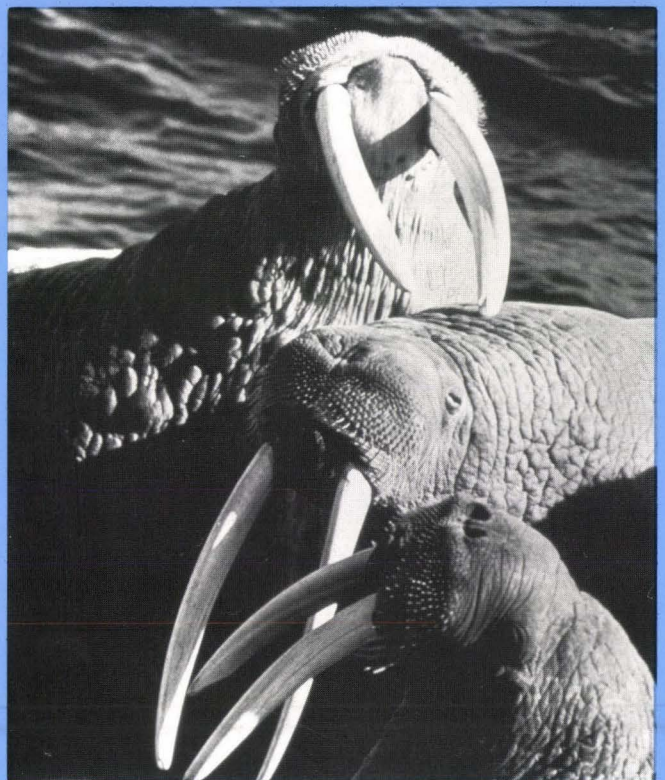
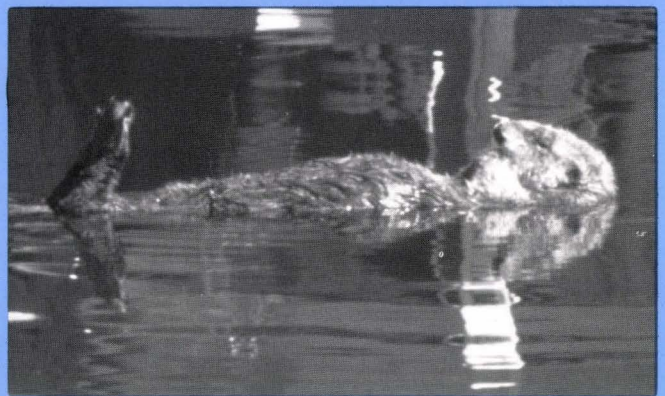


Administration of the Marine Mammal Protection Act of 1972

January 1, 1990 to December 31, 1990



U.S. Department of the Interior • U.S. Fish and Wildlife Service
Washington, DC 20240

Department of the Interior
U.S. Fish and Wildlife Service

Marine Mammal Protection Act
Report of the Department of the Interior

The Marine Mammal Protection Act of 1972, as amended (16 U.S.C. 1361-1407, 86 Stat. 1027 (1972), 95 Stat. 979 (1981), 98 Stat. 440 (1984), 100 Stat. 3741 (1986), and 102 Stat. 4755 (1988)) states in Section 103(f) that:

“Within six months after the effective date of this Act [December 21, 1972] and every twelve months thereafter, the Secretary shall report to the public through publication in the *Federal Register* and to the Congress on the current status of all marine mammal species and population stocks subject to the provisions of this Act. His report shall describe those actions taken and those measures believed necessary, including where appropriate, the issuance of permits pursuant to this title to assure the well-being of such marine mammals.”

The responsibility of the Department of the Interior is limited by Section 3(11)(B) of the Marine Mammal Protection Act to those marine mammals that are members of the Orders Carnivora (polar bear, sea otter and marine otter), Pinnipedia (walrus) and Sirenia (manatee and dugong). Accordingly, published herewith is the report of the Department of the Interior for the period of January 1, 1990, to December 31, 1990, on the administration of the Marine Mammal Protection Act with regard to those mammals.

Issued at Washington, D.C., dated August 8, 1991


Director

Administration of the Marine Mammal Protection Act of 1972

January 1, 1990 to December 31, 1990



U.S. Department of the Interior U.S. Fish and Wildlife Service

Washington, DC 20240

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Introduction

Authority

The passage of the Marine Mammal Protection Act of 1972, hereafter referred to as the Act, gave the Department of the Interior responsibility for manatees, polar bears, walrus, sea and marine otters, and dugongs. Within the Department of the Interior, the Fish and Wildlife Service (Service) is responsible for managing these marine mammals and for enforcing the moratorium on taking and importing marine mammals and marine mammal parts.

The Service administers requests for waiving the moratorium and for the transfer of management authority to States, issues permits, conducts research programs, enforces provisions of the Act, publishes rules and regulations to manage marine mammals, cooperates with the States, and participates in international activities and agreements. In addition, the Service lists and delists species as endangered or threatened and undertakes other Endangered



Walrus in Alaska. U.S. Fish and Wildlife Service photo.

Species Act-related responsibilities and maintains a close working relationship with the Marine Mammal Commission and its Committee of Scientific Advisors.

During the period of time covered by this report, there were no significant changes to the listed status of any of the species of marine mammals whose management is the Service's responsibility.

Species List

Species List and Status of Marine Mammals Under Service Jurisdiction Under the Act and the Endangered Species Act

Species		Marine Mammal Protection Act	Endangered Species Act
Common Name	Scientific Name		
Polar bear	<i>Ursus maritimus</i>	Yes	No
Sea otter-Alaska	<i>Enhydra lutris lutris</i>	Yes	No
Sea otter-southern	<i>Enhydra lutris nereis</i>	Yes	Threatened
Marine otter	<i>Lutra felina</i>	Yes	Endangered
Walrus	<i>Odobenus rosmarus</i>	Yes	No
Dugong	<i>Dugong dugon</i>	Yes	Endangered
West Indian manatee	<i>Trichechus manatus</i>	Yes	Endangered
Amazonian manatee	<i>Trichechus inunguis</i>	Yes	Endangered
West African manatee	<i>Trichechus senegalensis</i>	Yes	Threatened

Appropriations

The Service's most recent funding authorization was under authority of Section 116(b) of the Act as adopted in the 1988 amendments (102 Stat. 4755) for Fiscal Years (FY) 1989 to 1993. Calendar year

1990 covered by this report overlaps FYs 1990 and 1991, and authorized and appropriated funds (in \$000) for both years are presented.

	Authorized	Appropriated
Fiscal Year 1990	\$3,120	\$2,697
Fiscal Year 1991	\$3,240	\$3,011

Distribution of appropriations (in \$000)

	Actual FY 90	Projected FY 91
Marine Mammal Protection Act		
Research and Development		
Alaskan sea otter ¹	\$ 249	\$ 275
Walrus	195	146
Polar bear	801	825
Total Research and Development	\$ 1,245	\$ 1,246
Management		
Permit activities	\$ 25	\$ 30
Law enforcement activities	502	810
Other management activities	925	925
Total Management	\$ 1,452	\$ 1,765
Grand Total	\$ 2,697	\$ 3,011
Endangered Species Act		
Section 6 (Grants-to-States)		
California—sea otter	\$ 100	\$ 0
Florida—manatee	105	87
Total Section 6	\$ 205	\$ 87
Section 15 (Research and Development)		
Endangered/threatened otters	\$ 821	\$ 763
Manatee	344	624
Total Section 15 Research	\$ 1,165	\$ 1,387
Section 15 (Management)		
Endangered/threatened otters	\$ 386	\$ 386
Manatee	350	380
Hawaiian monk seal ²	105	30
Total Section 15 Management	\$ 841	\$ 796
Grand Total	\$ 2,211	\$ 2,270

¹ Totals do not include \$854 in FY 1990 and \$324 in FY 1991 for damage assessments related to the *Exxon Valdez* oil spill.

² Although the National Marine Fisheries Service (NMFS) has primary responsibility for Hawaiian monk seals, the species utilizes the Hawaiian Islands and Johnston Atoll National Wildlife Refuges. Funds reported are spent for Hawaiian monk seal activities on the Refuge lands under authority of the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee).

Summary of 1990 Program

Outer Continental Shelf Operations and Environmental Studies

The Service participated in a limited number of Outer Continental Shelf (OCS) activities involving marine mammals in 1990. The Service reviewed the Secretarial Issue Document (SID) for oil and gas lease sale 124 (Beaufort Sea, Alaska) affecting bowhead and gray whales. The SID presented Secretarial options on the structure of the sale, leasing options and lease stipulations. The Service, assisting the Assistant Secretary for Fish and Wildlife and Parks, urged selection of options that provided greatest protection for marine mammals. As of the date of this report, no final decisions on leasing had been made.

The 5-Year OCS Natural Gas and Oil Draft Proposed Program (DPP) was circulated for review by Service offices in 1990. The DPP covers the period 1992-1997 and potentially affects all marine mammals under Service jurisdiction within U.S. territory. The Service provided Scoping comments on the Notice of Intent to Prepare the Environmental Impact Statement emphasizing that sensitive fish and wildlife resources should be considered in the analyses of the alternatives. Possible techniques for minimizing impacts to marine mammals were suggested, including deferral of leasing, changes in frequency and timing of leasing, reductions in the size of lease sales, establishment of buffer areas, restrictions on methods of transporting oil, and phasing of new development.

The Service selected comprehensive program options for each of 28 OCS Planning Areas. These options included consideration for leasing; no leasing, but continued geologic and environmental studies; and no leasing and no studies related to program decisions. Detailed leasing options by region/planning area were also provided. These covered the pace of sales in a planning area over the next five years, and limits on the size of a given sale.

The Service completed formal interagency endangered species Section 7 consultation for oil and gas lease sale 137 (Eastern Gulf of Mexico) that evaluated effects on the West Indian manatee. The Biological Opinion concluded no jeopardy to the manatee, but urged adoption of measures to restrict upland support facilities in a manner that would minimize effects on the species. No incidental take of manatees was anticipated. The Service completed other Section 7 consultations in 1990 for OCS lease actions; they are not discussed here because they did not involve endangered or threatened marine mammals under Service jurisdiction.

Research and Development

The Service conducted research under the Act during FY 1990 at several Centers and Field Stations. The Alaska Fish and Wildlife Research Center is responsible for polar bear, walrus and northern sea otter research. The National Ecology Research Center (Fort Collins, Colorado) is responsible for all other marine mammal research, including the southern sea otter, manatees and other depleted species. The Cooperative Fish and Wildlife Research Units Center conducts additional research to support the needs of Service Regions, and other Service Research Centers. For each project active during FY 1990, the project title and summary, followed by highlights of results to date are given below by species.

1. Polar bear

A. Project Title & Summary:

Distribution, timing and importance of polar bear denning in northern Alaska. Female polar bears captured in October and November or March and April are fitted with radio collars and subsequently followed to their maternity dens. Activities of instrumented bears are monitored during den

entrance, occupancy and emergence periods. Evidence of 19 new polar bear dens in Alaska's Beaufort Sea region was found, bringing the total discovered in this study to well over 100; previously only 35 recent and historic dens were known in Alaska. Fourteen of 19 confirmed dens were located on land, with the remaining on shore-fast or drifting ice. A comprehensive report will be prepared in 1991.

Results to date:

Over 100 dens have been found in the Beaufort Sea Region since 1981. Most have been on drifting or shore-fast ice, but increasing numbers have been found on land. Most dens on land have been found on small barrier islands along the coast, including those that are part of the Arctic National Wildlife Refuge. Despite their small number, dens on land are highly productive and contribute disproportionately to production of cubs.

B. Project Title & Summary:

Population definition and estimation of survival, recruitment and numbers of polar bears in the Beaufort Sea. During March, April and May, Alaskan polar bears captured in the northern portion of the State are permanently marked. Assessment of critical population parameters is achieved by analysis of mark/recapture data, catch/effort analysis and mathematical simulations. Sixty-five polar bears were captured in FY 1990 and 28 were fitted with radio collars. Survival of cubs was determined by observation from aircraft. Stock assessment studies continued. A manuscript summarizing annual and seasonal movements of polar bears in the Beaufort Sea is in press. Sample sizes are still limiting for many types of analyses.

Results to Date:

Analysis of overwinter survival indicated a rate of 83-89 percent for cubs, based on relatively small sample sizes. Mitochondrial DNA and isotope ratio studies have shown promise for indicating relationships and geographic affinities of polar bears, but are not yet sufficiently developed to serve as an operational means for distinguishing stocks. Polar bear home ranges appear to be very large and studies of movements employing radiotelemetry continue to show that movements of polar bears are highly variable and more extensive than formerly thought. Movements between the Beaufort and Chukchi Seas over relatively long time periods have been verified, but the reasons for these movements are not understood.

C. Project Title & Summary:

Relationships between polar bears, sea ice movement and condition, and pagophilic seals. High altitude aircraft and satellite imagery are used along with drifting buoy data to classify ice movements and conditions. Foraging methods used by polar bears are determined by radio tracking and snow tracking. Prey species, frequency of kills, habitat types and hunting methods are recorded. Logistical problems including failure of radio transmitters, inclement weather conditions, and unusual distributions of collared animals continued to prevent full progress on this work in FY 1990. Methods of data collection are being reevaluated.

Results to Date:

Limited information based on snow tracking has revealed much detail about polar bear activity, including distances traveled, number of attempted kills and kill success rate. The quality of the information obtained is high, so this study potentially has great value, despite its vulnerability to poor weather and equipment problems.

D. Project Title & Summary:

Population definition and estimation of survival, recruitment and number of polar bears in northwestern and western Alaska. During March and April, Alaskan polar bears captured in the western portions of Arctic Alaska are permanently marked. Assessment of critical population parameters is achieved through continued analyses of mark/recapture data, catch/effort data, and mathematical simulations. Three previously collared females were recaptured and fitted with new transmitters, and 28 new females were captured and fitted with satellite collars; 22 of these new individuals were captured on Wrangel Island in the Soviet Arctic. A joint U.S./U.S.S.R. cruise to census polar bears in the Chukchi Sea is planned for 1991.

