

Hawaiian Monk Seal (*Monachus schauinslandi*)

The Hawaiian monk seal is the most endangered seal in U.S. waters and one of the most endangered seals in the world. It occurs only in the Hawaiian Archipelago, where it numbers about 1,300 to 1,400 animals. The vast majority of monk seals breed, pup, and live out their lives in the remote Northwestern Hawaiian Islands. This chain of small islands and atolls extends about 2,000 km (1,100 nmi) northwest of the main Hawaiian Islands (Fig. 7) and includes the species' six major breeding sites: French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, the Midway Islands, and Kure Atoll. Almost all Hawaiian monk seal pups are born at these

sites. Although it seems likely that the species' range originally included the main Hawaiian Islands, monk seals apparently were extirpated from those islands after the first Polynesians arrived about 2,000 years ago. A small monk seal colony now occurs on Niihau (the westernmost of the main Hawaiian Islands) and, in recent years, a few births have been reported annually at other islands, principally Kauai. This suggests that the species may be in the process of reoccupying the main Hawaiian Islands.

In the 1800s sealers, explorers, shipwrecked sailors, and other visitors to the Northwestern Hawaiian Islands killed monk seals for their skins, oil, and food.

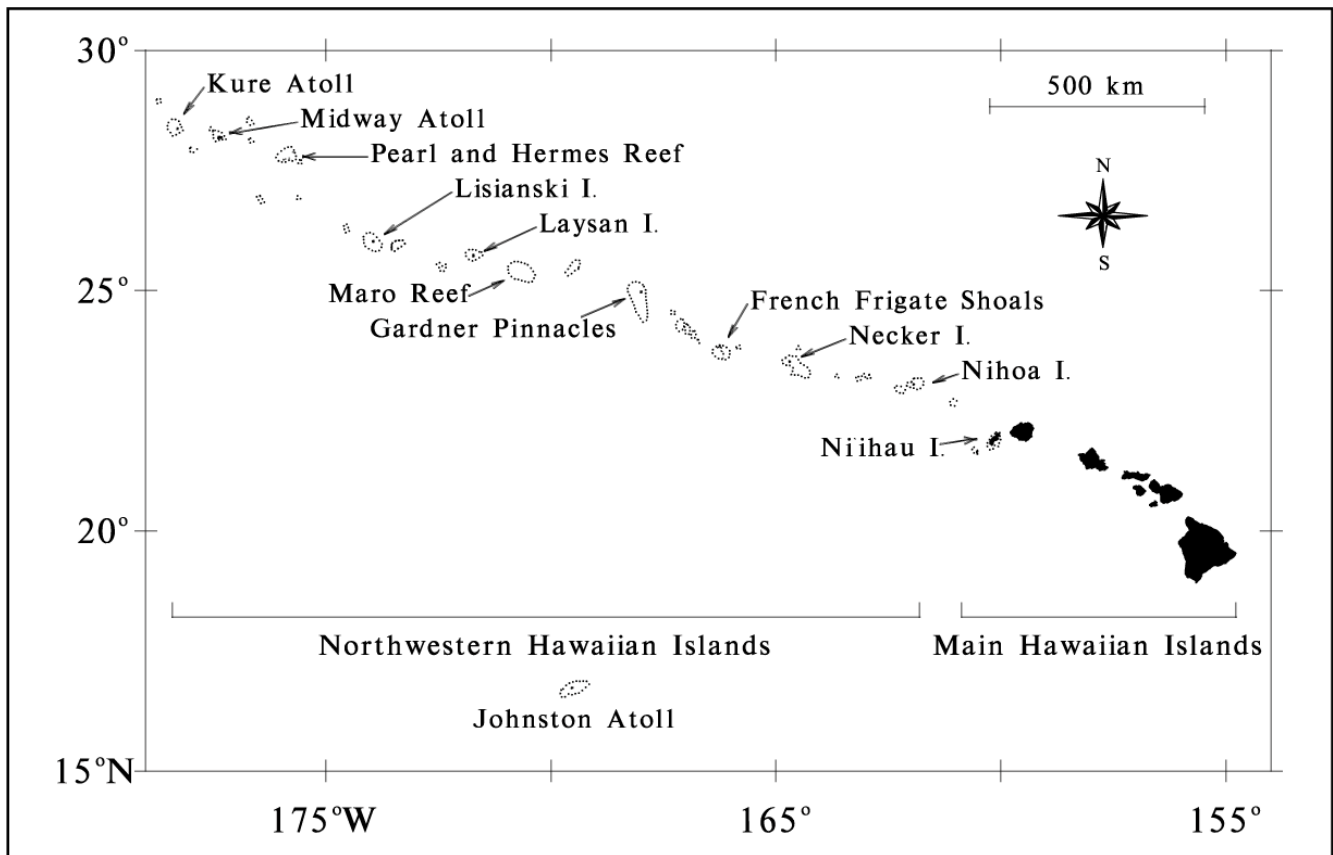


Figure 7. The Hawaiian Archipelago. The Northwestern Hawaiian Islands provide pupping beaches for all major breeding colonies of Hawaiian monk seals.

Although data on their numbers during that period are not available, this exploitation probably caused a significant decline. There is evidence suggesting that by the 1900s monk seals were extirpated from three of the Northwestern Hawaiian Islands (i.e., Laysan, the Midway Islands, and French Frigate Shoals).

By the mid-1950s when the first beach counts of seals were made, there must have been some degree of recovery because monk seals were found at all of the current breeding sites. By the late 1970s, however, beach counts had declined by nearly half. During that period, sharp declines occurred at all of the colonies in the western end of the chain while a rapid increase occurred at French Frigate Shoals in the eastern half of the chain. By the early 1980s the colony at French Frigate Shoals made up nearly half of the remaining population. Human activity associated with expansion of a naval air station at Midway Atoll and installation of a Loran station on Kure Atoll likely were significant factors causing the declines at the westernmost atolls.

