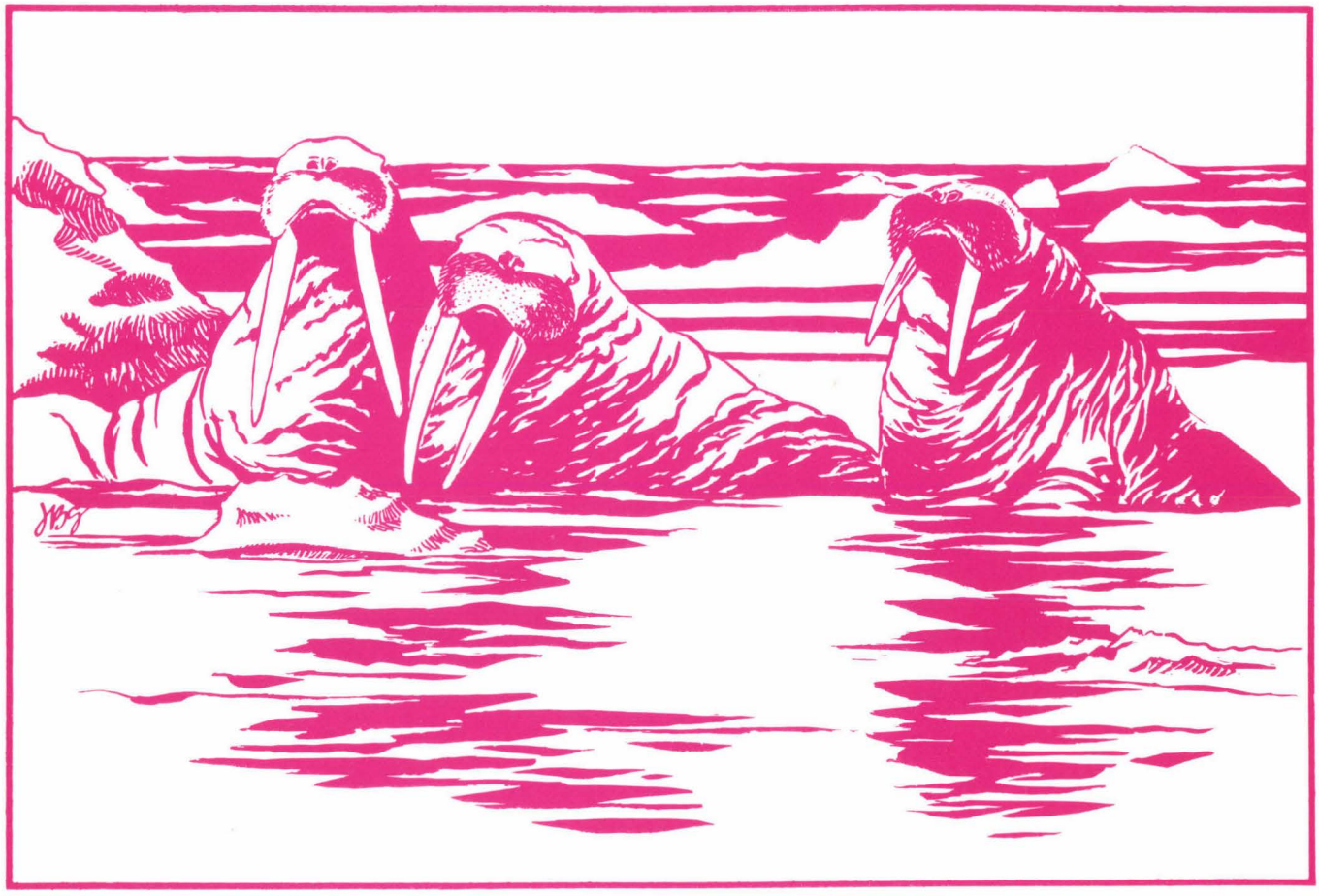
Administration of the Marine Mammal Protection Act of 1972

JANUARY 1, 1989 TO DECEMBER 31, 1989



U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
WASHINGTON, DC 20240

Administration of the

MARINE MAMMAL PROTECTION ACT OF 1972

Annual Report

January 1, 1989 - December 31, 1989

Prepared by

Department of the Interior

U.S. Fish and Wildlife Service

Washington, D.C. 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, 1989, to December 31, 1989, on the administration of the Marine Mammal Protection Act with regard to those mammals.