Results to Date:

The data base on western Alaska polar bear movements was greatly expanded and the sharing of polar bear populations with the Soviet Union was verified; data collected by satellite telemetry in FY 1990 indicate that 80 percent of the polar bears in the Bering and Chukchi Seas den in Soviet territory.

A formal exchange of information on polar bears was initiated with Soviet scientists through the Service's International Affairs Office and the State Department.

The pilot study of mitochondrial DNA rapid sequencing and amplification was completed by cooperators and is being evaluated by Service geneticists.

E. Project Title & Summary:

Inter-relationships between sea ice habitats and polar bear distributions in the Bering and Chukchi Seas in northwestern Alaska. Remotely sensed data on ice types, distributions and movements are being analyzed with reference to concurrent locational data from satellite instrumented polar bears in the Bering and Chukchi Seas. Location of denning activity is also being recorded via locational data from satellite-instrumented polar bears. Locational data received from "Service ARGOS" were routinely integrated into the ARC/INFO and IDRISI Geographic Information Systems (GIS). Advanced Very High Resolution Radiometry (AVHRR) data were acquired and incorporated into the GIS. Cooperation with two Soviet research groups provided access to Soviet RADAR satellite imagery.

Results to Date:

Locational data for polar bears were routinely added to the Regional GIS data base.

AVHRR data appear to have potential use in analysis of polar bear habitat use patterns on a large scale, but may be of less value than higher resolution imagery available from Soviet RADAR satellites.

2. Northern sea otter

A. Project Title & Summary:

Biological information necessary to establish a zonal management program for sea otters in Alaska. This study is designed to examine movements, mortality and reproduction of sea otters at Kodiak Island (by staff of the Alaska Fish and Wildlife Research Center) and Prince William Sound (by Cooperative Agreement). Funds are provided to personnel of the University of Minnesota to support an intensive study of movement and reproduction of sea otters in eastern Prince William Sound. Efforts to collect location fixes on radio-tagged sea otters at Kodiak Island and Prince William Sound continued until transmitters ceased operation. Visual sightings of marked animals were made as frequently as possible to document reproductive rates and dependency periods of pups. Dead sea otters were examined for mortality factors. Temporary reassignment of staff from this project to assessment of impacts of the *Exxon Valdez* oil spill continued to cause progress to

be deferred on certain aspects of this study, particularly on sea otter ecology at Kodiak Island. Analysis of data was initiated.

Results to Date:

Mortality of sea otters at Kodiak Island was substantially higher than in Prince William Sound; causes of mortality included shooting, entanglement in nets and disease. A period of unusually high mortality in the Cordova area in 1990 and other data suggest that populations have not yet stabilized. Feeding experiments suggest that sea otters can detect paralytic shellfish toxin.

Middle aged female sea otters in Prince William Sound have a higher rate of reproductive success than younger individuals.

Two models may describe sea otter movements in southeast Alaska. One describes sedentary animals with single home ranges, and the other describes animals that shift ranges seasonally.

B. Project Title & Summary:

Interactions between sea otters and fisheries in Alaska. Research along two fronts continued at Kodiak Island in order to: (1) describe sea otter diets with an emphasis on the importance of commercial species of shellfish, and (2) investigate the impacts of sea otter foraging on subtidal benthic communities. There was continued refinement of the line transect survey techniques during FY 1990. A paper on censusing methodology was published in the *Journal of Wildlife Management*. Foraging data on sea otters at Kodiak Island were not collected, owing to reassignments of personnel to assess damage from the *Exxon Valdez* oil spill. The target completion schedule is being reevaluated.

Results to Date:

Telemetry data at Kodiak suggest a movement of sea otters into Chiniak Bay. Fisheries conflicts are likely to develop over dungeness crabs and sea urchins in that area. Elsewhere at Kodiak island, commercially valuable shellfish species do not figure importantly in sea otter diets. Preliminary data suggest that little regard to sea otter distribution has been given in siting mariculture operations. Limited data from southeastern Alaska suggest that red sea urchins are important prey of sea otters in newly-invaded habitats on the outside coast. A commercial fishery for that species exists but it is likely to remain small. The dungeness crab was identified as the species most likely to be impacted by sea otter predation in southeastern Alaska.

Impacts of sea otters on populations of the commercially important dungeness crab are significant, as they are on the less valuable red and green sea urchins and abalone.

C. Project Title & Summary:

Basis of estimating sustained yield, and means to regulate population size and dispersal relative to sea otter management in North America. More than 3,500 sea otters were counted in southeastern Alaska in five populations in 1987 from an original 402 animals released between 1965 and 1968. Plans are underway for an experimental manipulation of one or more sea otter populations in southeastern Alaska to test hypotheses related to range expansion and, hence, zonal management. Due to inadequate funds, further work on this project will be deferred until FY 1992 when funds released by the completion of other projects are expected to be available.

Results to Date:

Populations of sea otters in southeastern Alaska continue to grow exponentially. Investigators had difficulty maintaining precision of counts using repeat-censusing from skiffs in even small populations of sea otters.

No funds were provided to the Cooperative Agreement with the Alaska Department of Fish and Game in FY 1990.

D. Project Title and Summary:

Assess the fate of sea otters oiled and rehabilitated as a result of the *Exxon Valdez* oil spill. The objective of this study is to evaluate cleaning and rehabilitation efforts as effective tools for returning oiled sea otters into the environment as functioning individuals in the population. Survival and recruitment histories of rehabilitated sea otters are compared with those of free-living sea otters in the area of the spill and with those in oil-free habitats. Forty-five sea otters were selected for study, based on the degree of oiling and the methods of rehabilitation. Selected individuals were implanted with radio transmitters before release. Those instrumented have been followed continuously since July 1989. Visual observations were obtained as frequently as possible. Survival and reproductive performance were monitored, and recovered carcasses were sent for post-mortem analysis.

Results to Date:

As of April 1990, 22 of the 45 radioed otters were either missing or dead. Movements are greater than those of non-rehabilitated otters. Some animals

released in Prince William Sound returned to the Kenai Peninsula where they were originally caught. The survival rate of instrumented otters is lower than would be expected in a wild population.

E. Project Title and Summary:

Magnitude, extent and duration of impacts from the *Exxon Valdez* oil spill on sea otter populations. The purpose of this study is to determine the long term effects of the *Exxon Valdez* oil spill on sea otter populations, including effects on individuals from chronic exposure to petroleum contaminants and effects on populations of alterations to the ecosystems supporting them. The study relies on comparisons made between populations in oiled and unoiled habitats and on comparisons of both with the long term data base collected on sea otters in the area. Aerial surveys are conducted to determine the occurrence of sea otters in oiled and unoiled portions of Prince William Sound. Biological information on sea otters found dead after the spill was collected and has been incorporated into a data base. A program of instrumentation studies movements, behavior and survival of animals in oiled and unoiled portions of Prince William Sound.

Results to Date:

Some preliminary analyses of data have been completed, but information is not yet available for release owing to its litigation-sensitive nature.

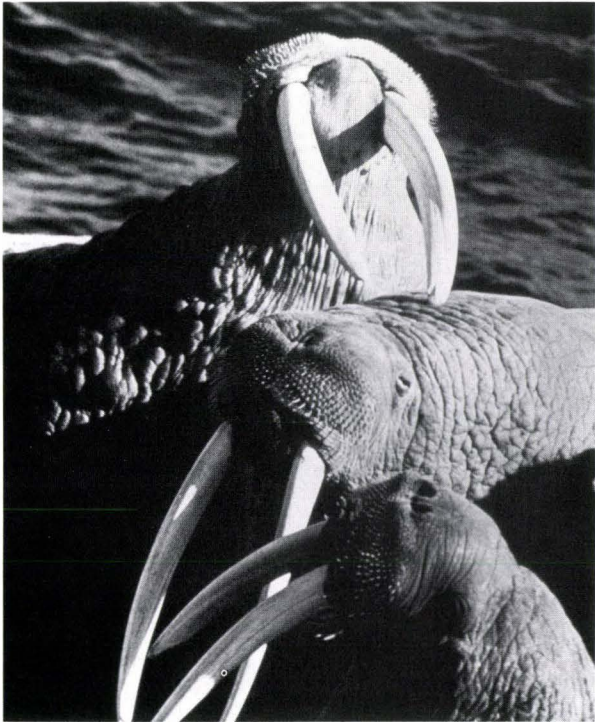
3. Pacific walrus

A. Project Title & Summary:

Techniques to monitor movements for population assessment, age/sex composition, behavior and estimates of populations of walrus. Satellite transmitters yield data concerning spatial and temporal distribution and haul out behavior of Pacific walruses that are necessary to quantify biases in the joint US/USSR walrus survey results. Nine satellite transmitters were deployed on walruses in spring 1990 and radioed and non-radioed walruses were monitored using standardized techniques. Data sets for all previous years were computerized for analysis.

Results to Date:

Several alternate techniques for conducting aerial surveys have been tested. Adaptive sampling techniques, videography, 35 mm photography, and line transect methods have been evaluated. A preliminary Leslie-type matrix model was developed.



Walrus. U.S. Fish and Wildlife Service photo.

A comprehensive protocol for the joint US/USSR walrus survey involving an adaptive sampling procedure combined with systematically spaced line transects was recommended.

Numbers of walrus estimated from visual surveys are generally higher than counts made from video images, and airborne videography has been abandoned as an aid for censusing walrus.

Transmitters performed well in FY 1990, despite problems encountered in prior years.

4. Manatee and dugong

A. Project Title & Summary:

Develop a generalized microcomputer capability for field offices to address large-scale resource assessment problems. Develop a prototype decision support tool that is compatible with existing PC standards currently at Service field offices. The prototype will be evaluated in an operational setting on several large-scale resource problems such as support of Section 7 consultations on the Florida manatee and to track location, status and success of mitigation activities. A prototype microcomputer "Desktop Mapping System" was enhanced for distribution to field offices in FY 1991. Base map information for Lee and Collier Counties, Florida, is undergoing conversion for tests of the GIS capabilities at the Vero Beach Field Office.

Results to Date:

Capabilities were demonstrated using manatee mortality and sighting data in a three county area in eastern Florida at the Endangered Species Office in Jacksonville. The prototype has been demonstrated in Jacksonville and Vero Beach and is in use by the Sirenia Project in Gainesville, Florida.

B. Project Title & Summary:

Ecological studies of manatees and dugongs. This work is concerned with obtaining data on status of populations of sirenians throughout the geographic range of the Order, to obtain estimates of population levels, and to evaluate the potential of surveys in selected areas as indices of population densities and movements.

Radio telemetry studies of manatees on the east coast of Florida continued, with 20 individuals monitored in 1990. Three were monitored by VHF transmitters, and PTT's (satellite transmitters) were deployed on 17 individuals. The QuickMap software continues in use to handle telemetry data. Stomach content analysis continued, along with evaluation of ingested marine debris.

Results to Date:

Manatee movement data show that seasonal migrations and within-season movements on Florida's east coast are extensive and complex. Rates and timing of movements, stopover areas and other ecological information are being gathered. Information on use of key areas is being used as it develops by management agencies to plan permitting policies, habitat acquisition, and regulation of waterborne activities.

Feeding studies show use of a wide variety of plants in the diet, and that up to 95 percent of the shoot biomass and 58 percent of the shoot and rhizome biomass is removed in feeding patches in seagrass beds.

Sample sizes on inter-birth interval and age at first reproduction were increased by the scar-pattern based life history studies.

The existence of a remnant, isolated population of manatees on the northwestern Caribbean coast of Panama was documented.

The existence of the largest known population of manatees in the Caribbean was documented in Belize.

Data on habitat use documented by telemetry have been used for the acquisition and/or protection of

manatee sanctuaries on the Sebastian and Banana Rivers in Florida.

C. Project Title & Summary:

Hobe Sound seagrass study. Hobe Sound is a valuable natural resource containing well-developed seagrass meadows and algal beds that serve as nursery, breeding habitat, shelter and feeding ground for important commercial and recreational fish species, as well as food for a population of manatees that over-winters locally. Concern for the interrelationships between a decline in water quality and the status of seagrasses has raised several questions. Observers have reported that over several years the turbidity in Hobe Sound has increased coincidental to the intensity of boat traffic. These observers support a proposal that a rule be adopted limiting boat speeds and wakes. As the information supporting the adoption of the proposed rule is presently based on qualitative and subjective observations, this study approaches the problem with a scientifically valid research program. Winter feeding impact studies on the Hobe Sound seagrass beds continued. Weekly intensive light sampling was completed, as well as gathering of data on boat traffic and short-term boat-wake effects on light attenuation. FY 1990 was the final year of this study.

Results:

Only low-light-adapted species occur at depths exceeding 2.0 meters in Hobe Sound, suggesting that submarine light availability may be limiting the overall abundance of seagrasses in the Sound; values for net leaf production were also at the lower end of those reported elsewhere.

Modeling of empirical data shows that boat wakes approximately double the average total amount of wave energy in the lagoon. They are a significant source of turbidity through their resuspension of sediments.

Water clarity was found to limit the distribution of climax species of sea grasses in Hobe Sound; these species occur at greater depths in Jupiter Sound, where water clarity is greater.

D. Project Title & Summary:

Manatee Protection Project: Survey of boat usage patterns. The exact number of West Indian manatees in the Florida population is not known, but an intensive State-wide, winter aerial survey of winter habitat concentrated at warm-water refuges counted a minimum of 1,465 individuals. Average known mortality has been increasing from approximately 90

per year (1976-1983) to 146 per year since 1984. Human-caused mortality, including manatees crushed or otherwise injured by boats, crushed in locks or water control structures and poaching account for approximately 1/3 of all known mortality. The objective of the study is to maximize validity of location, duration and types of boating activities that characterize manatee habitats and their relationship to marine boat launching ramps, multifamily docks, single (private) family docks, etc. This will be done in two Citrus County locations. Products will include proposed restrictions relating to a general permit for building boat docking facilities, and a manatee protection plan for 18 affected counties.