Over the past 15 years there has been a reversal in trends at individual colonies. That is, the western colonies have increased slowly or remained stable while the colony at French Frigate Shoals has experienced a sharp decline (Fig. 8). As a result, the overall population has remained relatively stable since the mid-1990s. Increases at the westernmost colonies appear to be due in large part to improved efforts to prevent disturbance of seals hauled out on pupping beaches and the translocation of underweight pups that were taken from French Frigate Shoals for rehabilitation and released at Kure Atoll in the 1980s and early 1990s.

The cause of the decline at French Frigate Shoals is uncertain and may include a combination of factors. Since the decline began in the mid- to late 1980s, pups and juveniles at this site typically have been underweight or starving and have experienced very low survival rates. Also, adult females have tended to be smaller than those at other sites, suggesting that the availability of prey has been limited. Possible explanations for the low weight and poor survival rate include overfishing of monk seal prey by the commercial lobster fishery, declines in prey productivity due to regional climate shifts and associated changes in current patterns, prey depletion due to growth of the monk seal colony to a size exceeding its carrying capacity, entanglement of seals in derelict fishing gear, shark predation, and injuries sustained by pups, females, and juveniles from aggressive adult male seals.

The National Marine Fisheries Service has lead responsibility for the recovery of Hawaiian monk seals under the Endangered Species Act and the Marine Mammal Protection Act. However, other agencies also have important responsibilities. Among these are the Fish and Wildlife Service, which manages wildlife habitat and human activities within the lands and waters of the Hawaiian Islands National Wildlife Refuge and the Midway Atoll National Wildlife Refuge; the U.S. Coast Guard, which assists with enforcement and efforts to clean up marine pollution; the State of Hawaii, which owns Kure Atoll and also has jurisdiction over waters between the refuge boundary and 3 nmi (5.5 km) around all emergent lands in the Northwestern Hawaiian Islands (except Midway); the National Ocean Service, which is charged with conserving natural resources in the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve extending from state waters out to a perimeter about 50 nmi (92.5 km) from the Northwestern Hawaiian Islands; and the Western Pacific Regional Fishery Management Council, which is responsible for developing fishery management plans and proposing regulations to the National Marine Fisheries Service for commercial fisheries around the Northwestern Hawaiian Islands.

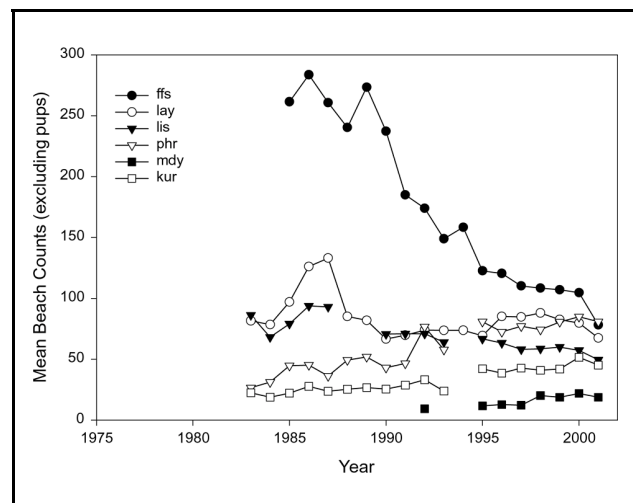


Figure 8. Mean beach counts of Hawaiian monk seals at major breeding colonies; 1983–2001 (source: National Marine Fisheries Service, unpublished data, data for 2001 are preliminary).

In addition, the Service has established a Hawaiian Monk Seal Recovery Team. Composed of scientists and agency resource managers, the team has met annually over the past decade to review program progress and plans and to provide advice on priority research and management needs to the Service. The Marine Mammal Commission has also periodically held reviews of the monk seal recovery program to help provide program guidance.

Developments during 2001 related to the conservation of Hawaiian monk seals are discussed below.

Population Trends at Major Monk Seal Colonies

Major monk seal colonies are visited annually during the summer breeding season by field crews to monitor pup production and to undertake other research and management activities. During these field visits, which now typically last from a week to several months at each site, repeated counts are made of the number of seals hauled out on atoll beaches. Abundance trends at each site are measured by the mean of those counts. As a general rule, beach counts represent about one-third of the total number of seals at a colony, with the other two-thirds at sea when the counts are made. Based on preliminary data through 2001 (see Fig. 8), mean beach counts at French Frigate Shoals have declined by nearly two-thirds since the late 1980s although the rate of decline has slowed since the mid-1990s. In contrast, counts at Pearl and Hermes Reef, Midway Atoll, and Kure Atoll have been increasing slowly but steadily, and counts at Laysan and Lisianski Islands have remained relatively stable.

Preliminary results of beach counts in 2001 suggested a marked decline at all major breeding colonies. Also in 2001, there was a marked decline in observed survival rates of one-year-old seals (i.e., the 2000 cohort) at all atolls except Pearl and Hermes Reef. The reports of the unusually high numbers of juvenile deaths prompted the National Marine Fisheries Service to declare an “unusual marine mammal mortality event” and to undertake an investigation under provisions of section 404 of the Marine Mammal Protection Act (see Chapter VI).

The mortality event designation was triggered by the discovery of four dead juvenile monk seals on Laysan Island over a nine-day period in early January 2001. A field team, including a veterinarian, was dispatched to examine dead seals on Laysan Island as well as at other atolls. During this and subsequent population monitoring work, one adult and 12 juvenile

monk seal deaths were reported at several breeding colonies between early January and early July. Necropsy results revealed that the animals were emaciated, suggesting that an inability of weaned pups and seals between the ages of one and two to find food was the most likely explanation for the deaths. As of the end of 2001 analyses of tissue samples had revealed no signs of infectious diseases, natural or anthropogenic toxins, parasitism, or injuries although further testing remained to be done.

Also during 2001 field crews at French Frigate Shoals continued to see evidence of high rates of shark predation on pups. Concern arose in 1999 when evidence suggested that more than 25 percent of the pups born that year at that site were killed by sharks. Because this predation continued to occur in 2000, contingency plans were developed to catch individual sharks found patrolling waters adjacent to pupping beaches and preying on pups. In 2001 eleven pups were believed to have been killed by sharks and six others were injured. A large majority of the shark-related deaths, disappearances, and injuries has occurred at one of the atoll’s islands, Trig Island. In response, five sharks exhibiting predatory behavior were culled, and 18 weaned pups were moved from Trig Island and Round Island, where predatory sharks were also seen patrolling the beach, to other islands in the atoll. The 11 pup deaths in 2001 represented about 17 percent of the pups seen during the field season.

