collection, with invertebrate, fish, and bird species being the most diverse and abundant (Table 1). One unique species of the site is the beach meadow vole, which is found only on Muskeget Island. Endangered and threatened species found in the site include sea turtles, least tern, roseate tern, peregrine falcon, and humpback whale.

Map 1. Significant Features



# Nantucket Sound/Shoals and Oceanographer Canyon, Massachusetts

**Table 1. Species Presence**

<b>Invertebrates</b>	Red hake Silver hake Atlantic cod Haddock Pollock Black sea bass Striped bass Bluefish Scup White perch Atlantic croaker Tautog Atlantic mackerel Bluefin tuna White marlin	<b>Birds</b>	Snowy egret Black-crowned night heron American bittern Glossy ibis Common gallinule American coot American oystercatcher *Piping plover Spotted sandpiper Dunlin Sanderling Great black-backed gull Herring gull Arctic tern Common tern *Least tern *Roseate tern
<b>Fish</b>	Smooth dogfish Spiny dogfish Atlantic sturgeon Alewife Atlantic menhaden American shad Atlantic herring Sea herring	Yellowtail flounder <b>Reptiles</b> * ,#Sea turtles	<b>Mammals</b>
		Whitewing scoter Marsh hawk *Peregrine falcon Great egret	Beach meadow vole Gray seal *Humpback whale

\*Federal endangered, #Federal threatened

**Species Maintenance:** The shoals are an important spawning area for cod and other species (Table 2). Humpback whales migrate and feed in the area, and gray seals breed on the small islands. Wintering grounds for waterfowl and nesting grounds for shorebirds are also provided.

**Habitat Features:**

**Shoreline Types:** The coastline is composed of dunes, beaches, and salt ponds.

**Geology:** Glacial processes have been responsible for the formation and character of this area.

The shoals and interspersed channels are a result of glacially deposited sediments (mainly sandy gravel) that have been worked and re-worked by the strong, erratic currents characterizing the waters.

**Hydrology:** January surface currents are southwesterly; in July, they turn more toward the south, but develop westerly crosscurrents. This is a gross oversimplification of the actual current systems; the shoals have strong, erratic currents and rough conditions. The tidal range is about 1 m. January surface temperatures average about 5°C, and range from 12.5°C to 15°C in July.

**Table 2. Life History/Utilization Characteristics for Selected Species**

Species	Utilization						
	Resident	Migrant (Sum, Win)	Haulout or Rest Site	Breeding Area	Nursery/ Nesting Area	Juvenile Area	Feeding Area
Herring spp		Win		●			
Atlantic menhaden	●						
Atlantic mackerel	●						
Mute swan		Win		●			
Common eider		Win					●
Whitewing scoter		Win					
Peregrine falcon			●				
Dunlin		Win					
Least tern					●		
Roseate tern					●		
Gray seal			●		●		
Humpback whale							●

## Nantucket Sound/Shoals and Oceanographer Canyon, Massachusetts

**Natural Hazards:** The currents, rough conditions, and bad weather make this a hazardous boating and shipping area.

### Human Use Values

**Fisheries Resources:** Significant commercial and sport fisheries are supported by the site, and depend on the maintenance of good water quality. The most valuable commercial finfish are cod, yellowtail and winter flounder, haddock, bluefin tuna, and swordfish. The most valuable shellfish are bay and sea scallops, lobster, oyster, soft-shell clams, and blue mussels. Striped bass, flounder, bluefish, and scup are taken recreationally. Bloodworms and clamworms are harvested commercially as bait.

**Aesthetic and Recreation Resources:** The Nantucket region has a high degree of recreational and vacation activities. Boating, fishing, swimming, and sight-seeing are some of the activities resulting from the aesthetic resources and high quality waters. These and other recreational activities are supported by 81 boating ramps, 18 docks, 12 fishing piers, and over 260 km of beach. In 1984, there were 56 party boats in 24 ports and 127 charter boats in 33 ports.

**Education and Interpretation Opportunities:** The prestigious Woods Hole Oceanographic Institute is close to the site, and provides a unique opportunity for integration of a well-established and well-known education program into Sanctuary interpretive activities.