Issued at Washington, D.C., dated JUL 23 1990

Richard M. Smith

Acting Director

ADMINISTRATION OF THE MARINE MAMMAL PROTECTION ACT OF 1972

January 1, 1989 - December 31, 1989

Report of the Department of the Interior

Contents

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

General information on distribution and migration, abundance and trends, general biology, ecological problems, allocation problems, regulations and research can be found in the 1979 annual report. Thus, it is not repeated here. Except for impacts to Alaska sea otters arising from the Exxon Valdez oil spill as described elsewhere in this report, there were no significant changes during this report period in the status of any of the species of marine mammals whose management is the Service's responsibility.

SPECIES LIST

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

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

APPROPRIATIONS

The most recent funding authorization by Congress for the Service was under Section 116 of the amended Marine Mammal Protection Act (16 U.S.C. 1361-1407, 86 Stat. 1027 (1972)); 102 Stat. 4755 (1988) for Fiscal Years 1989 through 1993. Calendar Year 1989 covered by this report overlaps FY 1989 and FY 1990, and funds authorized and appropriated for both fiscal years are shown below.

Reporting Year (January 1 to December 31, 1989) Funding (in $000):

	Marine Mammal Protection Act Section 116	
	Authorized	Appropriated
Fiscal Year 1989	$3,000	$2,255
Fiscal Year 1990	$3,120	$2,523

Walrus at a haul out site in Alaska. U.S. Fish and Wildlife Service photo.

Distribution of appropriations (in $000):

Marine Mammal Protection Act	Actual FY 89	Projected FY 90
Research and Development		
Alaskan sea otter 1/	$ 275	$ 288
Walrus	146	200
Polar Bear	825	667
Total Research	$1,246	$1,155
Management		
Permit activities	$ 24	$ 30
Law enforcement activities	445	498
Other management activities	540	840
Total Management	$1,009	$1,368
Grand Total	$2,255	$2,523
Endangered Species Act		
Section 6 (Grants-to-States)		
California - Sea otter	$ 100	$ 100
Florida - Manatee	105	105
Total Section 6	$ 205	$ 205
Section 15		
Research and Development		
Endangered/threatened otters	$ 756	$ 756
Manatee	325	375
Monk seal	0	0
Total Section 15 Research	$1,081	$1,131
Management		
Endangered/threatened otters	$ 350	$ 502
Manatee	75	155
Monk seal 2/	10 3/	0
Total Section 15 Management	$ 435	$ 657
Grand Total	$1,721	$1,993

1/ Totals do not include $923,800 in FY 1989 and $854,200 in FY 1990 for damage assessments related to the Exxon Valdez oil spill.

2/ Although the National Marine Fisheries Service has primary responsibility for monk seals, the species utilizes the Hawaiian Islands and Johnston Atoll National Wildlife Refuges.

3/ Spent for Hawaiian monk seal activities on the Hawaiian Islands National Wildlife Refuge under authority of the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee).

SUMMARY OF 1989 PROGRAM

OUTER CONTINENTAL SHELF OPERATIONS AND ENVIRONMENTAL STUDIES

The Service participates in the Department of the Interior's Outer Continental Shelf Oil and Gas Leasing Program by providing advice, review and input at various stages in the leasing, exploration, development and production process. The Service provides technical expertise to the Minerals Management Service on the expected impacts of such development on fish and wildlife resources and related habitat.

The Service began initial involvement in the next 5-year oil/gas lease cycle (1991-1996) with its review and comment on the Notice of Intent to Prepare the Environmental Impact Statement (Scoping Phase) during this report period.

Service participation in individual oil/gas lease sales reflected a generally reduced leasing program during 1989. The Service revisited and updated its review of Sale 121 (mid-Atlantic), which did not affect marine mammals. A final Biological Opinion, pursuant to the Endangered Species Act, was released on Sale 91 (central California) which included evaluation of potential effects on the southern sea otter. Evaluations of exploratory drilling off western Florida, including effects to manatees, were also completed in 1989.

In a separate action, the Service rendered a final Biological Opinion to the National Marine Fisheries Service on new regulations on commercial fisheries that addressed the incidental take of southern sea otters, West Indian manatees and dugongs.

RESEARCH AND DEVELOPMENT

The Service conducted research under the Act during FY 1989 at several Centers and Field Stations. The Alaska Fish and Wildlife Research Center is responsible for polar bear, walrus and northern (i.e., Alaska) sea otter research. The National Ecology Research Center in 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 1989, the project title and summary, followed by highlights of results to date are given below by species.

1. Polar bear

   A. Project Title and 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 22 new polar bear dens in Alaska's Beaufort Sea region was found, bringing the total discovered in this study to over 100; previously only 35 recent and

historic dens were known in Alaska. Seven of 16 confirmed dens were located on land, with the remaining on shore-fast or drifting ice. Evidence of six other dens on land was discovered. Preliminary results have been summarized in a report and two publications, and a major manuscript is in press.