Interactions with Commercial Fisheries

Hawaiian monk seals feed on a variety of species, including small reef fishes, octopuses, and lobsters. The sharp decline in monk seal numbers at French Frigate Shoals began in the late 1980s as commercial lobster stocks in the Northwestern Hawaiian Islands declined. The commercial lobster fishery, which focused on banks east and west of French Frigate Shoals (i.e., Maro Reef, Gardner Pinnacles, and around Necker Island), also has a bycatch of octopuses, crabs, and other monk seal prey species. Management of the fishery was based on the assumption that lobster stocks would be sustained as long as the spawning stock biomass of lobsters did not fall below 20 percent of the estimated level that would have occurred in the absence of fishing. Thus, it was assumed that removal of 80 percent of the mature lobsters would have no significant effect on either lobster

recruitment or prey availability for monk seals. Under this management system, lobster catch rates declined significantly, and the fishery was closed under an emergency rule in 1991 to prevent overfishing.

In the early 1990s the concurrent declines of lobster stocks and the French Frigate Shoals monk seal colony, the occurrence of lobsters and other species taken by the fishery in monk seal diets, and clear signs of limited prey availability for seals at French Frigate Shoals led the Commission to question the National Marine Fisheries Service's assumption that the lobster fishery was having no significant effect on monk seals. The Service, however, stated that there was no evidence that lobsters were an important part of the monk seal diet and, under management measures developed by the Western Pacific Regional Fishery Management Council, the Service reopened the fishery in 1992 even though there had been little change in lobster abundance. At the recommendation of the Commission, the Service also took steps to determine monk seal foraging patterns using satellite tags on adult male seals at French Frigate Shoals. These studies soon revealed that some monk seals at French Frigate Shoals traveled farther to feed than previously thought, including excursions to the neighboring banks that had been fished intensively for lobster.

Low survival rates of pups and juveniles at French Frigate Shoals continued and, over the past decade, the Commission has repeatedly recommended that the Service adopt a precautionary management approach by closing waters to commercial fishing around French Frigate Shoals until information is adequate to indicate that lobster fishing and its bycatch are not contributing to the sharp decline in monk seals at that site. In 1995 the Commission also recommended that the Service use a new research technique to identify monk seal prey preferences — the analysis of fatty acids from prey deposited in seal blubber. Although the Service agreed to pursue this line of research, no action was taken to adopt the Commission's management recommendations. Monk seal numbers at French Frigate Shoals and lobster stocks at banks in the eastern end of the chain continued to decline.

As a result of depletion of lobster stocks at the eastern end of the chain, the Western Pacific Regional Fishery Management Council proposed a new management system, which the Service adopted in 1998. The new system encouraged a shift in fishing effort to banks that had received comparatively little or no commercial lobster fishing effort, including French

Frigate Shoals and banks in the western end of the chain supporting major monk seal colonies. The Commission wrote to the Service and the Council several times in 1998 and 1999 opposing the plan and recommending that all banks supporting major monk seal colonies be closed to lobster fishing until better information was available on its effects on monk seals. However, these recommendations were not adopted. The Commission also wrote to the Hawaii Department of Land and Natural Resources urging that the state close waters within its jurisdiction in the Northwestern Hawaiian Islands to lobster fishing, but no action was taken at that time.

Concerned about the possible effects of the lobster fishery on monk seals, the Hawaiian Monk Seal Recovery Team also wrote to the Service following its 7 December 1999 meeting, recommending that the fishery be closed for at least three years to allow the region's depleted lobster stocks time to recover. Also, on 26 January 2000 several environmental groups represented by Earthjustice, a public interest law firm, sued the Service for failing to properly manage Northwestern Hawaiian Islands lobster and bottomfish fisheries to avoid harming monk seals.

In April 2000 the Service proposed and in June 2000 adopted a rule to close the Northwestern Hawaiian Island lobster fishery for the 2000 fishing season. At that time, the fishery involved about six vessels that each fished for a few weeks in July and August. In closing the fishery for 2000, the Service noted concern about the depleted status of lobster stocks but made no reference to possible effects of the fishery on monk seals. It also announced plans to conduct an experimental lobster fishery in 2000 to assess the status of the lobster stock by sampling previously tagged lobsters at several banks. Catch levels in this program were to be set at a much reduced level from earlier commercial harvests. As noted in its previous annual report, the Commission commented on a research protocol for the experimental fishery. Among other things, it recommended that lobsters caught in this fishery be returned to the reef alive, rather than kept for later sale, to help rebuild the lobster stock and avoid possible effects on monk seal prey availability. Plans for the experimental fishery, however, were subsequently canceled.

On 22 February 2001 the Service announced that the lobster fishery would remain closed for the 2001 fishing season. At the end of

2001 it was the Commission's understanding that the Service planned to assess the status of lobster stocks in the Northwestern Hawaiian Islands in 2002 through a tagging and sampling program in which all caught lobsters would be released alive.

As a related matter, in December 2001 the Hawaii Department of Land and Natural Resources proposed rules to designate a fishery management area in all state waters around the Northwestern Hawaiian Islands and the region's national wildlife refuges. Under the proposal, a state permit would be required to access and remove living resources around the Northwestern Hawaiian Islands to ensure the sustainable use of area resources for present and future generations. At the end of 2001 the Commission was developing a comment letter expressing support for the state's proposed rule and recommending that management goals for the area explicitly state an intent to apply a precautionary management approach and to consult with managers of the adjacent national wildlife refuges and the coral reef ecosystem reserve to ensure that decisions affecting the regional ecosystem are implemented in a compatible, consistent manner.