Results:

This study was completed in 1990.

Distributions of boating activities on the Crystal and Homosassa Rivers are similar to the distribution of manatees.

Boating activities were characterized as to frequency, seasonal patterns, length of trips, identity of operators and destination.

E. Project Title & Summary:

An evaluation of manatee distribution patterns in response to public use activities: Crystal River, Florida. This study was designed to analyze the distribution response of manatees in warm water sanctuaries of the Crystal River Refuge in response to weather patterns and public-use activities during the over-wintering period of 1988. The studies include evaluations of observation techniques, including aircraft types, photography versus direct observations, transect patterns and time intervals. The study area is confined to the waters of the Kings Bay reach of the Crystal River in Citrus County, Florida. The area is entirely within the Crystal River National Wildlife Refuge and specifically inclusive of waters in the Bay south of Warden Key and Banana Island. This area of approximately 70 acres is considered critical, or core, habitat to the manatee. A final report was received in FY 1990.

Results:

Manatees using the southern part of Kings Bay as a winter thermal refuge respond to increasing boat traffic by moving into boat-free sanctuaries.

Food resources in the boat-free sanctuaries are not sufficient for the manatees congregating in them; hence, restricted boat traffic or larger sanctuaries are indicated.

F. Project Title & Summary:

An evaluation of cumulative impacts to the habitat of the West Indian manatee, Crystal River National Wildlife Refuge. Numbers of people using the recreational center at Kings Bay for boating, diving, sailing and fishing are estimated at 600 per week day and 1,302 per weekend day. Manatees wintering in the area have increased from 115 in December 1983 to 161 in January of 1987. Continued use of the manatee habitat is threatened by water activities and by rapid development of Kings Bay. Objectives of the study include developing a specially referenced database from existing and newly developed information on land use, submerged vegetation, herbicide use, and manatee use of habitats to predict threats and conflicts involving manatees. This study was completed in FY 1990.

Results:

Recreational development in the Kings Bay area and consequent increases in boat traffic have caused manatees to shift to less-used Magnolia Spring on heavy-usage days.

Increased pressure to control aquatic vegetation is expected.

Maps were produced showing areas of recreational activity and of manatee distribution and abundance.

G. Project Title & Summary:

Manatee movements and foraging in Cumberland Sound, Georgia, and adjacent waters. Conventional biotelemetry is used on manatees in Cumberland Sound to assess habitat use and duration of stay in the area. Foraging areas are determined and vegetation composition and density recorded. Of particular interest are the effects of vessel traffic on habitat use. The project is near completion.

Results to Date:

Extensive movements of manatees were documented, with radio-tagged individuals moving among Brevard County, Florida, and Kings Bay, Florida, and Cumberland Sound, Georgia; Georgia is normally occupied only during warm seasons.

Georgia is more important as manatee habitat than formerly believed.

Manatees in Cumberland Sound feed primarily on *Spartina alterniflora* and *Ulva* sp.

Dredging and support vessels may disturb feeding manatees.

5. Southern sea otter.

A. Project Title & Summary:

Ecological studies of sea otters and other marine mammals. Objectives of the research are: to determine the home range, life range and territory size of adult and subadult sea otters in central California; to relate dispersal data to population phenomena observed in central California; to determine trends in the size and distribution of sea otter populations; and to estimate the size of the adult population of sea otters. Counts of the near-shore sea otter population along the central California coast were completed, and analyses of the long-term life history information (birth rates, birth intervals and longevity) were continued.

Results to Date:

Range-wide counts completed during spring 1989 resulted in the highest total count since current methods were initiated in 1982. A total of 1,864 sea otters were counted.

There was a 10 percent drop in sea otters counted in the spring 1990 census; reasons for the decline are unknown. However, the number of otters counted in the fall 1990 survey (i.e., 1,636) increased by 2 percent from the previous fall's survey when 1,599 otters were counted.

B. Project Title & Summary:

Interactions between sea otters and nearshore ecological communities. The objective of this study is to determine the preferred prey species and activity patterns of sea otters, and to clarify the substantial interactions that take place between sea otters and invertebrates and plants in the environment. Analysis of changes in nearshore communities off central California and at San Nicolas Island continued. Studies of the demography of the red abalone were begun in historical sea otter habitats off northern Sonoma County to enable comparisons with similar data gathered within the present range of sea otters.

Results to Date:

The translocated sea otter population at San Nicolas Island has not yet had an effect on the structure or dynamics of the nearshore community, probably because the size of the population remains small.

Studies of sea otter habitats on the mainland coast indicate that ecological effects of sea otters are complex, may include economic benefits and may be of lesser importance than human effects on habitats.

C. Project Title & Summary:

Translocation of sea otters. Capture, transport and release of sea otters to San Nicolas Island from the vicinity of Morro Bay, California, was undertaken in order to: (1) establish a viable colony of sea otters; (2) determine changes in distribution and abundance of sea otters in the parent and translocated populations; (3) determine changes in behavior and population parameters of sea otters at San Nicolas Island as the population grows from an initial small size to equilibrium density; and (4) establish criteria for determining the level of success of sea otter translocations as a management tool. Fourteen sea otters were released at San Nicolas Island during FY 1990. Fewer sea otters were translocated than had been planned owing to commitment of facilities for Alaska sea otters undergoing rehabilitation as a result of the *Exxon Valdez* oil spill. Radio and visual surveys were conducted, both at San Nicolas Island and along the coast where animals had originally been captured.

Results to Date:

Since November 1989, the number of sea otters at San Nicolas Island has remained stable at between 13 and 15 individuals. This small population gave birth to 4 pups in 1990. The stability and reproductive success of the small population at San Nicolas Island suggest that the reintroduction will be successful in the long term, despite the failure of many reintroduced individuals to remain there.

Enforcement

The Service's Division of Law Enforcement investigates known, alleged or potential violations of the Act involving illegal take or importation of marine mammals or their products for which the Service is responsible. In addition, it assists the National Marine Fisheries Service (NMFS) by making apprehensions and conducting investigations in cases involving endangered or threatened species under that agency's jurisdiction. Results of these efforts are referred to the NMFS for its consideration and appropriate action. However, under a NMFS/Service Memorandum of Understanding, the Service retains authority over those investigations that involve endangered or threatened species under the jurisdiction of the Department of the Interior. Violations are referred to the Department of the Interior's Office of the Solicitor for civil action or the Department of Justice for criminal enforcement action.

A subject from Kent, Washington, delivered 61 sea otter pelts to Service undercover agents. The individual was one of several believed to be involved in the international sale of sea otter pelts acquired by Alaskan Natives and subsequently routed through Seattle, Washington, into the foreign black market. Agents purchased the pelts for \$1,500 each although it was discovered during the investigation the pelts could be sold for as much as \$9,800 each in the black market. A total of 62 pelts were recovered and the case is pending prosecution in Seattle. As a result of special agents' covert involvement in this investigation, information provided to the Federal Bureau of Investigation was instrumental in clearing up several thefts of semi-trailer loads of marine products from the Seattle area.

An investigation in Monterey, California, area revealed an individual who while operating a jet ski near the beach was observed by several witnesses to make numerous attempts at, and to eventually succeed in, hitting an otter with the jet ski. Subsequent to the impact, the otter was observed to have suffered injuries and slowly swam away. The subject was later identified and will be charged with a criminal violation of the Endangered Species Act in San Jose, California.

A forensic team of scientists from the Clark R. Bavin National Fish and Wildlife Forensics Laboratory (Laboratory) traveled to Alaska to investigate the cause of death of walrus along the beaches of the southern Chukchi Sea. The team surveyed a number of carcasses for a comparison of mortality statistics with those of previous years. There is a direct correlation between walrus carcass deposition and proximity of fishing villages and towns. The forensic team has been able to infer where pelagic hunting takes place and how environmental factors (ocean currents and storms) affect the deposition of walrus carcasses on beaches. A significant number of walrus carcasses were necropsied and the cause of death investigated; as in previous years, the 1990 forensic team found that a majority of the walrus died of unnatural causes.

The ivory characterization project established at the Laboratory allows for the identification of carved ivory items by nondestructive analysis. This has given field personnel the ability to recognize and identify the most common sources of ivory items such as mammoth tusks, elephant tusks, walrus teeth and tusks, cetacean teeth (killer and sperm whales) and tusks (narwhal), hippopotamus teeth, wart hog tusks and ivory substitutes. The results of the ivory project were presented at the International Association of Forensic Sciences meeting in

Adelaide, Australia, and were awarded "Best Paper" at the conference. Additionally, the World Wildlife Fund, in conjunction with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Secretariat, has funded publication of a booklet entitled "The Identification of Ivory and Ivory Substitutes". The primary purpose of this booklet is to make identification techniques available to all CITES member countries.

The Service's Southeast Region spent the majority of its marine mammal protection efforts in Florida and on processing notices of violations for manatee sanctuary and boat speeding infractions. The reported instances of people directly injuring or killing manatees were low.

The Southeast Region reported that a dead (cut and slashed) manatee was found tied to a bridge piling. It is suspected the manatee was caught in a shrimp/fish net and drowned before someone cut the manatee to puncture the lungs in an unsuccessful attempt to sink the manatee and, subsequently, tied it to the bridge. This information was coordinated with the Florida Marine Patrol. Service Special Agents conducted subsequent interviews.

Increased travel between the Soviet Union and the United States has resulted in a large increase in the number of marine mammal import seizures in the Service's Alaska Region. Frequency of Soviet flights arriving in Alaska has grown to approximately one each week and is increasing. Some passengers on nearly all flights are found to be importing marine mammal parts, usually seal or walrus products. Many of the seized items are for personal use, but commercial shipments are increasing proportionately as well. The majority of illegal imports are committed unknowingly, and Law Enforcement personnel are devoting time to educating travelers and the business community. Sample marine mammal products added to displays at the Anchorage International Airport have been effective as have talks and training sessions to private individuals, businesses, airlines, and other government agencies.

Investigations into the trade and sale of marine mammal products for narcotics resulted in seized and forfeited polar bear hides and walrus ivory. Several of these cases involved individuals who stole polar bear hides from local hunters to trade for cocaine and marijuana.

By a unanimous decision, the Ninth Circuit Court of Appeals upheld the 1989 conviction of an Alaskan Native man who was found guilty by an Anchorage Federal jury of wasteful take of nine



A polar bear on ice in Alaska. U.S. Fish and Wildlife Service photo.

walrus. The defendant, arguing that the Act is vague, has petitioned for Supreme Court review.

Special Agents continued to conduct meetings with key Alaskan Native villages to update and inform them regarding requirements under the Act and their responsibility for sensible use of marine mammal resources. These meetings were held in March, April and May prior to the walrus hunting season.

In June, Law Enforcement also conducted field checks of Alaskan Natives hunting walrus on Alaska's west coast. Special Agents from outside the Alaska Region were assigned to assist and many contacts with Native hunters were made to explain provisions of, and ensure compliance with, the Act. These contacts were well-received by the hunters, and it is hoped this effort will continue on a yearly basis. Law Enforcement agents worked with Service forensics experts along the coastal areas of north-west Alaska, locating dead marine mammals for necropsy. The project was an attempt to learn more about walrus mortality, ways to determine time and cause of death, and any other information useful to forensic examination of marine mammals.

Permits and Registrations

The Act prohibits the take or import of marine mammals and marine mammal products although exceptions may be made under permit for scientific research, public display or to enhance the survival or recovery of a species or stock. Registered agent/tannery permits may be issued to authorize the buying or selling of raw marine mammal parts or products by non-Alaskan Natives (i.e., persons other than Alaskan Indians, Eskimos or Aleuts) or to enable marine mammal hides to be tanned to facilitate trade of their products among Alaskan Natives.

Section 104 of the Act authorizes the Director of the Service, acting on behalf of the Secretary of the Interior, to issue permits for the activities identified above. These provisions are implemented in Title 50 of the Code of Federal Regulations—50 CFR 18.23(d) for registered agent/tannery permits and 50 CFR 18.31 for scientific research or public display permits. Regulations will be developed for issuance of permits for enhancement of the survival or recovery of a species or stock.

During 1990, two new permits were issued for scientific research and five permits were renewed and/or amended. No permits were issued for public display. Seven parties were registered, or renewed registration, as agents and/or tanneries.

The following is a brief description of permit actions taken in 1990.

Scientific Research Permits

1. PRT-689424, NMFS, Southwest Fisheries Center, La Jolla, California, is a permit issued jointly by the Service and the NMFS. The permit was renewed by the two agencies on 2/20/90 and 4/3/90, respectively, through 2/28/91 authorizing the importation and exportation of dead, salvaged material of all Cetacea, Pinnipedia, Sirenia, sea otters and marine otters.
2. PRT-701871, Smithsonian Institution, National Museum of Natural History, Washington, D.C., is a permit issued jointly by the Service and the NMFS. The permit was renewed by the two agencies on 7/19/90 and 7/17/90, respectively, through 5/31/91 authorizing the importation and exportation of dead, salvaged material of all Cetacea, Pinnipedia, Sirenia, sea otters and marine otters.
3. PRT-750950, Fish and Wildlife Service, Marine Mammals Management Field Office, Anchorage, Alaska, was issued 8/15/90 through 8/31/91 authorizing take by harassment of Pacific walrus while conducting an aerial survey along western coastal Alaska, in the Bering Sea, and on ice in the Chukchi Sea.
4. PRT-691972, Carle Foundation Hospital, Urbana, Illinois, was amended and renewed 8/22/90 through 8/31/92 authorizing the importation of two live polar bears and the importation annually of 1,200 biological samples from Manitoba or the Northwest Territories, Canada, to examine the seasonal ability of the polar bear to use specialized protein sparing metabolic adaptations to facilitate long-term fasting during their over-wintering hibernation. The permit was amended to increase the number of biological samples imported. No live polar bears were imported under the previous permit.
5. PRT-750916, Fish and Wildlife Service, Alaska Fish and Wildlife Research Center, Anchorage, Alaska, was issued 9/7/90 through 8/31/91 authorizing the take of up to 400 northern sea otters in Prince William Sound (Phase 1) and along the Kenai Peninsula in the Kodiak Archipelago, and Sitka in southeastern Alaska (Phase 2), to measure bioindicators reflecting physiological and genetic changes in male sea otters exposed to petroleum hydrocarbons from the *Exxon Valdez* oil spill. Activities authorized include capture, drugging, tagging, injecting with subcutaneous transponder chips and collecting biological samples. The second phase will be conducted only if significant and meaningful differences in bioindicators are detected in the first phase.
6. PRT-672624, Fish and Wildlife Service, Marine Mammal Section, San Simeon, California, was renewed 12/5/90 through 11/30/93 authorizing continuation of capture and tagging activities with up to 100 southern sea otters annually for three years. The overall research objective is to continue the long-term life history studies which include research on movements, foraging, activity patterns, characteristics of the reproductive cycle and characteristics and variations in social behavior and social structure.
7. PRT-717318, Fish and Wildlife Service, Assistant Regional Director for Fish and Wildlife Enhancement, Portland, Oregon, was amended on 12/19/90 through 8/11/92 to authorize the surgery needed to implant radio transmitters on southern sea otters to be conducted at a new location, the Aguajito Veterinary Hospital in Monterey, California.