Results to date:

o Over 100 dens have been found in the Beaufort Sea region since 1981. Most dens have been on drifting or shore-fast ice; only 23 percent have been on land. Most dens on land have been found on small barrier islands on the Arctic National Wildlife Refuge. Despite their small number, dens on land have resulted in 37 percent of the known production of cubs.

B. Project Title and 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. Ninety-nine polar bears were captured in FY 1989 and 49 were fitted with radio collars. Survival of cubs was determined by observation from aircraft. Preliminary evidence suggests the ratio of stable isotopes of carbon in keratinous tissues of polar bears may be very valuable in describing where individual bears occurred during the preceding year. Ultimately, the study will combine carbon isotope ratios with telemetry data to help define populations.

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:

o 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. Studies of movements employing radiotelemetry have shown that movements of polar bears are more variable and may be 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 and 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,

Alaska Fish and Wildlife Research Center research biologists weighing a captured polar bear. U.S. Fish and Wildlife Service photo by the Alaska Fish and Wildlife Research Center.

inclement weather conditions, and unusual distributions of collared animals continued to prevent full progress on this work in FY 1989. Seventy-one bears were captured in the Beaufort Sea region and 33 were fitted with radio collars. Poor weather and equipment breakdown prevented much sought after information. Methods of data collection have been modified and the target completion date for the study has been extended from 1990 to 1992.

Results to Date:

o 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 prospects for future success are good, despite the vulnerability of this work to poor weather and equipment problems.

D. Project Title and 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. Twenty satellite collars were deployed on female polar bears in the Bering and Chukchi Seas during March and April 1988. Ten of these bears denned during 1989, some on land and others on sea ice in Soviet territory. Two Soviet scientists visited the project in the spring of 1989 as part of a formal information exchange. U.S. and Soviet scientists will capture and mark female polar bears emerging from dens on Soviet territory in 1990. A joint cruise to census polar bears in the Chukchi Sea is planned for 1991.

Results to Date:

o 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.

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

o The pilot study of mitochondrial DNA rapid sequencing and amplification was completed by cooperators. This study resulted in application of rapid analytical procedures to the polar bear mitochondrial DNA materials.

o Data collected from satellite telemetry in FY 1989 indicate that 80 percent of the polar bears in the Bering and Chukchi Seas den in the Soviet Union.

E. Project Title and 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 were routinely integrated into the Regional Geographic Information System (GIS). The ARC/INFO GIS system has some shortcomings and alternative systems are being examined. Advanced Very High Resolution Radiometry (AVHRR) data were acquired for several ice edge scenes and are being evaluated for potential use in the project. Other sources of digitized ice data are being contacted for cost comparisons. A VCR camera system was tested for utility in the provision of "truth" data.

Results to Date:

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

o The VCR camera system shows potential for use in evaluating habitat use by polar bears.

o AVHRR data appear to have potential use in analysis of polar bear habitat use patterns on a large scale.

o Shortcomings of the ARC/INFO GIS may be overcome by use of the PC-based MAYA system or an interface of ARC/INFO and Statistical Analysis System (SAS) software.

2. Alaska sea otter

A. Project Title and 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 Service staff) and Prince William Sound (by Cooperative Agreement). Funds were 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. We continued to collect location fixes on radio-tagged sea otters at Kodiak Island and Prince William Sound. 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. A manuscript on sea otter mortality at Kodiak Island was published in the Journal of Mammalogy. An additional manuscript is in press and two others are in review. Temporary reassignment of staff from this project to assessment of impacts of the Exxon Valdez oil spill caused progress to be deferred on certain aspects of this study, particularly on sea otter ecology at Kodiak Island.

Results to Date:

o 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. Feeding experiments suggest that sea otters can detect paralytic shellfish toxin.

o Middle-aged females in Prince William Sound have a higher rate of reproductive success than younger individuals.

o 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 and Summary: Interactions between sea otters and fisheries in Alaska.

Research along two fronts continued at Kodiak Island: (1) a description of sea otter diets with an emphasis on the importance of commercial species of shellfish, and (2) an investigation of the impacts of foraging by sea otters on subtidal benthic communities. Collection of data on the developing mariculture industry in Alaska continued in 1989. The final year of crab sampling in southeastern Alaska was completed, as was a dive survey of benthic prey resources. Reports on conflicts between sea otters and fisheries and mariculture were prepared. 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. Two new reports on potential conflicts between sea otters and humans over shellfish resources in southeastern Alaska were prepared, and two manuscripts are in review.