Although the Service's plans for commercial lobster fishing in 2002 and beyond were uncertain as of the end of 2001, the future of this and other fisheries in the Northwestern Hawaiian Islands was the subject of actions taken to establish the coral reef ecosystem reserve (see below).

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve

On 4 December 2000 President Clinton signed into law Executive Order 13178 establishing the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve. Its purpose is to "ensure the comprehensive, strong, and lasting protection of the coral reef ecosystem and related marine resources and species of the Northwestern Hawaiian Islands." The reserve includes all submerged lands and waters around the Northwestern Hawaiian Islands from the seaward limit of state jurisdiction (3 nmi around all emergent lands) out to a distance of about 50 nmi from the center of the chain's islands and banks. At Midway Atoll, where the Midway Atoll National Wildlife Refuge boundary extends to 3 nmi, the reserve boundary is coterminous with the refuge boundary. These boundaries make the reserve the world's second largest marine protected area — second only to Australia's Great Barrier Reef Marine Park. However, much of the chain's coral reef habitat lies in state waters between the reserve

boundary and the boundaries of the Hawaiian Islands National Wildlife Refuge.

The executive order directed the National Ocean Service to manage the reserve and to begin the process of designating it as a national marine sanctuary. The order also directed that a Coral Reef Ecosystem Reserve Advisory Council be established to provide advice on these matters. The council includes experts in certain scientific disciplines and representatives of stakeholder groups as voting members; officials of certain concerned agencies, including the Marine Mammal Commission, serve as nonvoting members.

The executive order also directed that restrictions be imposed on commercial and recreational fishing; exploration and extraction of oil, gas, or other minerals; anchoring on coral; discharging or depositing material; and removing, taking, harvesting, or damaging living or nonliving resources. With regard to fishing, it called for a cap on the number of permits and harvest levels for existing fisheries and a ban on permits for any new types of fishing not authorized by permit in the year before the reserve was established. As a lobster catch limit was in place through December 1999 but not in 2000 when the fishery was closed, it is unclear whether or at what level lobster harvests might resume under terms of the order. The order also called for establishing 15 "reserve preservation areas" within which all fishing (except bottomfish fishing in certain portions of those areas) would be prohibited. The preservation areas were to remain in effect pending an opportunity for public comment and action to make some or all of them permanent. They included waters from the state jurisdictional limit to the 100-fathom isobath around all banks with emergent land (except Midway Atoll) as well as waters within 12 nmi (22.2 km) of certain submerged banks.

A request for comments on the reserve preservation areas was published in the *Federal Register* on 7 December 2000. The Commission responded by letter of 8 January 2001 to the National Oceanic and Atmospheric Administration. In its comments, the Commission expressed support for proposed reserve preservation areas and recommended that they be adopted as permanent. It also suggested some minor changes in the boundaries allowing bottomfish fishing. To the extent that lobster fishing might continue, the Commission noted its concern about its possible

effects on Hawaiian monk seals and recommended that the fishery remain closed. It also encouraged close coordination with the State of Hawaii and the Fish and Wildlife Service to develop a consistent, comprehensive management program for the entire Northwestern Hawaiian Islands ecosystem.

After consideration of submitted comments, President Clinton signed Executive Order 13196 on 18 January 2001 making all of the proposed reserve preservation areas permanent. Among other changes, the final provisions increased access to preservation areas for commercial bottomfish fishing and recreational fishing.

Following the inauguration of President Bush and the change of Administration, the Western Pacific Regional Fishery Management Council wrote to the Secretary of Commerce on 22 February 2001 raising concerns about the boundaries of the new reserve and questioning the legality of certain provisions in the executive orders as they related to the management of fisheries. In response, the Secretary initiated a review of the executive orders in March. As of the end of 2001 the review had not yet been completed.

To guide management decisions pending a decision on designating the reserve as a national marine sanctuary, the National Ocean Service drafted a reserve operations plan. At the end of 2001 the draft was undergoing internal review and was expected to be circulated for public review and comment early in 2002. Other initial efforts to administer the new reserve included partial funding to continue work to remove derelict fishing gear and other marine debris from reefs in the Northwestern Hawaiian Islands (see below), construction of a research vessel for use in the reserve, development of a public interpretative display at the reserve's offices at Hilo, and convening four meetings of its advisory council. A representative of the Commission participated in all of those meetings. Among other things, the council provided advice on key management activities, particularly the drafting of the reserve operations plan.

As of the end of 2001 the National Ocean Service planned to begin a scoping process in the spring of 2002 to solicit public comments on designating the reserve as a national marine sanctuary. This is the first step in developing an environmental impact statement on options related to sanctuary designation.

Foraging Ecology Workshop

As noted above, limited prey availability appears to have been a factor in the decline of monk

seal abundance at French Frigate Shoals. In recent years, there also have been signs of prey limitations at Laysan Island even though lobster fishing within 20 nmi (37 km) of the island had been prohibited since 1986. Because of these and other concerns, the Service has supported studies to investigate monk seal foraging patterns. Those include the use of satellite tags and depth-of-dive recorders to determine where and at what depths monk seals feed, "crittercams" (a battery-powered video-camera that can be mounted on an animal) to document underwater foraging behavior, scat and spew analyses to identify the types and frequency of prey items consumed, and studies of fatty acids from prey in seal blubber to assess the relative composition of different dietary components. Although all of these studies address important information needs, it has been unclear whether the locations, sample sizes, age and sex composition of animals studied, and other factors have been coordinated in a way that would maximize their collective value.

At the recommendation of the Hawaiian Monk Seal Recovery Team, the Service therefore convened a foraging ecology workshop on 14–15 September 2001 in Honolulu. The purpose of the workshop was to obtain recommendations from an independent panel of experts for use in formulating a comprehensive research plan on monk seal foraging ecology. Specific objectives included evaluating past and ongoing studies, setting priorities for future research needs, and providing a conceptual framework for synthesizing research elements into a multidisciplinary research plan. A member of the Commission's Committee of Scientific Advisors participated on the panel. At the end of 2001 a report of the workshop was being completed and the results were expected to be available early in 2002.