Registered Agent/Tannery Permits

1. PRT-741795, Ivory Broker, Anchorage, Alaska, was registered as an agent on 2/6/90.
2. PRT-691228, Vancouver Taxidermy & Royal Fur Dressing Inc., Vancouver, Washington, was renewed registration as an agent and tannery on 9/18/90.

3. PRT-717725, Alaska Native Cultural Arts Exchange, Inc., Anchorage, Alaska, was renewed as an agent on 9/26/90.
4. PRT-748545, Alaskan Treasures, Anchorage, Alaska, was registered as an agent on 10/16/90.
5. PRT-750707, Island Taxidermy, Kodiak, Alaska, was registered as an agent on 10/17/90.
6. PRT-747501, Grizzly Tanning Company, Anchorage, Alaska, was registered as an agent on 10/31/90.
7. PRT-751287, Ron Alleva, Anchorage, Alaska, was registered as an agent on 12/19/90.

Litigation

Last year's annual report mentioned a lawsuit filed against the Service by the National Society for Animal Protection, Clawson, Michigan, alleging that PRT-740507 issued to the Service's Alaska Fish and Wildlife Research Center was not in compliance with the Act and the Comprehensive Environmental Response Compensation and Liability Act. By year's end, the suit was still pending. (Note: On January 18, 1991, the case was concluded based upon the stipulation of the parties for a dismissal of the action without prejudice.)

International Activities

An American specialist visited the Soviet Union for one week in early August 1990 to continue joint studies on non-metrical color pattern variations in harbor seals (*Phoca vitulina*) and aging in pinnipeds with Soviet colleagues at the All-Union Scientific Research Institute of Fisheries and Oceanography and the Institute of Developmental Biology of the USSR Academy of Sciences, both in Moscow.

International Workshop on Walrus Population Biology and Management

In March 1990, the Service joined with the Marine Mammal Commission and the University of Alaska, Fairbanks, to support an international workshop on "The Ecology and Management of Walrus Populations." The workshop was held in Seattle, Washington. Over 35 representatives from five nations participated. The workshop's purpose was to facilitate communication, encourage coordination and generate cooperation among the researchers and

managers responsible for conservation of the world's walrus populations. A report of the workshop's findings is available from the National Technical Information Service as publication PB91-100479.

US-USSR Environmental Agreement: Marine Mammal Project

In February, an American scientist from the Alaska Region's Marine Mammals Management (MMM) Field Office and a contracted scientist from the University of Maine, traveled to Khabarovsk, USSR, to discuss design and methodology for the 1990 joint US-USSR walrus population survey. Planning discussions continued in Seattle, Washington, in April in association with the Tenth Marine Mammal Project Working Group meeting. Three American scientists, including one from the MMM Field Office traveled to the northern Chukotsk Peninsula in September to participate in the aerial survey of walrus originating from the Soviet coast. This pentennial survey was conducted cooperatively by the two countries from August to October 1990. Further discussion on the survey appears elsewhere in this report in the "STATUS REPORTS—Pacific Walrus" Section.

Additional exchanges are planned in 1991 to conclude analysis and report writing associated with the walrus survey.

Polar Bear Management

Personnel from the MMM Field Office and the Alaska Fish and Wildlife Research Center participated with the Soviet Union in the cooperative study of polar bears of the Chukchi and Bering Sea area. Soviet biologists indicated that they intend to list polar bear populations in the Chukotka Region of the Soviet Union as recovered; a status change would allow polar bear hunting to be reinstated in this Region. The Soviets are advocating hunting as a management tool which would allow for the control of problem bears in coastal settlements; the Soviet Union has banned hunting of polar bear since 1956 and inhabitants of coastal settlements are encountering greater numbers of problem bears. Information on the distribution and abundance of polar bears collected by observers residing at high arctic meteorologic stations corroborates this.

The United States shares this population with the Soviet Union and the need for developing a cooperative management or allocation agreement between our countries was discussed. The Soviet Union has

subsequently made a formal request that the Service begin joint discussions on cooperative management of this shared international resource. The Service concurs with the concept and need for continued discussion on future cooperative management; meeting dates, locations and agenda development are pending.

Status Reports

Rulemaking on Incidental Take of Marine Mammals; Modifying the Definition of Citizen of the United States

On July 13, 1990, the Service concluded a rulemaking process by publishing in the *Federal Register* (55 FR 28764) a final rule modifying the definition of "Citizen of the United States" and "U.S. citizen" in Service regulations appearing at 50 CFR 18.27. These regulations govern small takes of marine mammals incidental to specified activities. This was a joint rulemaking action with the NMFS that also modified the same definition in their regulations appearing in 50 CFR 228.3.

The revision of 50 CFR 18.27 allows Letters of Authorization (LOA) to take small numbers of marine mammals incidental to a specific activity pursuant to section 101(a)(5) of the Act to be granted to corporations and similar entities organized under laws of the United States or any State law, even though such entities may not be controlled by citizens of the United States. Previous language limiting the definition to organizations "controlled by U.S. citizens" was incorporated without explanation when regulations implementing section 101(a)(5) of the Act were promulgated, even though there is no suggestion in the Act or its legislative history that Congress intended to preclude any entities organized under United States or any State law from qualifying as United States citizens. The requirement that corporations and similar entities be organized under United States or any State law, and therefore subject to United States jurisdiction, was retained in the regulations to ensure these entities are accountable for their actions and to maintain consistency with the Act.

Incidental Take During Commercial Fishing

The Service is participating on the NMFS's Marine Mammal Task Group whose responsibility is to develop a proposed management regime to govern marine mammal/commercial fishing interactions after October 1, 1993. As the lead agency, the NMFS is developing the proposal to regulate the incidental take of marine mammals in commercial fishing operations as required by a 1988 amendment to the Act. Sea otters in Alaska and California, Pacific walruses, West Indian manatees, and a variety of seabirds are affected to varying degrees by commercial fisheries. The proposal will be incorporated into a Draft Legislative Environmental Impact Statement that is scheduled by the NMFS for publication in spring 1991. The Service's representatives on the Marine Mammal Task Group attend Task Group meetings, coordinate review of the developing draft management regime by appropriate Service offices, and provide informal input on various topics and issues of concern warranting Service involvement.

Incidental Take During Oil and Gas Exploration

The Act authorizes the Secretary of the Interior to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals in a specified activity within a specified geographical region if it is found that the total of such taking will have a negligible impact on the species or stock and will not have an unmitigable adverse impact on the availability of such species or stock for subsistence uses. General implementing regulations in 50 CFR 18.27 provide for development of specific regulations to govern incidental take activities and for issuance of LOAs to applicants proposing to conduct activities under the specific regulations. Regulations can be for a period of not more than five consecutive years. LOAs will prescribe specific stipulations for each applicant and must be renewed annually.

On March 30, 1990, Shell Western E & P Inc. (SWEPI) petitioned the Service for specific regulations for incidental take of polar bear and walrus during oil and gas exploration in Alaska State waters and on the Outer Continental Shelf (OCS) during the open water season in the Chukchi Sea over the next five years.

On August 10, 1990, the Service published in the *Federal Register* a Notice of Receipt of Request for Rulemaking and Request for Information (55 FR 32651) on the SWEPI petition. The comment period closed on September 24, 1990. Comments were received from the Minerals Management Service (MMS), the Alaska Department of Fish and Game (ADF&G), the North Slope Borough, two oil and gas industry groups, four environmental groups and four other interested parties.

The Service's Regional Office in Anchorage reviewed the petition and prepared a draft environmental assessment in conjunction with the SWEPI application. The environmental review process led the Service to propose the finding that the projected takings would have a negligible impact on the species or stocks and would not have an unmitigable adverse impact on the availability of such species or stocks for subsistence uses.

By the end of 1990, the Service was preparing a proposed rule intended to be published in the *Federal Register* in early 1991. Public meetings were being planned for Barrow, Wainwright, Point Lay, Point Hope and Anchorage, Alaska. The proposed regulations would set forth: (1) permissible methods of taking; (2) other means of effecting the least

practicable adverse impact on the species or stocks and on their availability for subsistence uses; and (3) monitoring and reporting requirements pertaining to the taking. (Note: This Proposed Rule was published in the *Federal Register* on February 25, 1991 (56 FR 7645).)

SWEPI conducted exploratory activities in Federal waters of the Chukchi Sea in 1989 and 1990 with MMS authorizations, but without the benefit of incidental take regulations covering walrus and polar bear. On July 6, 1990, Trustees for Alaska (Trustees) filed a "Petition for Reconsideration" with the Secretary of Interior seeking revocation of approval of SWEPI's exploration plan associated with the MMS's OCS Lease Sale Area 109 in order to halt exploration activities in 1990 and beyond. Exploration activities in 1990 were not halted as requested. In October 1990, Trustees withdrew its "petition" for 1990 because the exploration season had ended. However, they have filed a lawsuit seeking injunctive relief, which seeks to suspend operations by SWEPI in the Chukchi Sea in 1991 pending issuance by the Service of incidental take regulations and a LOA; the case is pending. (Note: The Service published a Final Rule in the *Federal Register* on June 14, 1991 (56 FR 27443); these incidental take regulations became effective on the



A polar bear with a kill on the Arctic National Wildlife Refuge. U.S. Fish and Wildlife Service photo by Dave Olsen.

date of publication. On June 28, 1991, the Service issued a LOA to SWEPI valid through December 31, 1991.)

British Petroleum-Exploration has informed the Service it intends to submit three petitions requesting development of incidental take regulations for the Beaufort Sea. One of these petitions will cover exploratory activity during the winter (ice) season; such activity has occurred for several years without the benefit of specific regulations. The other two petitions will cover exploration during the open water season and year-round production.

Polar Bear

The Service continued to collect harvest information from polar bears taken by Native hunters in coastal villages for subsistence purposes. **The kill during the 1989/90 period (July 1 to June 30) totaled 98 bears comprised of 62 males, 24 females, and 12 for which the sex is unknown [Table 1].** The sex ratio of known-sex animals was 2.5:1, males to females. The kill was 19 percent below the five-year average (120

bears). The harvest occurred primarily in the months of January to March (68.7 percent) and May (12.8 percent) [Table 2].

Age analysis for bears killed during this reporting period is ongoing and will be reported in 1991. Ages compiled for 1988/89 harvest season, where N is the number of animals and S.D. is the standard deviation, are as follows: male average age 6.4 (N=42, S.D.=5.1) and female average age 7.9 (N=27, S.D.=4.5). **The age class composition for 1988/89 was: cubs 25.4 percent (N=18), subadult 23.9 percent (N=17) and adult 50.7 percent (N=36).**

Polar bears are an upper level consumer and, as such, mirror the health of the Arctic environment. Studies conducted by the Canadian Wildlife Service (CWS) indicate that a doubling of certain chlorinated hydrocarbon concentrations in polar bear fat occurred during the 1960s to early 1980s. Although concentration levels were not great, the rapid increase warrants monitoring. Polar bear fat samples were contributed to the CWS as part of a circumpolar five-Nation effort to assess the concentrations and the trend of accumulation of these contaminants. Acquisition of internal organ and fat tissue continues as part of the harvest monitoring program.

Claw samples are being acquired from hunter-killed bears for the analysis of isotopic carbon/nitrogen by the University of Alaska, Fairbanks. Previous studies of radio collared polar bears indicate that the carbon material contained in claws varies and is unique to specific geographic areas. The management application of this finding is to determine if hunters are harvesting bears from different stocks, and if so, at what rates.

Polar Bear Management Agreement, Beaufort Sea

The 1989/90 season was the second year of implementation for the Polar Bear Management Agreement (Agreement) for the southern Beaufort Sea between the Inuvialuit Game Council, Northwest Territories, Canada, and the North Slope Borough, Alaska. During the reporting period 23 polar bears were harvested by residents of three Alaskan communities and one defense-of-life kill was made by industry. **The harvest was 14 animals below the 38 bear allocation of the Agreement. The Canadian harvest was 34 bears and also was below the allocation.** The Alaska village harvest was distributed as follows: Kaktovik (1), Barrow (15) and Wainwright (7) [Table 3]. All villages party to the Agreement harvested fewer bears than their five-year average (\bar{x}) and fewer bears than the preceding

Table 1. Polar Bear Harvest, Alaska: July 1, 1989, to June 30, 1990.