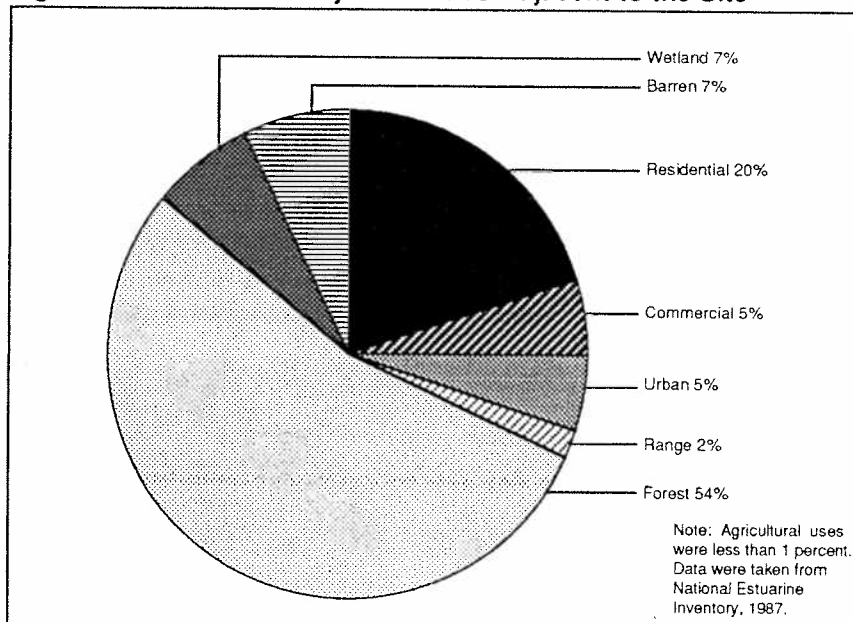
**Research Opportunities and Resources:** Oceanographer Canyon is one of the better-studied marine canyons on the northeast coast, though basic research indicates that canyon ecology can differ from one to the next. The Nantucket region provides opportunities for research in biogeographic relationships, glacial processes and geology, and shelf-edge ecology. The University of Massachusetts maintains the Nantucket Field Station, and Woods Hole Oceanographic Institute is located nearby.

**Historical and Cultural Resources and Value:** Although it contains a number of shipwrecks, the site's primary cultural value is its contribution to the maritime heritage of the country. Since the Revolutionary War, the Nantucket region has served as the home of shipyards, home ports, and shipping corridors for a major segment of coastal industries. Nantucket's Brant Point Lighthouse was built in 1746 and is still active.

### Impacts of Human Activities

**Population Trends:** The major counties adjacent to the site (Barnstable, Duke, and Nantucket) have experienced significant growth in the last 20 years (47 percent population increase), which is greater than Massachusetts (6 percent) and the United States (21 percent) over the same period. Although the rate of increase is expected to slow (to 14 percent from 1990 to 2010), this growth will still be greater than that projected for the State and Nation. Increasing population will place increasing pressure on coastal and marine resources, and make both planning and protection more important than ever.

Figure 1. Land Use in Major Counties Adjacent to the Site



**Land Use:** Nearly half of the land adjacent to the site is forested, with other large portions used for urban and residential purposes (Figure 1). The large developed portions indicate potentially large sources of pollution and runoff.

## Nantucket Sound/Shoals and Oceanographer Canyon, Massachusetts

**Commercial/Industrial/Service Activities:** Six wastewater treatment plants are in the counties adjacent to the site (Barnstable, Dukes, and Nantucket); of these, half have ocean discharge and the other half have inland or estuarine discharge. Four of the plants have no or only primary treatment. A low volume oil pipeline crosses the southwest portion of the sound. Nantucket Harbor is a fishing port and houses commercial and recreational vessels. Nantucket Island has an airport.

**Military Uses:** There is little military use of the site. Otis Air Force Base, located on Cape Cod, is the closest military facility.

**Ocean Mining and Mineral Extraction:** Although Oceanographer Canyon is in an area known to have high hydrocarbon potential, the site is not part of proposed lease sales for 1992 to 1997.

### Pollution and Physical Impacts

The primary sources of pollution are urban runoff and wastewater treatment plants. Commercial shipping, another potential source of pollution, has been moved away from the shoal area in the interests of environmental protection and shipping safety (see discussion under Relationship to Existing Program).