Proposal for a Fishery Support Base at Midway Atoll

Midway Atoll, located near the western end of the Northwestern Hawaiian Islands, includes two of the chain's largest islands: Sand Island (about 445 hectares or 1,100 acres) and Eastern Island (about 135 hectares or 334 acres). The islands have been used since the early 1900s for various purposes, including a trans-pacific cable station, a stop for early transpacific clipper flights, and a Naval air station. The site also was attacked by Japanese planes on 3 June 1942 during the course of

the Battle of Midway. As part of its base closing process, the Navy transferred ownership of the atoll to the Fish and Wildlife Service in 1996 for use as the Midway Atoll National Wildlife Refuge.

The airfield, harbor, and other facilities on the island remain strategically important for emergency aircraft landings, medical evacuations of seafarers, a refueling station for Coast Guard enforcement planes, and other purposes. To maintain and operate key components of the islands' infrastructure, including the airfield and harbor, the Service developed a cooperative agreement with a private company to manage the facilities. To generate funding to pay for these expenses, the arrangement includes authority for operating an ecotourism-based public use program that affords paying visitors an opportunity to view the atoll's historic and natural resources in a manner compatible with wildlife protection needs.

On 12 January 2001 the Western Pacific Regional Fishery Management Council forwarded a proposal to the Fish and Wildlife Service requesting permission to use Midway Atoll as a fishery support station. The proposal, developed by the Western Fishboat Owners Association, sought to use the atoll's facilities as a refueling station for bottomfish, lobster, and albacore trolling vessels. It also proposed establishing a catch transshipment station for a 20- to 70-vessel albacore trolling fleet that operates north of Midway Atoll between May and October. Those vessels would transfer their catch to refrigerated carrier vessels up to 250 ft (76.2 m) long for transport to a cannery in Samoa. Other catch might be shipped to the main Hawaiian Islands by planes already servicing Midway. Such a station could cut a few hundred miles of transit distances for fishing vessels that now offload their catch in the Aleutian Islands or the main Hawaiian Islands and provide income to help maintain the islands' facilities.

Statutes for administering national wildlife refuges require that no activities be permitted unless they are compatible with the purposes of the refuge and the mission of the refuge system. Those include maintaining biological diversity; conserving fish and wildlife and their habitats; providing opportunities for research, education and compatible wildlife-dependent activities; and maintaining the historic significance of the Midway Islands. Consistent with these purposes, vessel access to the atoll has been strictly limited due to the variety of risks vessels may pose, including the transport of alien species to the atoll, fuel spills, introduction of debris, discharges of sewage and bilge

water, accidental groundings, and anchor damage to corals. In addition, the condition of the harbor's piers and bulkheads is poor and deteriorating. Accordingly, vessel access has been restricted largely to small recreational boats, supply vessels, and government ships. The fishery management council's proposal would significantly increase the number of vessels using the atoll.

As of the end of 2001 the proposal had been denied at the regional level of the Fish and Wildlife Service, but was being reviewed by the Secretary of the Interior in response to an appeal by the Western Pacific Regional Fishery Management Council.

Figure 9. Tern Island, French Frigate Shoals.



Tern Island Shoreline Protection

Tern Island is one of several small islets at French Frigate Shoals (Fig. 9). It is an important haul-out site for Hawaiian monk seals, as well as a nesting beach for sea turtles and a rookery for many species of seabirds. Tern Island is largely an artificial island built by the Navy during World War II as a landing strip. Originally a shifting sand island about 4.5 hectares (11 acres) in size, it was expanded to about 13.5 hectares (34 acres) to accommodate a landing strip and buildings. This was done by installing a sheetmetal bulkhead around the island and in adjacent shallow waters and backfilling with coral rubble dredged from the surrounding lagoon. In the process of backfilling, various scrap materials as well as fuel storage tanks were buried on the island. Between 1952 and 1979, the Coast Guard took over the island for use as a Loran station.

In 1979 the Fish and Wildlife Service resumed possession of the island and began using its

facilities as a permanent field station for the Hawaiian Islands National Wildlife Refuge. (The Service had previously been assigned ownership of the island pursuant to a 1909 executive order by President Theodore Roosevelt establishing the Hawaiian Islands Reservation.) Since 1979, however, corrosion has caused the seawall to collapse in several areas, forming erosion pockets behind the bulkhead. The eroded areas have created entrapment hazards for seals and turtles and have exposed dump sites containing discarded electrical equipment left during the Coast Guard occupation. Those sites include high concentrations of contaminants, including polychlorinated hydrocarbons (PCBs).

If left to deteriorate further, new openings in the bulkhead will result in loss of the airstrip and possibly the entire island, forcing the Service to abandon the field station. That would eliminate what has become an important terrestrial site for wildlife, leave entrapment hazards for seals and turtles with no on-site rescue personnel, expose unknown types and amounts of hazardous debris buried on the island, and distribute chemical contaminants from untreated dump sites into the surrounding lagoon.

To address this situation, the Service contracted with the U.S. Army Corps of Engineers in 1993 to design a new rock revetment to replace the deteriorating bulkhead. The project was estimated to cost about \$11 million. Over the past decade, the Service has sought congressional funding to begin construction. In the interim, the Service, the Coast Guard, and the Corps have been responding to breaches in the seawall with emergency repairs and to discovery of new dump sites with a series of contaminant clean-up efforts. Due to changes in the condition of the seawall and erosion patterns, changing construction costs, and other factors since the initial 1993 design was developed, the planned project is now estimated to cost \$16 million. At the end of 2000, \$11.9 million had been appropriated for the project.

During 2001 the Service proceeded with steps to initiate the project. In June it circulated a draft environmental assessment for public review and comment. The preferred alternative called for installing 3,854 ft (1,175 m) of rock revetment and 820 ft (259 m) of steel sheet pile bulkhead along one side and both ends of the island. To protect wildlife during construction, the Service identified a number of possible mitigation measures, including phasing construction work to avoid the sensitive seal breeding season, confining construction work to the smallest

possible area at any given time, suspending work when seals or turtles approach work sites, closely monitoring potential impacts, and restricting the movement of workers and equipment around the island.