Village	Male	Female	Unknown	Total
Kaktovik*	-	-	1	1
Nuiqsut*	-	-	-	-
Barrow*	10	4	-	14
Atqasuk*	-	-	-	-
Wainwright*	6	-	1	7
Point Lay	-	-	-	-
Point Hope	9	5	10	24
Kivalina	4	1	-	5
Kotzebue	1	2	-	3
Shishmaref	13	1	-	14
Wales	2	1	-	3
Diomede	4	3	-	7
Brevig Mission	-	1	-	1
Savoonga	7	3	-	10
Gambell	6	3	-	9
Total	62	24	12	98
Percent of Total	(63.3)	(24.5)	(12.2)	(100)

* Denotes villages party to the Inuvialuit Game Council/North Slope Borough (IGC/NSB) Polar Bear Management Agreement.

Table 2. Monthly Polar Bear Harvest, Alaska: July 1, 1989 to June 30, 1990.

Village	Month												Total
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
Kaktovik*	-	-	-	-	-	-	-	-	-	-	-	-	-
Atqasuk*	-	-	-	-	-	-	-	-	-	-	-	-	-
Barrow*	1	1	-	2	1	-	2	-	2	1	4	-	14
Nuiqsut*	-	-	-	-	-	-	-	-	-	-	-	-	-
Wainwright*	-	-	-	-	1	1	-	-	2	-	2	-	6
Point Lay	-	-	-	-	-	-	-	-	-	-	-	-	-
Point Hope	-	-	-	-	1	-	8	2	1	-	2	-	14
Kivalina	-	-	-	-	-	-	-	1	4	-	-	-	5
Kotzebue	-	-	-	-	-	-	-	-	3	-	-	-	3
Shishmaref	-	-	-	-	-	1	8	1	3	-	1	-	14
Wales	-	-	-	-	-	-	1	1	-	1	-	-	3
Diomedede	-	-	-	-	-	1	2	3	1	-	-	-	7
Brevig Msn.	-	-	-	-	-	-	-	1	-	-	-	-	1
Savoonga	-	-	-	-	-	-	4	1	1	4	-	-	10
Gambell	-	-	-	-	-	-	-	2	5	-	2	-	9
Total	1	1	-	2	3	3	25	12	22	6	11	-	86
Percent	1.2	1.2	-	2.3	3.5	3.5	29.1	14.0	25.6	7.0	12.8	-	100

* Denotes villages party to the IGC/NSB Polar Bear Management Agreement.

Notes: Individual percentages do not add to total due to rounding. The total number of bears in Tables 1 and 2 do not agree because the date of kill for 12 bears in Table 2 was not recorded.

Table 3. Alaska Polar Bear Harvest, Southern Beaufort Sea 1989/90.

Sex	Village						Total
	Kaktovik	Nuiqsut	Barrow	Atqasuk	Wainwright	Industry	
Male	1	-	10	-	7	1	19
Female	-	-	4	-	-	-	4
Unknown	-	-	1	-	-	-	1
Total	1	-	15	-	7	1	24

Harvest season extends from July 1, 1989, to June 30, 1990.

Table 4. Hunter Take of Polar Bear, Southern Beaufort Sea 1989/90.

Village	Number of Bears per Hunter						Total
	One	Two	Three	Four	Five	Six	
Kaktovik	1	-	-	-	-	-	1
Barrow	11	-	-	1	-	-	12
Wainwright	5	1	-	-	-	-	6
Total	17	2	-	4	-	-	23
Percent	(73.9)	(8.7)	-	(17.4)	-	-	100

Harvest season extends from July 1, 1989, to June 30, 1990.

Kaktovik ($1/\bar{x}=5$), Barrow ($15/\bar{x}=21$), Nuiqsut ($0/\bar{x}=3$), Atkasuk ($0/\bar{x}=4$) and Wainwright ($7/\bar{x}=12$). The number of bears harvested per hunter was as follows: one bear (17), two bears (1) and four bears (1) [Table 4].

male to female sex ratio determined from tagging and tagging form data was 5:1. Sex was known for one bear taken during the harvest period. Complete sex and age information was available for 52 percent (13/25) of harvested bears as follows: Kaktovik 0 percent (0/1), Barrow 80 percent (12/15), Wainwright 14 percent (1/7) and Nuiqsut 100 percent (1/1). An improvement in complete reporting was noted for Barrow although improvements in acquiring teeth for aging are necessary for Wainwright and Nuiqsut.

The harvest occurred in 9 of 12 months. Two bears were taken in the summer outside of the prescribed season [Table 5]. The harvest was evenly dispersed throughout the year; only the month of May composed a large percentage of the harvest, 28.6 percent (6/23). Five bears (one female) were taken during the October and November den initiation period. Nuisance bears did not appear to be as great a problem as in 1989 although one bear was taken in Barrow by a non-Native in defense of property and one bear was taken within the village of Wainwright following repeated visits by the bear to the village.

As reported in 1989, age information for this region is unavailable for the current harvest year and will be reported in 1991. In 1988/89, the average age of males was 8.0 years (S.D.=1.4) and 6.8 years (S.D.=3.6) for females. Joint Commissioners and Technical Advisors (the Service, the ADF&G, and the CWS) to the Agreement conducted an annual

meeting in October to review scientific information, current allocations and harvest, problem areas, and progress to date. No changes in allocation numbers were proposed. A continuing unmet need for the development and dissemination of conservation and educational materials was identified. The Joint Commissioners and Technical Advisors were critical of the lack of progress in this area and felt that the long term success of the Agreement would be enhanced through a greater emphasis on communications with and education of local hunters.

The Service's 1989 Regional Director's Commendation Award was presented jointly to the Inuvialuit Game Council and the North Slope Borough at the annual meeting in Anchorage. Additionally, the North Slope Borough was among the recipients of the National Take Pride in America award presented by the Service. Both awards recognize the exemplary contributions of private individuals or groups representing the public in the field of wildlife conservation.

Bear/Human Interactions

The first human mortality caused by a polar bear attack in recent time occurred on December 8, 1990, in the village of Point Lay. The attack occurred in the early morning hours as a husband and wife returned home on foot from visiting relatives. After the attack the bear and the victim were located by residents of the village and the bear was killed. A necropsy of the bear was conducted by two veterinarians employed by the North Slope Borough. The results showed the bear was extremely lean without detectable subcutaneous or internal fat reserves. Hunger appeared to be a factor in the attack. The victim was partially consumed by the bear.

Table 5. Monthly Polar Bear Harvest, Southern Beaufort Sea 1989/90.

Village	Month												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Kaktovik	-	-	-	-	-	-	-	-	-	-	-	-	-
Nuiqsut	-	-	-	-	-	-	-	-	-	-	-	-	-
Barrow	2	-	2	1	4	-	1	1	-	2	1	-	14
Nuiqsut	-	-	-	-	-	-	-	-	-	1	-	-	1
Wainwright	-	-	2	-	2	-	-	-	-	-	1	1	6
Total	2	-	4	1	6	-	1	1	-	3	2	1	21
Average	9.5	-	19.0	4.8	28.5	-	4.8	4.8	-	14.3	9.5	4.8	100

Harvest season extends from July 1, 1989, to June 30, 1990.

People living in remote coastal villages within the range of polar bears are concerned about the attack and human death and are more cautious when active outdoors. A number of questions and concerns continue to be voiced in an attempt to understand why the attack occurred, whether other attacks may follow and how to avoid duplicating the result of this fatal attack. A polar bear monitor has been hired to patrol the village of Point Lay. The North Slope Borough's Fish and Game Management Committee will highlight this issue during their March meeting. To date, it appears that people living in coastal villages have not overreacted by killing bears out of fear or anger and are using prudence when polar bears are encountered. Information on the polar bear population status and trend, prey (ringed seal) availability, general physical condition of polar bears and the population, and background information on polar bear/human attacks have been sought along with recommendations to minimize encounters.

Industry: Bear/Human Interactions

The first lethal take of a polar bear associated with industrial activity in Alaska occurred on January 8, 1990. The Service's Alaska Region Division of Law Enforcement investigated the incident. Based on the circumstances of the take, a decision was made against prosecution.

Oil and gas companies operating in the Beaufort Sea are keenly interested in minimizing polar bear/human interactions. Service representatives have provided training to operators on detecting polar bears and avoiding encounters. The Service coordinated a review with the ADF&G of information in operators' polar bear interaction plans, and Service and ADF&G personnel contributed to an informational video to be shown for employee environmental orientation. The Service is presently unable to recommend specific deterrent programs which would be incorporated as a contingency in a human/polar bear interaction plan. Authority for an active deterrent program is unavailable pending request for, and development of, incidental take regulations and issuance of Letters of Authorization for incidental taking of polar bears resulting from oil and gas activities. However, provisions in Section 109(h) of the Act might be used to authorize individuals engaged in deterrent efforts to take polar bears in emergency situations for both the welfare of the polar bears and to protect the public health and welfare.

Management Planning

The development of a polar bear management plan, as reported in the Service's 1989 Annual Report, has been delayed due to more pressing priorities. Management planning will be resumed in 1991.

Sea Otter-Alaska

Management of sea otters in Alaska involved three primary concerns in 1990: (1) activity related to the interim rule prohibiting the taking of sea otters by Alaska Natives for creating and selling handicrafts and clothing to non-Natives; (2) a survey of sea otter populations in the Aleutian Islands; and (3) the response and damage assessment associated with the *Exxon Valdez* oil spill.

Interim Rule on Sale of Handicrafts and Clothing to Non-Natives

On April 20, 1990, the Service published in the *Federal Register* (55 FR 14973) an Interim Rule that prohibits the take of sea otters by Alaska Natives for use in creating and selling handicrafts and clothing to non-Natives. The Service interpreted that the intent of Congress in passing the Act was to preserve existing Native uses of marine mammals rather than promote the expansion of Alaska Native arts and crafts industries or the creation of new industries. The Service could find no evidence of a history of the sale of handicrafts and clothing made from sea otters to non-Natives at the time the Act was signed in 1972. The Interim Rule did not affect the ability of Alaska Natives to take sea otters for subsistence purposes.

On May 30, 1990, the Alaska Sea Otter Commission, on behalf of Alaska Natives who use sea otter skins to make handicrafts and clothing, and an individual Alaskan Native filed civil suit against the Department of the Interior (DOI) in U.S. District Court contending that the Interim Rule violated the Act and its implementing regulations. As of December 31, 1990, arguments for both the Alaska Sea Otter Commission and the DOI had been submitted to the Court and the case was expected to be heard early in 1991. (Note: The case was heard on January 24, 1991, by District Court Judge Holland; a written ruling is expected soon.) The Interim Rule will stay in effect pending further ruling from the district court.



A sea otter in kelp. U.S. Fish and Wildlife Service photo.

Sea Otter Survey

Service biologists from the Alaska Region, in cooperation with biologists from the National Ecology Center, initiated a survey of sea otters in the Aleutian Islands in summer 1990. The principal objectives of the study are to document the current distribution of sea otters in the Aleutians and to estimate their abundance. The survey effort was limited to seven days in late August. The survey design utilized both strip and line transect survey techniques combined with simultaneous ground and aerial counts of sea otters along pre-determined coastal segments. Poor weather limited the survey to partial counts around Agattu, Attu and the Semichi Islands. Statistical expansion of the survey data for the three islands or island groups resulted in nearshore population estimates of 552 sea otters for Agattu, 3,368 sea otters for Attu and 195 sea otters for the Semichi Islands but the accuracy of those estimates is unknown. The estimate of 3,368 sea otters at Attu Island suggests that the population of sea otters there is still growing at a rapid rate. In addition, the survey indicates that the expanding population of sea otters in the western Aleutian Islands is now well-entrenched in the Semichi Islands. Planning was underway in late 1990 to completely survey the Aleutian Islands in summer 1991 including a re-survey of Attu, Agattu and the Semichi Islands. Planning was also underway to survey one or more of the small, isolated populations of sea otters in southeastern Alaska.

Exxon Valdez Oil Spill

The Service continued to coordinate and oversee clean-up activities associated with the *Exxon Valdez* oil spill. These activities were focused on refuge lands, and on those species managed by the Service, including sea otters. This effort primarily included providing guidance to Exxon and its contractors. Early in 1990, the Service established a plan and criteria for capturing sea otters during the 1990 cleanup effort. No sea otters were encountered in 1990 that warranted treatment. As part of the Natural Resources Damage Assessment, combined sea otter and marine bird surveys were continued in Prince William Sound. The objectives of these surveys were to (1) determine the winter distribution and abundance of sea otters, and (2) determine if additional injury had occurred to the sea otter population. In 1990, surveys were conducted in March, June, July and August.

Management Planning

Management planning for Alaskan sea otters was initiated by the Service in late 1990. A meeting of interests potentially affected by a management plan was initially scheduled for December 12, 1990. The purpose of the meeting was to compile an inclusive list of issues that should be addressed by a management plan, and to review a draft outline of the plan prepared by the Service. The meeting was postponed due to several last minute cancellations by invited participants. (Note: the meeting was rescheduled and held on January 25, 1991).

Sea Otter/Commercial Fisheries Interaction

The final report of the sea otter/commercial fisheries interaction study conducted in the Cordova-Copper River delta area, and jointly funded by the Service and the University of Alaska's Sea Grant College Program, was published by the University of Alaska. The study concluded that: (1) the number of sea otter-driftnet encounters on the Copper River delta had increased between 1978 and 1988 and will likely continue to increase as populations of sea otters continue to increase in the fishing area; and (2) a larger, stratified sampling effort is required to estimate fishery-wide take and mortality rates of marine mammals. The authors found that educating fishermen of non-lethal removal techniques is a useful method for reducing the number of mortalities following entanglement in fishing gear.

The Service commented on 36 applications for shellfish mariculture permits in southcentral Alaska. Some of the applicants proposed construction of unprotected shellfish grow-out facilities in areas frequently used by sea otters. The Service is continuing to track the growth of this new industry in Alaska, which may result in a new conflict between sea otters and humans if facilities are not designed to exclude sea otters and other shellfish predators.

Public Display

A stranded sea otter pup was discovered on a beach in Kachemak Bay in late May 1990. The pup received intensive care from local veterinarians and concerned citizens until the Service could find an aquarium willing to permanently house the animal. The Shedd Aquarium in Chicago, Illinois, offered to take the animal and it was transported there in early June.