## Management Concerns

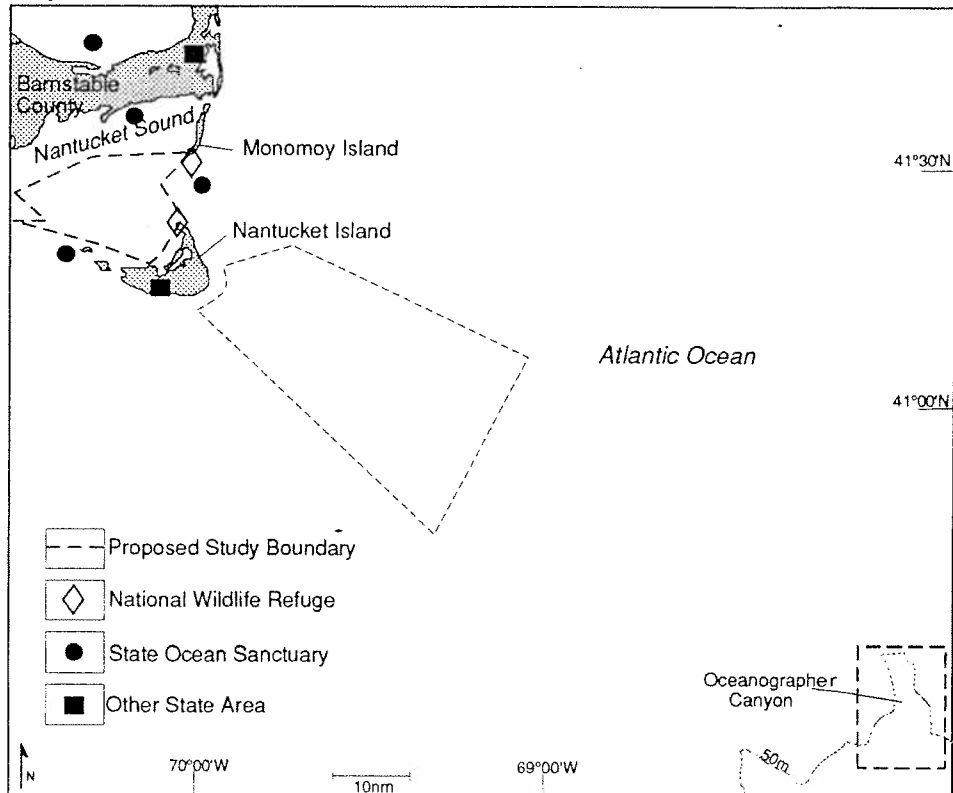
### Management of the Site as a Conservation Unit

Although the three components of the site are a cross-section of habitats in this region, they cannot function as an ecosystem, given the disjointed, open water nature. If the State ocean sanctuaries and Federal site waters could be integrated into a management unit, however, a representative ecosystem may be formed. Oceanographer Canyon is a discrete unit, and could be used as a test area for management techniques and baseline measurement.

### Relationship to Existing Programs

Massachusetts protects some of the nearshore waters adjacent to the site under its Ocean Sanctuary Act; a viable opportunity for a Federal-State partnership in ocean protection is presented. The International Maritime Organization has created an "Area to be Avoided" in the shoals for environmental protection and shipping safety, applying to ships carrying oil or hazardous materials, or over 1,000 gross tons of cargo. The New England Regional Fishery Management Council is responsible for regulating fishing activities in the area. Two National Wildlife Refuges are located near the site (Map 2).

Map 2. Protected Areas



## Nantucket Sound/Shoals and Oceanographer Canyon, Massachusetts

Sanctuary designation would allow for the coordination of the above regulatory mechanisms, as well as the creation of education and research programs geared toward the whole ecosystem.

### Accessibility

The bay is very accessible and supports a high level of recreational activity. The shoals and canyon components are less accessible, due to rough conditions and their distance from shore.

### Surveillance and Enforcement

Two U.S. Coast Guard Stations are located near the site, one at Woods Hole and another at Brant Point. A Sanctuary surveillance and enforcement program would most likely have to make use of these as well as State facilities in order to provide adequate monitoring of the site.

### Economic Considerations

Because the fishing and tourism industries make a large contribution to the regional economy, Sanctuary status impact on these activities must be considered during the designation process. Potential long-term economic gain from hydrocarbon exploitation must also be evaluated, since Sanctuary designation would probably halt such efforts within its boundaries.

### Possible Issues

Concern will likely be raised by recreational and commercial fishermen and from other recreational

interests who may perceive a threat to their activities. Although not currently developing the resources of the area, the oil and gas industry may wish to do so in the future and will also have concerns.

### Support for Designation

Most of the comments received during the 1983 SEL process were in support of the site.

### Probable Designation Impacts

Table 3 summarizes the probable short-term (within five years of designation) and long-term (after five years) impacts of Sanctuary status this site.

### Site Bibliography

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**Table 3. Probable Designation Impacts**

Activity	Impact	
	Probable short term	Probable long term
Habitat protection	+	+
Listed species protection	+	+
Research	+	+
Education	+	+
Commercial fishing	0	+
Recreational activities	+	+
Tourism	0	+
OCS activities	0	-
Vessel traffic	0	0

+ = positive, - = negative, 0 = neutral, ? = unknown