On 23 July 2001 the Commission wrote to the Service commenting on the draft assessment. In the letter, the Commission expressed its belief that replacing the seawall was essential to (1) prevent the spread of hazardous debris and chemicals now buried on the island, (2) prevent the formation of new entrapment hazards, (3) retain important terrestrial wildlife habitat, and (4) maintain logistical support for research and management work at French Frigate Shoals. The Commission therefore concluded that long-term benefits of the project far outweighed potential short-term impacts and recommended that construction proceed at the earliest possible date. It also recommended that the identified mitigation measures be included as part of the proposed project and that the Service consult with the Coast Guard and the Navy to identify contingency measures for cleaning up any contaminated dump sites that might be discovered during construction.

During 2001 the Coast Guard and the Service undertook further efforts to clean up contaminated dump sites exposed by erosion. The Coast Guard contracted for the removal of 785 cubic yards of PCB-contaminated soil, but, as the affected area was larger than had been anticipated, it ended up removing 1,700 cubic yards. Additional contamination was identified during the clean-up operation and will need to be removed before initiation of the seawall project. With the project \$800,000 over budget, the Coast Guard was unable to obtain the necessary funds to complete the work in 2002. As of the end of 2001 the Coast Guard, the Service, and the Corps were considering steps to integrate the removal of known contamination sites replacing the seawall, and the Coast Guard was reconsidering the availability of clean-up funds as part of its FY 2003 budget. During 2001 the Service also submitted applications for required project permits and initiated formal consultations under section 7 of the Endangered Species Act with the National Marine Fisheries Service and the responsible branch of the



Figure 10. Diver removing derelict trawl net from reefs in the Northwestern Hawaiian

Fish and Wildlife Service.

Additional construction funds were requested for FY 2002; however, after the terrorist attacks on 11 September additional funding for the project was withdrawn from the FY 2002 budget. As of the end of 2001 the Service was planning to request additional construction funds for the project as part of its FY 2003 budget, complete its section 7 consultation and permit application processes, and, if possible, solicit bids for construction and begin work in the fall of 2002. It was uncertain, however, whether the Coast Guard would be able to secure funding to complete clean-up work at the contaminated dump site in time to avoid delaying the seawall project.

Marine Debris

The reefs and atolls of the Northwestern Hawaiian Islands act as traps that catch floating marine debris circulating in the North Pacific Ocean. As a result, large amounts of debris, including lost and discarded net material, accumulate on its reefs and beaches. Some seals, particularly young ones, may be attracted to debris because of curiosity or other behaviors. Resulting encounters sometimes lead to entanglement. Since 1982 field crews monitoring monk seal haul-out beaches have documented more

than 200 entangled monk seals, with a record one-year total of 25 incidents in 1999. In 2001, eight seals were observed entangled.

Although some seals are able to free themselves from minor entanglements, those that cannot do so quickly are likely to die of wounds and infections caused by chafing and cutting lines, exhaustion and drowning due to the drag or weight of attached debris, or an inability to avoid sharks or catch prey. In many instances, field crews have had to catch and remove material — usually ropes, netting, or packing bands — from hauled-out seals. However, those efforts do not address the unknown number of entangled seals that are caught on reefs or otherwise fail to make it back to shore or entangled seals that haul out when field crews are not present.

To help reduce such entanglement, field crews have routinely removed hazardous nets and ropes from seal haul-out beaches for more than 15 years. Recently the National Marine Fisheries Service and other concerned agencies and groups also have sent teams of divers to the Northwestern Hawaiian Islands to recover derelict nets from reefs and lagoons around major monk seal breeding beaches (Fig. 10). The latter effort began after a Service survey of nearshore waters in 1997 found densities of 94 and 64 net fragments per square

kilometer on reefs at French Frigate Shoals and Pearl and Hermes Reef, respectively. Most of the debris appears to be derelict trawl netting from unknown locations, possibly including Southeast Asia and/or Alaska. In addition to ensnaring seals, this debris entangles sea turtles, seabirds, crustaceans, and fish and, when caught on reef outcrops, can abrade and damage substantial areas of coral.

Alarmed by the amounts of debris present, in 1998 the Service began coordinating cooperative underwater clean-ups in addition to the beach clean-ups. Funding, ship time, personnel, equipment, and in-kind services for the work have been generously contributed by many agencies and groups in addition to the Service. These include the Center for Marine Conservation (now The Ocean Conservancy), the City and County of Honolulu, the Coast Guard, the Fish and Wildlife Service, the Hawai'i Wildlife Fund, the Hawaii Sea Grant Program, the National Fish and Wildlife Foundation, the Navy, the University of Alaska Marine Advisory Program, and numerous other state and private agencies and groups. Initial clean-up work began at French Frigate Shoals in 1998 six state and private agencies and groups. Initial clean-up work began at French Frigate Shoals in 1998 when six tons (5,440 kg) of debris was removed and shipped to Honolulu for disposal. In 1999, 25 tons (22,675 kg) was recovered from waters and beaches around Lisianski Island and Pearl and Hermes Reef, and in 2000 an additional 25 tons (22,432 kg) was removed from those atolls plus Midway and Kure Atolls.

In 2001, \$3 million was made available for clean-up work, with most of that money coming from an appropriation to the National Oceanic and Atmospheric Administration to address coral reef management issues. With those funds, three vessels were chartered for a 90-day period in the fall. In addition, a 30-day cruise was undertaken aboard a National Oceanic and Atmospheric Administration research vessel to help remove debris and to conduct studies of in-water debris accumulation rates at Pearl and Hermes Reef, Kure Atoll, and Lisianski Island. As a result of these efforts, reefs and beaches at all of the major monk seal colonies received some clean-up attention during the year, and a total of 24 tons (21,365 kg) of debris was removed. As part of this work, studies are being done to assess accumulation rates and to identify sources of the debris. With more than 100 tons (90,700 kg) of derelict netting and fishing gear thought to remain, the Service hopes to increase this clean-up effort in 2002.