Alaska Sea Otters in Washington State

During 1969 and 1970, a total of 59 sea otters was translocated from Alaska to the northern coast of Washington State, 29 in 1969 and 30 in 1970. Sixteen sea otters released in 1969 died within 2 weeks of the release. This mortality has been attributed to improper handling and release procedures at the translocation site. The handling and release protocol was changed prior to the 1970 operation, resulting in a significant reduction in post-release mortality.

The Service conducted the first comprehensive survey of the population in 1977. Seven additional surveys have been completed since then. Results indicate that the population has grown at an average annual rate of about 16 percent. The population

now numbers over 200 individuals (212 were counted in July 1990), and is distributed from Destruction Island to Makah Bay.

The Service, in cooperation with the Washington Department of Wildlife, plans to continue annual surveys of this small but growing population of sea otters. The data obtained from these surveys will provide valuable comparative information that will lead to a better understanding of sea otter population dynamics throughout the distribution of the species.

Pacific Walrus

Population Surveys

Cooperative surveys of the Pacific walrus population have been conducted in the fall at five year intervals since 1975 under terms of the 1972 "Agreement on Cooperation in the Field of Environmental Protection," between the United States and the Soviet Union. In anticipation of the 1990 survey, joint studies of survey design and methodology were conducted in 1989 through the Alaska Fish and Wildlife Research Center. In late 1989, Region 7's MMM Field Office assumed a lead role for planning and carrying out the American side's involvement in the joint survey. Planning activities continued through early 1990 (as discussed in the "International Activities" Section). Discussions incorporated consideration of results from the 1989 test surveys, logistical constraints, and review of population survey design theory to arrive at a common design for the 1990 joint census.

The survey was conducted between late August and early October and consisted of two phases: unilaterally flown surveys of walrus on the coastal haulout sites of each nation and a fully coordinated survey of walrus in the pack ice of the Chukchi Sea. The degree of coordination between nations in the timing and design of the survey was unprecedented: surveys were flown simultaneously; both sides followed the same sampling techniques; American biologists flew with the Soviet team; and data were exchanged and will be analyzed cooperatively.

Data analysis was initiated in late 1990 and will continue through early 1991 with the visit of three Soviet biologists to Anchorage. A draft survey report will be prepared during that visit. The Service anticipates having a completed report of survey results available for public distribution by the fall of 1991.

The southern edge of the pack ice in the Chukchi Sea was between 80 and 320 km further north than normal during the survey period, and was north of the shallow waters used by walrus for feeding. Therefore few walrus were using the ice for resting between feeding sessions and they were not as readily counted as in previous surveys. Limited surveys over water found some walrus far south of the ice edge; however, over-water surveys are believed to grossly underestimate numbers present.

The Service and other members of the Tenth Marine Mammal Project Working Group (Seattle, April 1990) recognized a need for more timely and accurate monitoring of walrus population status. In particular the Working Group recommended that surveys be conducted more often than the current five year cycle and suggested that moving toward a three year cycle is desirable.

Habitat Issues

In 1989 the Service worked with the ADF&G, the Eskimo Walrus Commission, the North Pacific Fishery Management Council and the NMFS to implement a two year seasonal closure restricting yellow-fin sole fishing within 12 nautical miles of walrus haulout sites in northern Bristol Bay. This action was taken because compelling circumstantial evidence indicated that yellow-fin sole fishery operations were causing airborne and aquatic acoustic disturbance to walrus. These agencies were concerned that the level or frequency of this disturbance was associated with the significant decline (up to 60 percent) in the number of walrus reported hauling out at Round Island and the Twins in the Walrus Islands State Game Sanctuary, and Cape Peirce, Togiak National Wildlife Refuge.

Walrus numbers at Round Island nearly doubled in 1989, a year of no yellow-fin sole fishing in northern Bristol Bay. During 1990, the Service continued cooperative monitoring of walrus numbers at Round Island and Cape Peirce. Alaska Department of Fish and Game personnel on Round Island reported that peak walrus numbers declined slightly from 1989 counts. Togiak National Wildlife Refuge biologists reported stable numbers at Cape Peirce throughout most of the season. There was about a 50 percent reduction in the peak numbers present in the fall. The Service will continue to work cooperatively with the ADF&G to monitor the status of walrus in these areas to assess relationships between walrus use of the sites and potential effects of the fishery.



Walrus resting on a haulout in Alaska. U.S. Fish and Wildlife Service photo.

Management Planning

The Service began to develop a long range walrus management plan in 1989. A planning team comprised of a broad spectrum of interested parties and walrus experts developed a draft outline for the plan and a preliminary task schedule for completing the plan. Progress was delayed in 1990 by higher priority issues. The Service views development of a walrus management plan as a high priority task; planning activity will resume in 1991.

Harvest Monitoring Program

The Service has monitored the spring walrus harvest in six villages in the Bering Sea since 1979. In 1990 the program was curtailed due a lack of resources. The Harvest Monitoring Program not only recorded the level of take, but also collected a broad array of biological samples for analysis of reproductive, contaminant and age determination data. These data provided a continuing assessment of the structure of the harvest and condition of the animals. The Service is pursuing the resources necessary to reinstate a redesigned, fully representative Harvest Monitoring Program.

Other Issues

In 1990 there was a great deal of media attention on possible relationships between the international ban on trade of elephant ivory, the price of Alaskan walrus ivory, and the level of both legal and illegal harvest of walrus. The Service received several hundred letters from interest groups and individual citizens expressing concern for the level of harvest relative to the size of the walrus population. Some of these letters protested the lack of the harvest monitoring program while others called for implementation of enforcement programs to reduce the illegal practice of "head-hunting." Some groups have proposed implementing measures through the

Convention on International Trade in Endangered Species (CITES) that could affect Alaskan Native taking for commercial handicraft purposes (e.g., adding the Pacific walrus to Appendix II). Any decisions by the nations party to CITES regarding possible listing of walrus should be based on sound biological data.

to collect biological information from the harvest, and marks and tags are applied to skins, skulls and tusks to help in controlling illegal activities associated with the specified marine mammal parts. In 1990 staffing requirements for village taggers were completed. There are 97 trained taggers and 44 alternates located in 78 locations throughout coastal Alaska [Table 6]. Of these, 76 are Alaskan Natives, three are non-Natives living in villages and the remaining 18 are Service employees.

Marking, Tagging and Reporting Program

In October 1988 the Service established a Marking, Tagging and Reporting Program (MTRP) to monitor the subsistence and handicraft/clothing harvest of polar bear, sea otter and walrus. Taggers are hired

Problems and needs related to MTRP implementation include the following:

1. An attitude is held by some hunters that it is not necessary to get the specified items tagged if

Table 6. Villages with Service Taggers and Species Tagged.

Village	Species Tagged*	Village	Species Tagged*	Village	Species Tagged*
Adak	SO	Akhiok	SO	Akutan	SO
Anchorage	PB/SO/W	Atka	SO	Barrow	PB/W
Bethel	W	Brevig Mission	W	Chefornak	W
Chenega Bay	SO	Chevak	W	Chignik	SO
Clarks Pt.	W	Cold Bay	SO/W	Cordova	SO/W
Craig	SO	Dillingham	W/SO	Elim	W
English Bay	SO	Fairbanks	W/SO	Gambell	PB/W
Goodnews Bay	W	Golovin	W	Homer	SO
Hoonah	SO	Hooper Bay	W	Juneau	SO
Kaktovik	PB	Karluk	SO	Kenai	SO/W
Ketchikan	SO	King Cove	SO	King Island	W
King Salmon	SO/W	Kipnuk	W	Kivalina	PB/W
Kodiak	SO/W	Kongiganak	W	Kotzebue	PB/W
Koyuk	W	Kwigillingok	W	Larsen Bay	SO
Little Diomedede	PB/W	Manokotak	W	Mekoryuk	W
Naknek	W	Newtok	W	Nikolski	SO
Nome	W	Nuiqsut	PB	Old Harbor	SO
Perryville	SO	Pilot Point	SO/W	Platinum	W
Point Hope	PB/W	Point Lay	PB/W	Port Lions	SO
Port Graham	SO	Port Heiden	SO/W	Quinhagak	W
St. George	W	St. Paul	SO/W	Sand Point	SO/W
Savoonga	PB/W	Seldovia	SO	Seward	SO
Shishmaref	PB/W	Sitka	SO/W	Stebbins	W
Tatitlek	SO	Togiak	W	Toksook Bay	W
Unalaska	SO	Unalakleet	W	Valdez	SO
Wainwright	PB/W	Wales	PB/W	Yakutat	SO

* SO = Sea Otter PB = Polar Bear W = Walrus

Names, addresses and telephone numbers of village taggers are available by contacting the Fish and Wildlife Service, Marine Mammals Management, 4230 University Drive, Suite 310, Anchorage, Alaska 99508, Telephone (907) 561-1239.

those items are to stay in villages and are going to be utilized personally.

2. Some hunters are not convinced of the importance of having each harvested animal accounted for.
3. Tagger complacency, unavailability, unwillingness or peer pressure that allows items to go untagged.
4. Need accurate assessment of the level of compliance.
5. Need additional staff assistance in conducting the program.
6. Need accountability for a harvest that traditionally and historically has not been recorded.
7. Need to acquire accurate walrus calf harvest figures.
8. Need to verify data collected.

Where problems have been identified with hunters or taggers, the following measures have been taken:

1. Holding additional village informational meetings.
2. Working individually with hunters and taggers to emphasize the importance of having all items tagged.
3. Replacing taggers where compliance is not satisfactory.
4. Emphasizing possible law enforcement and penalties for non-compliance.

Acquiring accurate walrus calf harvest information presents a special problem because only tusks are required to be marked. To date the MTRP has relied on estimates from village taggers and on-site drying rack counts to determine the number of calves harvested. In an effort to remedy this, payment procedures will be modified to compensate taggers for collecting data on calves at the same rate as is paid for adult animals and marking tusks.

The MTRP is now responsible for marking and registering non-Native beach-found ivory. Beginning in 1991, all non-Native ivory will be marked and tagged similar to Native-harvested ivory. This will eliminate a source of confusion and ensure greater uniformity. Several NMFS offices will assist in this marking and registration program.

Continued success of the MTRP and increased compliance will depend on frequent Service presence in villages; increased development of information, education and news media materials; continued coordination with and cooperation from Native leaders, village residents, contracted taggers

Table 7. Sex and Age Class of Sea Otters Tagged through the Marking, Tagging, and Reporting Program as of December 31, 1990.

Sex	Pre-rule	1988	1989	1990	Total
Male	230	43	183	149	605
Female	93	8	40	24	165
Unknown					
Adults	156	1	51	10	218
Total	479	52	274	183	988
Age Class	Pre-rule	1988	1989	1990	Total
Adults	433	51	242	141	867
Subadults	27	1	10	34	72
Pups	7	0	2	3	12
Unknown	12	0	20	5	37
Total	479	52	274	183	988

and individual hunters; and feedback on how collected data are being used in Marine Mammals Management activities. A quarterly MTRP newsletter is proving to be a valuable tool in dispensing information and answering commonly asked questions. The newsletter is distributed to all taggers and selected Native leaders and is often posted in the villages for all residents to read.

In 1990, harvest data were collected from 52 villages. Several villages collect information on both walrus and polar bear and a few locations report harvest figures for both walrus and sea otter.

Sea otter hunters reported a harvest of 988 otters, of which 477 were pre-rule (animals taken between December 1972 and October 1988). Harvest summaries are shown in Tables 7 and 10. A majority of otters harvested are male, probably because of their larger size and the hunters' reluctance to kill females with pups. The decrease in harvest numbers for 1990 is probably related to the Service's Interim Rule that prohibits the sale of sea otter handicrafts and clothing to non-Natives. That rule became effective on May 21, 1990.

A total of 3,573 walrus have been tagged since the inception of the marking and tagging program [Tables 8 and 10]; 3,198 adults and subadults, and 377 calves. The marked increase in numbers tagged in 1990 (1,559) probably reflects better ice and hunting conditions as well as increased awareness and compliance with the regulations.

Table 8. Sex and Age Class of Walrus Tagged through the Marking, Tagging, and Reporting Program as of December 31, 1990.

Sex	Pre-rule	1988	1989	1990	Total
Male	515	0	307	528	1,350
Female	212	0	205	577	994
Unknown	533	0	242	454	1,229
Total	1,260	0	754	1,559	3,573
Age Class	Pre-rule	1988	1989	1990	Total
Adults	818	0	558	1,165	2,541
Subadults	103	0	66	44	213
Calves	12	0	19	346	377
Unknown	327	0	111	4	442
Total	1,260	0	754	1,559	3,573

The Service collected polar bear harvest information on a voluntary basis from 1980 through 1988, based on a harvest year from July 1 through June 30 (see Polar Bear Status Report Section). The MTRP summarizes the harvest on a calendar year basis. Change in harvest figures for past years reflects the delay of taggers in tagging animals and turning in reports. The MTRP taggers reported a total of 96 bears killed in Calendar Year 1990 [Tables 9 and 10].

Sea Otter-Southern

The southern sea otter in California is an extant population of the species that once ranged throughout the northern and eastern rims of the Pacific Ocean. In the mid-1700s, the sea otter was recognized as a valuable furbearing animal, and commercial exploitation began. The historical population in California is estimated to have been 16,000 to 18,000 individuals. By 1910, the species had been virtually exterminated from its entire range except for remnant populations in Russia, Alaska, the Queen Charlotte Islands (British Columbia), central California, and the San Benito Islands (Baja California). Even though the International Fur Seal Treaty of 1911 promoted protection of sea otters on the high seas, by 1920 the British Columbia and Baja populations were also extirpated.

In 1913, the California State Legislature protected the sea otter from exploitation, although there were apparently very few sea otters left in California.

Table 9. Sex of Polar Bears Tagged through the Marking, Tagging and Reporting Program as of December 31, 1990.

Sex	Pre-rule	1988	1989	1990	Total	
Male		14	64	83	63	224
Female		5	48	30	22	105
Unknown		5	3	14	11	33
Total		24	115	127	96*	362

* Date may be incomplete.

Table 10. Summary of the Total Number of Animals Tagged through the Marking, Tagging and Reporting Program as of December 31, 1990.

Year	Sea Otter	Walrus	Polar Bear
Pre-rule ¹	479	1,260	24
1988	52	0	115
1989	274	754	127
1990	183	1,559	96 ²
Total	988	3,573	362

¹ Those specified parts in the hunters' possession that were taken between December 1972 and October 1988.

² Incomplete data.

Those that survived were probably concentrated in the Point Sur area. In 1938, 50 otters were noted at Bixby Creek in Monterey County, just north of Point Sur.

Fully protected against take, the population subsequently grew in number and range. By 1970 the population had become reestablished in about 10 percent of its historic California range. However, between the early 1970s and mid-1980s, little or no growth in numbers was observed, although the range expanded somewhat. In 1977 the southern sea otter, already afforded the protection of the Act, was listed as a threatened species under the authority of the Endangered Species Act of 1973 (ESA). The sea otter's physiological vulnerability to oil and greatly reduced population size and distribution, combined with threats of oil spills resulting from increasing tanker traffic near the central California coast, were the primary reasons for the southern sea otter listing.

The California Department of Fish and Game (CDFG) and the Service again conducted spring and fall surveys in 1990. The area surveyed included the entire 220-mile long established range of the southern sea otter population, from Point Ano Nuevo in Santa Cruz County to the Santa Maria River in San Luis Obispo County, plus additional peripheral habitat. The total numbers of otters counted during the spring 1989 survey was higher than any since these counts were first begun [Table 11]; however, the spring 1990 survey counted 1,680 otters, 10 percent below the 1989 count. The initial concern that the population may be declining was allayed after the fall 1990 survey. The fall count was higher than the 1989 fall survey showing that the population was still increasing; albeit, the annual rate of increase is less than expected. The Service is concerned regarding this change in the annual rate of increase and will assess the spring 1991 survey to evaluate the implications of the survey results. As a rule, fall counts are consistently lower than spring counts. This may, in part, be due to the fact that sea otters are more difficult to observe in the fall owing to their decreased dispersal throughout the range, and, in part, to the greater abundance of bull kelp during the fall, which obscures some otters. In the spring, the giant kelp is more clumped and there is little bull kelp to contend with; therefore, the otters are easier to count. Most otters are still found between Monterey and Morro Bay.

Translocation of Southern Sea Otters

Translocation of southern sea otters to establish a second breeding colony was initiated in 1987. The purposes for establishing a second colony are twofold: (1) to eliminate the possibility that more than a small proportion of the population would be decimated by any single natural or human-caused catastrophe; and (2) to obtain data for assessing translocation and containment techniques, population status, and the influence of sea otters on the structure and dynamics of the nearshore community. The latter information is particularly important in attempting to understand the characteristics and impacts of a sea otter population at its optimum sustainable population level, which is the conservation goal of the Act.

Public Law 99-625 provided the authority and established the guidelines for carrying out the translocation program. A Final Environmental Impact Statement and draft rulemaking were distributed by the Service in May 1987. The final rule, published in August 1987, established the boundaries of a Translocation Zone to which otters would

Table 11. Comparison of Southern Sea Otter Counts Conducted Since the Spring of 1982.

Season	Number of Independent Otters	Number of Pups	Total
1982 Spring	1,124	222	1,346
Fall	1,194	144	1,338
1983 Spring	1,131	120	1,251
Fall	1,062	164	1,226
1984 Spring	1,181	123	1,304
Spring*	1,151	52	1,203
Fall	No survey		
1985 Spring	1,124	236	1,360
Fall	1,066	155	1,221
1986 Winter	1,231	181	1,412
Spring	1,345	225	1,570
Fall	1,088	113	1,201
1987 Spring	1,430	220	1,650
Fall	1,263	104	1,367
1988 Spring	1,505	219	1,724
Fall	No survey		
1989 Spring	1,575	290	1,864
Fall	1,484	115	1,599
1990 Spring	1,466	214	1,680
Fall	1,516	120	1,636

* CDFG aerial survey with ground truth stations.

be translocated and given protection similar to that of the parent population, and a Management Zone to be maintained otter-free by non-lethal means. The Translocation Zone consists of San Nicolas Island (Island) and surrounding waters in the Southern California Bight, ranging from 10 to 19 nautical miles from the 15-fathom contour surrounding the Island. The Management Zone includes the remainder of the Southern California Bight south of Point Conception, including the other offshore islands and mainland coast. As such, it implements a significant form of zonal management, a concept recommended by the Marine Mammal Commission (MMC) in 1980.

Analysis of data obtained during the initial year of translocation provided some insight into factors that are apparently necessary for successful translocation. In line with this information, translocation strategy changed. These changes were discussed in the Service' 1988 Annual Report to Congress.

Near the end of the third year of translocation (June 1990), 15 sea otters remained of the 139 sea otters moved to the Island. We have learned that the probability of sea otters being lost from the experimental population from either mortality or emigration is high. Analysis of the available data on loss rates of translocated sea otters indicates that the loss rates for juvenile and adult animals are similar. The survivorship of both age classes is such that there is a very low likelihood of a sufficient number of juveniles remaining at the Island long enough to attain sexual maturity. Based on the available data, adults or females with dependent pups must form the nucleus of a successfully breeding colony at the Island. This information has been reviewed by biologists from the Service's Sea Otter Research Program and the Sea Otter Recovery Program, the Sea Otter Recovery Team (SORT), the CDFG Sea Otter Program, the NMFS, and the MMC staff. All concur with the finding and conclusion. In fact, this appears to be similar to the initial growth patterns of the translocated populations of sea otters to Vancouver Island, Canada, and Washington. These reintroductions initially declined to very low numbers from which the populations increased and today number in the hundreds and appear to be established. The number of otters remaining at the Island (13 to 15 not including pups) has been stable since November 1989. Furthermore, reproduction at the Island is increasing and in 1990, four pups were successfully weaned into the population. These are the first observations of pups surviving to independence.

Capture and Monitoring Operations

Capture operations for the third year commenced on September 27, 1989, and were implemented in accordance with the amended Translocation Plan. Teams of biologists from the Service and the State effectively coordinated the capture, transport and release of sea otters in the main range and at the Island. Capture teams carried out their activities throughout the mainland sea otter range, from approximately Point Buchon north to Monterey Bay. Following capture, otters were taken to the Monterey Bay Aquarium (MBA) where they were held for observation and examined by an experienced sea otter veterinarian. All otters were held a minimum of 1-day to monitor their behavior and minimize stress. From the MBA, the otters were flown by charter plane directly to the Island and released. Translocation efforts from January 1, 1990, to December 31, 1990, were as follows:

Total Captured	= 8
(Male/Female)	(2/6)
[Adult/Juvenile, ≤ 35 lbs]	[2/6]
Died after Release at Capture Site	= 0
Total to MBA	= 5
Died at MBA	= 1
Returned to Capture Site from MBA	= 0
Taken to the Island	= 4

In 1990, the Service began translocating sea otters with implanted radio transmitters. As recommended by the SORT, this effort is to translocate up to 20 sea otters with intraperitoneal transmitters to obtain data on foraging time and activity budgets and hopefully obtain information on sea otter dispersal patterns and their fate. Two otters were surgically implanted with radios at the MBA, but only one was translocated to the Island. The second otter died during the convalescent period at the MBA. The translocation permit was temporarily suspended pending review of the incident. The permit was subsequently reinstated; however, it was too late in the permit year to translocate any additional animals.

Status of Colony

One hundred thirty-nine sea otters (31 males, 108 females) were translocated to the Island during the period August 24, 1987, to June 30, 1990. As of December 31, 1990, the disposition of 44 sea otters that are no longer at the Island is known or suspected. Thirty sea otters left the Island and returned to the parent population. Three were caught in the "no otter" Management Zone in southern California and moved back to their original capture site on the mainland. Three males died at the Island from "stress" related to their capture and transportation. Five females were found dead on beaches in southern California (one of these had been shot and the other causes of death were undetermined). Three sea otters are suspected of having died in fishing gear. Only 15 otters are known to remain at the Island, leaving 80 otters unaccounted for [Table 12].

Summary of Mortality and Natality

During the calendar year covered by this report, one sea otter mortality was reported within the Management Zone. There was no evidence that this otter was one translocated to the Island. One sea otter died while being held for translocation. The otter had been surgically implanted with an intraperitoneal transmitter, and was held at the MBA for convalescence. During this observation period the otter died. The necropsy could not determine the cause of death, but most likely death

resulted from complications associated with the surgery. A complete report of the incident and necropsy has been reviewed by the Service's Sea Otter Recovery Coordinator, the Service's Office of Management Authority, and the MMC.

A total of nine pups are known to have been born on the Island. During this calendar year, four pups were observed at the Island. To date, four pups are known to have been successfully weaned, all in 1990.

Containment

The containment program, a cooperative effort between the Service and the CDFG, is designed to prevent sea otters from colonizing the Management Zone. Surveys and reports by the public and other agency personnel continue to indicate that no sea otter colonies are being established in the Manage-

ment Zone. The containment operation, as outlined in the Translocation Plan and the Service's Containment Plan, consists of three interrelated and interdependent activities: (1) surveillance of the Management Zone; (2) the capture of sea otters in the Management Zone, and (3) post capture relocation.

During the period covered in this report, the Service received 23 reports involving 18 separate incidents. For five of the reports there was no Service response because the sightings were too old or the reports provided insufficient information from which to plan a response. There were 38 surveys conducted within the Management Zone resulting in the verification of 4 sea otters. Following 32 capture efforts there were 3 sea otters captured. The one sea otter that was not captured was observed at the northern boundary of the Management Zone and

Table 12. Fate Summary of Sea Otters Introduced to San Nicolas Island as of December 31, 1990.

	Year 1 08/11/87 to 08/11/88	Year 2 08/12/88 to 08/11/89	Year 3 08/12/89 to 08/11/90	Year 4 08/12/90 to 12/31/90
Identified at Island in last month of period ((% of cumulative total taken to Island))	16 ((23.2))	35 ((28.0))	13 ((9.4))	15 ((10.8))
Returned to mainland population (Male/Female) [Adult/Juvenile, ≤ 35 lbs]	13 (3/10) [8/5]	20 (4/16) [9/11]	30 (7/23) [15/15]	30 (7/23) [15/15]
Returned to mainland and captured	1 (0/1) [1/0]	1 (0/1) [1/0]	3 (0/3) [3/0]	3 (0/3) [3/0]
Died at Island	3 (3/0) [1/2]	3 (3/0) [1/2]	3 (3/0) [1/2]	3 (3/0) [1/2]
Died at mainland	2 (0/2) [2/0]	2 (0/2) [2/0]	5 (0/5) [4/1]	5 (0/5) [4/1]
Died in fishing gear	3	3	3	3
Subtotal	38	64	57	59
Taken to Island	69	125	139	139
Fate unknown	31 ((44.9))	61 ((48.8))	82 ((59.0))	80 ((57.5))

could not be relocated after the first sighting. This sea otter presumably moved out of the Management Zone.

Law Enforcement

Sea otters have been intentionally harassed, shot, clubbed and drowned in legally and illegally set commercial fishing gear in past years. Service law enforcement officers conduct surveillance operations and investigations, and seek prosecution of individuals who intentionally harm sea otters. Pursuant to Public Law 99-625 and the Federal regulations governing the sea otter translocation program, the Service has implemented a law enforcement plan for protecting the Island colony of sea otters.

From 1987 to 1989, the Service employed two wildlife officers specifically for law enforcement and containment needs associated with the Service's sea otter translocation program. In 1989, one officer left to work for the NMFS, and although the vacated position was filled, the new employee has not yet received Federal law enforcement training.

Law enforcement activities associated with the translocation of sea otters were reduced this year and tended to focus on peak boat use periods at the Island. Activities included the monitoring of boats from the shore of the Island and responding to reports of dead otters in the Management Zone. High visibility patrols using the Service's *M/V Sea Otter* were limited by availability of personnel trained in law enforcement and in navigation, marine safety and operation and maintenance of large boats. The use of the smaller, inflatable boat to patrol and visit vessels working the area was limited by availability of personnel trained in law enforcement.

Commercial and recreational boat activity at the Island followed the same general trends observed during the first 2 years of the translocation program. Boat activity peaked in early October when lobster season opened and sea urchin prices began to rise. At this time, up to 20 boats per day were observed at the Island. This activity tapered off gradually and was influenced greatly by weather conditions. Military operations at the Island appear to have had little effect on the number of boats coming to the Island for commercial or recreational purposes. However, operational needs did force boats to move away from specified sections of the Island on a regular basis.

There were no reports of illegal activities related to sea otters at the Island this year. Unintentional disturbance of sea otters by vessel traffic was noted by research personnel observing otters at the Island.

A typical case of unintentional disturbance would involve a boat either passing or anchoring near a group of sea otters causing the otters to disperse. Generally, this displacement is temporary and the otters regroup in the same area at a later time. There is still concern that such disturbance may result in some otters dispersing from the Island. Since the beginning of the translocation, most sea otters have tended to congregate in an area of the Island where vessel traffic is light.

Sea otters continue to be a target for harassment and malicious activities, as well as victims of incidental take in entangling nets. Two cases were opened, in 1990, for incidents involving malicious activity. Nine otters were reported drowned in legally set gill and trammel nets this year within the mainland range of the sea otter.

The death of an Island sea otter, found by the U.S. Navy on shore at Point Mugu in 1987, is still under investigation. This otter was shot, and although a \$10,000 reward was posted, no information has yet been forthcoming.