Occurrence in the Main Hawaiian Islands

As noted above, Hawaiian monk seals are becoming more common in the main Hawaiian Islands. As a result, they have been hauling out on public beaches with increasing frequency to rest, molt, and give birth to their pups (Fig. 11). Molting seals and mother-pup pairs may remain on a beach for several days to several weeks. On public beaches, this can lead to interactions between monk seals and beachgoers that are difficult to manage. In some cases, people have deliberately molested hauled-out seals, and seals have threatened and, on occasion, bitten people.

The Pacific Island Area Office of the National Marine Fisheries Service is the federal agency responsible for managing such interactions. When seals are reported on beaches, the agency works with state and local agencies to cordon off sections of beach around the seals. During the summer of 2001 the same monk seal hauled out and gave birth to a pup for the second year in a row at a popular swimming beach in Po'ipu, Kauai. In response, the beach, one of the most popular on Kauai, was closed at the request of the Service to protect the seals. This and similar actions at other beaches around Hawaii have adversely affected tourism and have strained relationships between the Service and state and local agencies. In addition, seals need to be monitored closely to ensure that people do not approach or molest them. The Service, however, does not have staff to monitor seals constantly, and therefore it has relied on volunteers to watch seals and educate the public about their endangered status and requirements for their protection.

To date, a long-term strategy has not been developed for responding to haul-out events on public and private beaches in the main Hawaiian Islands. In addition, lines of authority and responsibility among the Service, state and local officials, volunteer groups, and other relevant parties (e.g., lifeguards, local landowners, hotel operators) have not been clearly delineated. The Hawaii Department of Land and Natural Resources, which often receives the first reports of hauled-out seals and marine mammal strandings, has expressed interest in assuming a greater role in coordinating responses to such events; however, this authority now rests with the Service, and the Department has limited funding for this purpose.

Because of the increasing presence of monk

seals in the main Hawaiian Islands, the Hawaiian Monk Seal Recovery Team recommended in March 2001 that the Service convene a workshop to develop recommendations on how to manage such situations. In its 13 July 2001 reply to the team, the Service agreed that such a meeting should be held, but it was unable to schedule one in 2001 because of limited funds. It noted, however, that it would keep the team advised of progress to plan such a meeting.

As a related matter, the team also recommended that the Service seek funding under section 6 of the Endangered Species Act for the State of Hawaii to develop a cooperative program on managing monk seals in the main Hawaiian Islands. Section 6 of the Act authorizes the Secretary of Commerce to enter into cooperative agreements with state agencies for the purpose of conserving endangered species. Although the section also authorizes requests for federal funding to help develop and maintain cooperative state programs, such requests have never been made by the National Marine Fisheries Service for endangered marine mammals under the Department of Commerce's jurisdiction.

The Commission also had identified cooperative state programs as an important opportunity to strengthen several marine mammal recovery programs, including the Hawaiian monk seal program. On 19 June 2001, it wrote to the Service noting that state agencies could provide knowledge, personnel, expertise, resources, and legal authorities to help carry out urgent marine mammal recovery tasks. To encourage greater state involvement, the Commission recommended that the Service (1) examine the potential role of state agencies to help carry out recovery programs for Hawaiian monk seals, as well as certain other endangered marine mammals; (2) where appropriate, encourage state agencies to develop cooperative agreements under section 6 to help address marine mammal recovery needs; and (3) annually determine and request appropriate funding levels under section 6 to help support cooperative state programs.

On 16 July 2001 the acting Administrator for the National Oceanic and Atmospheric Administration responded, noting that the National Marine Fisheries Service had cooperative agreements with six states and was pursuing agreements with several other states, and that it intended to request specific funding for section 6 agreements in FY 2003. On 13 July 2001 in its response to the recovery team's recommendations, the Service also advised the recovery team that, although developing a cooperative agreement with the Hawaii

Department of Land and Natural Resources was contingent on receiving and approving a request from the state for such an agreement, it would consider budgetary requirements and develop a proposed budget for this purpose during the next funding cycle.

Program Oversight and Guidance

For more than a decade, Hawaiian monk seal research and management efforts have been reviewed annually by a Hawaiian monk seal recovery team composed mainly of scientific experts and resource managers. Team meetings were held annually in early December to consider results of the prior year's field season and to provide recommendations before planning for the next field season, which typically begins in March or April.

As noted in the previous annual report, in November 2000 the Service unexpectedly rescheduled the team's December 2000 meeting for late March 2001 due to demands on program personnel and resources. The team urged the Service not to reschedule the meeting because doing so would prevent timely advice for the coming field season, and by letter of 14 November 2000, the Commission also recommended that the meeting not be deferred. The Service, however, did not move the meeting back to the original December date, and it was held on 19–21 March 2001. At the beginning of the meeting, representatives of the Service advised the team that it was reviewing the need to update the Hawaiian Monk Seal Recovery Plan, which had not been revised since it was adopted in 1983. They also noted that consideration was being given to appointing a new recovery team in view of evolving management issues and plans to hire a permanent recovery plan coordinator. The meeting then proceeded to review the status of research and management activities.

After its meeting, the recovery team wrote to the Service on 26 March 2001 providing recommendations. The team suggested that its scientific focus and current membership be retained, subject to a rotational replacement by new members. The team also expressed its full support for hiring a recovery plan coordinator, offered to draft a revised recovery plan, and suggested that evolving management needs be addressed by a separate implementation team with appropriate agency officials and stakeholders appointed after approval

of the revised recovery plan. The team also urged that future recovery team meetings be held in December for reasons noted above. Among other things, the team also recommended that the Service:

- convene a workshop to formulate a comprehensive research plan on monk seal foraging ecology;
- take certain steps to complete assessments of monk seal prey preferences using fatty acid signatures as soon as possible;
- assess the potential for using “crittercams” to study the foraging behavior of young monk seals;
- determine the optimal duration of field camps to identify all parturient females and pups;
- continue work to remove debris and disentangle monk seals on beaches and reefs in the Northwestern Hawaiian Islands;
- develop a contingency plan for removing sharks found preying on monk seal pups at French Frigate Shoals;
- ensure that field staff are authorized to remove aggressive male seals they find attacking young seals and adult females;
- station a Service staff member at Midway Atoll year-round to minimize, document, and assess ecotourism impacts on seals;
- develop a cooperative interagency program to monitor contaminant clean-up work on French Frigate Shoals and Midway Atoll;
- take such actions as are necessary to prevent development of a fishery support base at Midway Atoll;
- transfer responsibility for removing debris from reef areas from the Service to the new Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve;
- convene a workshop to identify measures for protecting seals that haul out on public beaches in the main Hawaiian Islands and seek cooperative funding under section 6 of the Endangered Species Act to help support related state activities; and
- take such steps as possible to support actions to replace the Tern Island seawall.