Incidental Take Within the Mainland Range

Several lines of direct and indirect evidence indicate that incidental drowning of sea otters in gill and trammel entangling nets has been, and for 1990 continued to be, a significant source of mortality. The State of California continued to conduct a gill net observation program through a cooperative agreement with the Service, and also entered into a cooperative agreement with the NMFS to assist with the monitoring program required under the 1988 amendments to the Act. Three observers made shore-based observations of gill net fishing activities from Monterey to Morro Bay. Nine sea otters were reported to be killed in these nets in 1990. In summation, from June 1982 to December 31, 1989, a total of 73 otters have been observed or otherwise known to have drowned in commercial fishing nets: 6 in 1982, 6 in 1983, 16 in 1984, 12 in 1985, 3 in 1986, 5 each in 1987 and 1988, 11 in 1989, and 9 in 1990. Because only a portion of the entangling net fishery effort within the sea otter range has been observed, the actual number of incidental commercial net drownings is likely to be much higher. Emergency closures and protective legislation enacted by the State of California appear to have reduced the number of otters entangled in legally set nets.

California Senate Bill No. 2563, which provides additional restrictions on the use of gill and trammel nets in coastal waters, was enacted in 1990 and will become effective on January 1, 1991. This bill

prohibits the use of gill and trammel nets in waters shallower than 30 fathoms between Waddell Creek in Santa Cruz County and Point Sal in Santa Barbara County. The 30 fathom contour was selected based on analysis and recommendation by the Service using data obtained during a study by the MMS. The analysis indicated that currently, only an extremely small number of sea otters use waters deeper than 30 fathoms. The Service recommended to the NMFS that a 30 fathom closure should be implemented to likely reduce the incidental take of sea otters to near zero. The State legislation is expected to significantly reduce the number of incidental sea otter drownings. The NMFS and the CDFG will continue observations of the set net fishery occurring in waters outside this restricted area.

Section 7 Consultations

Pursuant to Section 7 of the ESA, the Service reviews proposed Federally funded, conducted or permitted activities that may affect the southern sea otter and issues Biological Opinions (Opinion) and recommendations to minimize impacts.

In 1990, the Service completed a draft Opinion for the U.S. Coast Guard (USCG) evaluating the proposed traffic separation scheme for central California and the port access routes into San Francisco Bay and the Port of Los Angeles. This consultation is considering oil spill risk to sea otters (and other listed species) from vessels, especially oil tankers and barges. The USCG is currently reviewing the draft.

Section 6

The Service provides funding for sea otter conservation to the CDFG through Section 6, Grant-in-Aid to the States, of the ESA. The CDFG uses these funds to obtain an index of sea otter mortality and to determine cause of death. This program involves sea otter carcass salvage and necropsy, and documentation of incidental take of sea otters in commercial fishing nets. The carcass salvage program involves computer cataloging of all verified observations of dead sea otters. Necropsies are performed on fresh carcasses and those animals suspected of being shot are X-rayed.

The CDFG cooperates with the Service in the capture operations for translocation and containment and in conducting spring and fall population counts discussed earlier. In addition, CDFG biologists conducted bimonthly aerial censuses of the range peripheries to determine changes in distribution and seasonal abundance.

Oil Spill Activities

Since the early 1980s the Service has been an active participant in a sea otter task group assembled to address oil spill contingency planning for sea otters. By Memorandum of Understanding with the CDFG, and as identified in the Sea Otter Recovery Plan, the CDFG had the lead for these activities. By 1989, little progress had been made beyond the establishment of a small temporary facility to care for oiled otters at the Pacific Gas and Electric's Diablo Canyon Nuclear Power Plant, San Luis Obispo County. At that time the Service became more active in attempting to get a contingency plan and response plan in place. The occurrence of the *Exxon Valdez* oil spill in 1989, provided the first field experience in sea otter rescue efforts. This effort produced valuable information relevant to contingency and response planning and helped resolve differences of opinion regarding appropriate actions before and after an oil spill.

Alaska, Washington, Oregon, California and Canada have all actively been involved in the contingency planning process for all marine resources. The Service's sea otter oil spill contingency plan has been drafted and is currently being revised to incorporate pertinent aspects of the Federal Oil Pollution Act of 1990, and California Senate Bill No. 2040 creating a new oil spill division within the CDFG. The ramifications of both Federal and State legislation have yet to be realized or applied to the existing document. The contingency plan is expected to be completed by spring 1991, with the response plan completed by summer 1991.

West Indian Manatee

The Florida Department of Natural Resources continued the Manatee Salvage/Necropsy Program. A total of 216 dead manatees was collected in 1990 in the southeastern United States. Florida accounted for 206 cases, and 10 occurred in Georgia. Causes of death were categorized as watercraft (50), crushing or drowning in locks or canal gates (3), other human-related (4), perinatal (45), other natural (20), and examined but undetermined (44). The sharp increase in mortality this year was due in part to the record cold spell in late December 1989 and January 1990, when at least 49 animals died apparently from cold stress. In addition, 1 dead manatee report was verified, but the carcass was not recovered. Total mortality and perinatal mortality were higher than any year since the salvage/necropsy program was first started by the Service in 1974. Twenty-three percent of all manatee deaths in 1990

were attributable to boat/barge collisions, and 26 percent of the manatee deaths were human related.

It is becoming increasingly obvious that a significant and growing threat to the survival of manatees in Florida are impacts linked to the rapid growth of the State's human population, 90 percent of which lives within 10 miles of the coast, and the increase in boat traffic accompanying that growth. Florida's population is increasing at a rate of nearly 1,000 residents a day. Accompanying the population boom has been a corresponding increase in the number of registered boats in the State. Where there were only 100,000 registered boats in Florida in the early 1960's, there are now more than 711,000; an additional 300,000 transient boats enter each year from out of state. There are at least 100,000 domiciled in Florida which are not required to be registered. It is projected that by the year 2000, there will be over 1,600,000 vessels using Florida's waterways.

The seriousness of these impacts is clearly illustrated not only by the increasing number of manatee deaths associated with human-related causes, but also by the dramatic increase in the number of Endangered Species Act Section 7 consultations with the Corps of Engineers (Corps) on boat docks, marinas and dredging projects affecting manatees and their habitats. The number of jeopardy biological opinions issued by the Service has also significantly increased. The Service has averaged nearly 200 Section 7 consultations on manatees each year for the past 6 years, mostly for marinas and launch ramps. Over 100 of these concluded that the project would likely jeopardize the continued existence of the manatee. More jeopardy opinions have been written for manatees than all other species combined, nationwide.

Problems resulting from the ever-expanding population of boaters cannot be addressed through one agency's actions or by isolated, small-scale initiatives. The Florida Department of Natural Resources, with the Service's assistance, is implementing a broad range of specific actions to protect the manatee and its habitat. These include additional rules that protect manatee habitat; specify manatee protection measures for the expansion of existing, or construction of new, marina facilities; allow the state to establish manatee sanctuaries and allow for the establishment for speed zones for manatee protection.

The Service provides funding for manatee conservation through Section 6 (Grants-in-Aid) of the Act to the Florida Department of Natural Resources. That Agency uses these funds to conduct a manatee salvage and necropsy program, to monitor the

manatee's population status, and to develop area specific manatee protection plans.

Site-specific manatee protection plans are being prepared by the thirteen counties experiencing the highest manatee mortalities. In addition, the State approved adoption of a boating facility expansion policy for these 13 counties, limiting construction of new or expanded boating facilities to one power-boat slip per 100 feet of shoreline until the counties have implemented an approved manatee protection plan and marine siting policy. Until the manatee protection plans have been completed, the 13 counties have been given several options for developing interim speed zones. All of the counties involved have chosen to develop site-specific zones which will include maximum speed limits, slow-idle zones, and possibly no-entry areas. Four of the counties site-specific speed zones, Brevard, Collier, Palm Beach and Martin, have been approved by the Florida Governor and Cabinet. The remaining nine counties' plans will go before the Governor and Cabinet in early 1991.

A second approach to strengthening the permit review process was the continuing development of a computer-based desk top mapping system. Such a system is expected to greatly facilitate review by integrating, mapping, and making readily available information on a local geographic area. Included in the data base will be manatee distribution and habitat use patterns, locations and numbers of boat-related manatee mortalities, vessel densities and use patterns, locations of boat speed regulatory zones, locations of existing boating facilities and trends in their development, zoning requirements, and a history of permit reviews and Section 7 consultations in the same geographic area. Through the "Save-the-Manatee Club," the State also expanded its interpretive and education programs.

The Service brought the Florida Manatee Recovery Team together four times in 1990 to continue to focus on the recovery tasks in the revised Florida Manatee Recovery Plan. Each agency or group on the recovery team was encouraged to develop participation schedules to implement tasks assigned to them in the Recovery Plan. The Plan contains 73 tasks, of which the Service has some responsibility for 90 percent. The participation schedules will be used as an instrument to aid in planning and budgeting to ensure organized and efficient implementation of the Recovery Plan.

Radiotelemetry field work on manatees continued on Florida's eastern coast. Twenty-five manatees were radio tracked during 1990. The objectives of this multiyear project are to determine movement

patterns and to identify key use areas for future protection. Habitat loss due to development and direct mortality of manatees due to boat strikes are major problems on the east coast. Unlike populations studied in the past at other sites on the St. John's River, northwestern and Southwestern Florida, the ongoing studies in eastern Florida are beginning to reveal extensive and complex patterns of movement and habitat use. Seasonal migrations were noted between south Florida and Georgia, and movements up to 850 kilometers were observed. In 1990, satellite-monitored platform terminal transmitters (PTT's) were used on 17 animals and proved to be a highly effective means to track manatees over wide ranges. PTTs also proved to be much safer and significantly more cost efficient than the conventional VHF transmitters and aerial tracking methods. Tail-notching and freeze branding were also used to identify manatees. All of these systems continue to be employed in order to maintain a large sample of manatees.

Field work for a study to characterize the seagrasses of Hobe Sound, Florida, and to determine the effects of boat-induced turbidity on this seagrass community, which is utilized as winter food base for manatees, was completed. This research was a cooperative effort by the Service, the NMFS, and the Florida Department of Natural Resources. Light sampling designs and seagrass productivity, distribution, biomass and species composition investigations were implemented. Manatee grazing impact studies were continued.

Life history studies of manatees continued to be carried out based on longitudinal records of individuals recognizable from distinctive scar patterns. The photographic catalog of individuals maintained for these studies (with assistance from Florida Power and Light Company) continued to expand in 1990. Stomach content analyses for manatee food habit studies also continued and provided the Service and cooperators with valuable information on food types and preferences.

The Service continued to support the Manatee Rescue Contingency Plan conducted through cooperative agreements with Sea World and Miami Seaquarium. The Florida Marine Patrol, through the "Resource Alert Watch Line," determines the validity of the reports of injured manatees and reports them to Sea World and Miami Seaquarium for rescue.

A major portion of the Crystal River National Wildlife Refuge staff's time in 1990 involved manatee protection and management. This involved the enforcement of manatee regulations (harassment,

speed zone and sanctuary); the participation in manatee surveys, research and rescues; and the development of viable public awareness programs in the Crystal River area. The total number of citations for violation of manatee protection regulations issued by Refuge officers has decreased from 134 in 1988-89, to 63 in 1989-90.

The Refuge held public meetings on June 11 and 12, 1990, to receive public input regarding the new Manatee Interpretative Center on Kings Bay, Crystal River, Florida. A total of 19 aerial manatee surveys were conducted by staff of the Crystal River National Wildlife Refuge. The highest count was made on December 19, 1990, when 280 animals were counted in the Crystal and Homosassa River areas. The refuge held a meeting of law enforcement agencies to improve cooperation between the various agencies as directed by the revised Florida Manatee Recovery Plan. The refuge staff participated in three manatee rescues as well as responding to numerous reports of distressed manatees.

Dugong

A full report was published in 1990 on previously completed dugong research. The report, entitled, "Development and application of conventional and satellite radio-tracking techniques for studying dugong movements and habitat use", was published in Volume 17 of the journal, "Australian Wildlife Research." The publication reported on collaborative dugong research conducted with biologists at James Cook University of North Queensland, Townsville, Australia.

Hawaiian Monk Seal

The Service cooperates regularly with NMFS personnel on various research and recovery actions recommended in the Hawaiian Monk Seal Recovery Plan. Hawaiian Islands National Wildlife Refuge (Refuge) staff provide a variety of support services, including transportation of equipment and supplies aboard Service-funded charters, radio monitoring and message relays, and maintenance of the Tern Island Field Station (Tern Island). As part of production and population surveys, Service biologists worked with NMFS researchers on each island of the Refuge tagging weaned pups and resighting tagged seals. They also conducted regular population censuses of monk seals at French Frigate Shoals, and intermittent surveys at other islands of the Refuge and at Midway Atoll.



A Hawaiian monk seal. U.S. Fish and Wildlife Service photo.

Entangled monk seals encountered during surveys throughout the Refuge were released from nets and other debris. Large nets that washed up on Refuge beaches were burned to reduce the likelihood of entanglement with seals. As the Tern Island seawall continued to deteriorate, seals occasionally became disoriented or were entrapped behind the seawall, unable to return to the water. Refuge staff freed all disoriented and entrapped seals and returned them to the population.

The Refuge assisted in transporting underdeveloped female pups from French Frigate Shoals to Honolulu where they were rehabilitated for release at Kure Atoll in an effort to repopulate Kure. Service biologists served on an interagency committee to develop protocol for maintaining Hawaiian monk seals in captivity.

At Midway Atoll National Wildlife Refuge, volunteer biologists were on-site for 5 months during the summer. The biologists conducted regular censuses of monk seals during this time. They also coordinated beach cleanups of potential entanglement debris items. A general wildlife video was produced to educate visitors to Midway. The video addresses seal biology, Federal regulations protecting them, and their sensitivity to disturbance. Signs were placed at beach access points to alert island residents and visitors of distances to maintain between themselves and the seals. Refuge staff prepared a final draft of the Midway Atoll Natural Resources Management Plan, which addresses future management considerations for Hawaiian monk seals.