A copy of the team’s letter was provided to the Commission and, on 13 April 2001, the Commission wrote to the Service expressing support for all the recommendations put forth by the team. The Commission also endorsed the team’s recommendation

that the recovery team maintain its scientific focus and current membership, that the recovery plan be updated, and that a separate implementation team be formed after a new recovery plan was adopted.

On 13 July 2001 the Service responded to the team’s recommendations and provided a copy of its response to the Commission. The Service noted that it was still reviewing the possibility of changing the recovery team’s composition and role. With regard to its specific recommendations, the Service concurred with most of the team’s recommendations and identified steps that were being taken or had been taken to address them.

In part, it noted that it had scheduled a foraging ecology workshop for September 2001, it was proceeding with fatty acid signature analyses to identify monk seal prey, and it would continue to work with other agencies to develop contaminant clean-up and monitoring plans. With respect to the proposed fishery support station at Midway, the Service noted that it expected to consult with the Fish and Wildlife Service and would ensure that potential effects of the proposal would not adversely affect monk seals. It also advised the team that it would discuss transferring responsibility for debris



Figure 11. Hawaiian monk seal on popular swimming beach on the Island of Kauai (photograph courtesy of David Nichols, Honolulu Laboratory, National Marine Fisheries Service)

removal from reefs with managers of the new coral reef ecosystem reserve. It also noted that a workshop on management needs for monk seals in the main Hawaiian Islands could not be scheduled until funding for the meeting was secured. With respect to developing a cooperative agreement to help support state involvement in managing seals in the main Hawaiian Islands, the Service noted that it would consider budget needs during the next funding cycle.

Following its reply, the Service decided to reconstitute the recovery team and assign the new team responsibility for drafting a revised recovery plan. In mid-September the Service advised existing team members of its decision and in October it invited new members to join the team. The new team, which includes two members of the previous team, has fewer scientific experts and more representatives from involved agencies and stakeholder groups. Terms of reference for the new team charge it with advising the Service on issues concerning the conservation and recovery of Hawaiian monk seals and, in particular, with developing and overseeing implementation of a revised Hawaiian Monk Seal Recovery Plan. The team also is charged with evaluating monk seal research and management programs, assessing the efficacy of specific recovery efforts, evaluating the species' status and listing classification when appropriate, and recommending emergency actions to enhance recovery as needed. At the end of 2001 the first team meeting was scheduled for early March 2002.

In light of developments and uncertainties affecting monk seal recovery efforts, the Marine Mammal Commission began making plans with the Service to convene a review of the Hawaiian monk seal recovery program during spring 2002.

Monk Seal Litigation

As noted above, on 26 January 2000 several environmental groups filed suit against the National Marine Fisheries Service claiming that the agency had violated the Endangered Species Act, the Administrative Procedure Act, and the National Environmental Policy Act in authorizing lobster and bottomfish fisheries in the Northwestern Hawaiian Islands (*Greenpeace Foundation v. Mineta*). The plaintiffs claimed, among other things, that (1) the fisheries were depleting monk seal food supplies, thus jeopardizing the continued existence of the species, (2) operation of the fisheries resulted in the unauthorized taking of monk seals in violation of section 9 of the Endangered Species Act, and (3) the environmental

impact statement and environmental assessments prepared by the Service failed adequately to assess the impacts of those fisheries on monk seals. The plaintiffs sought an injunction to close those fisheries until the Service came into compliance with the applicable statutes and regulations. The Service decided to close the lobster fishery while the case was under consideration because of concerns about the collapse of Hawaiian lobster stocks.

In an order issued on 15 November 2000 the court ruled in favor of the plaintiffs that the Service had not complied with section 7(a)(2) of the Endangered Species Act. It found that the Service had failed to ensure that implementation of the lobster fishery management plan would not jeopardize monk seals or result in adverse modification of the species critical habitat. As to section 9 claims, the court found that information in the record was insufficient to establish "as a matter of law" that lobster is a critical element in the diet of monk seals. Because a material fact existed with respect to this issue, the court declined to rule on it pending additional proceedings. In contrast, the court found sufficient evidence in the record that monk seals have been killed, hooked, and poisoned in connection with the bottomfish fishery and that such takings constitute a violation of the Endangered Species Act. Nevertheless, the court determined that it needed additional information before deciding whether to enjoin the fishery on that basis. The court did, however, grant the plaintiffs' motion for an injunction with respect to the lobster fishery until a new biological opinion and an adequate environmental impact statement were completed.

The evidentiary hearing to examine the impact of the bottomfish fishery on monk seals was convened by the court on 13 March 2001. Six witnesses testified, five of whom were either active in the fishery or had been participants in the past. The witnesses provided testimony on their experiences with bottomfishing, their fishing techniques, and their interactions with Hawaiian monk seals.

On 30 March 2001 the court denied the plaintiffs' motion for an injunction against implementation of the bottomfish fishery management plan. The court determined that allowing the fishery to continue while the new biological opinion and environmental impact statement were being prepared would not present a

reasonable likelihood of injury or irreparable harm to monk seals in the interim. The court also found that the plaintiffs' claim alleging violations of section 7 of the Endangered Species Act with respect to the bottomfish fishery was moot, inasmuch as the Service had voluntarily reinitiated formal consultation. Moreover, the court declined to set aside the 1986 and 1991 biological opinions on the impacts of bottomfish fishing on monk seals as being arbitrary or capricious because such action was unwarranted based on the evidence before the court.