Results to Date:

o 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.

o 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 and 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 minimal until 1990 or 1991, when funds released by the completion of other projects may be available.

Results to Date:

o 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.

o No funds were provided to the Cooperative Agreement with the Alaska Department of Fish and Game in either FY 1988 or FY 1989.

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.

Results to Date:

o All animals released into Prince William Sound have remained there, even though some were originally captured near the Kenai Peninsula. Movements have been sporadic and unpredictable.

o Preliminary results suggest that released animals may be capable of feeding and supporting themselves in the wild.

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 research biologist from the U.S. Fish and Wildlife Service's Alaska Fish and Wildlife Research Center applies satellite and radio tags to a walrus, July 1989, on the Chukchi Sea coast of the Soviet Union. U.S. Fish and Wildlife Service photo by Dana J. Seagars.

A program of instrumentation studies movements, behavior, and survival of animals in oiled and unoiled portions of Prince William Sound.

Results to Date:

o Most sea otters killed in the oil spill were pregnant or lactating females; the majority of deaths occurred in Prince William Sound, even though other areas were oiled.

3. Pacific walrus

A. Project Title and 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. Some alternate survey techniques were tested in 1989. Also tested was high-resolution video equipment deployed in Soviet aircraft. Six satellite and six VHF transmitters were attached to walrus at Rudder Spit in the Soviet Union. Not all objectives were met in 1989, owing to aberrant ice conditions and depletion of resources.

Results to Date:

o Several alternate techniques for conducting aerial surveys have been tested. Some, Krieging for example, look promising and will be evaluated further.

o U.S. and Soviet scientists have developed improved communications and have taken steps to standardize methods of data collection and analysis, and terminology.

o Numbers of walrus estimated from visual surveys are generally higher than counts made from video images.

o Transmitters used on walrus have had an effective life of no greater than 3 months, rather than the one year estimated in specifications.

4. Manatee and dugong

A. Project Title and Summary: Develop a generalized microcomputer capability for field offices to address large-scale resource assessment problems.

This activity is part of a larger effort to 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 system for display of spatial information was developed. Geographic Information System (GIS) capabilities were transferred to the Service's

Sirenia managers in Gainesville and Jacksonville, Florida, for use in manatee management. The system is being demonstrated to Service and Florida Game and Fresh Water Fish Commission personnel.

Results to Date:

o Capabilities were demonstrated using manatee mortality and sighting data in a three county area in eastern Florida at the Service's Endangered Species Office in Jacksonville, Florida.

o The prototype is being finalized for transfer to, and use by, the National Ecology Research Center's Sirenia Project in Gainesville, Florida.

B. Project Title and Summary: Ecological studies of manatees and dugongs.

This work is concerned with obtaining data on the 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 up to 17 individuals monitored. Most were monitored by VHF transmitters, but PTTs (satellite transmitters) were deployed on eight individuals. The QuickMap software was installed and used to handle telemetry data. Stomach content analysis continued, along with evaluation of ingested marine debris. A technique for aging manatee carcasses based on bone growth-layer groups was developed. Collection of longitudinal life history data at Crystal River and Blue Spring continued.

Results to Date:

o 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 is developed by management agencies to plan permitting policies, habitat acquisition and regulation of waterborne activities.

o 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 from feeding patches in seagrass beds.

o The data base on inter-birth interval and age at first reproduction was increased by the scar-pattern based life history studies.

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

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

o 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 and 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 overwinters 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 concurrent change proposal that a rule be adopted limiting boat speeds and wakes. As the information supporting the adoption of the proposed rule is 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.

Results to Date:

o 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 the reported values for sub-tropical seagrasses elsewhere.

o 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.

D. Project Title and Summary: Manatee Protection Project: Survey of boat usage patterns.

The Florida population of the West Indian manatee (Trichechus manatus) consists of approximately 1,200 individuals. Average known mortality has been increasing from approximately 90 per year (1976-1983) to 130 per year (1984-1985). Human-caused mortality, including manatees crushed or otherwise injured by boats, crushed in locks or water control structures and poaching, accounts for approximately one-third 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-family docks, etc. This will be done in two Citrus County locations. Products of the study may include proposed restrictions relating to a general permit for building boat docking facilities, and a manatee protection plan for 18 affected counties. Assessment of domains of generalizations from the results will be provided.

E. Project Title and Summary: An evaluation of manatee distribution patterns in response to public use activities: Crystal River, Florida.

These studies were designed to analyze the distribution response of manatees in warm water sanctuaries of the Crystal River Refuge weather patterns and public-use activities during the overwintering 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.

o Active research on this study has been completed, but the final report has not yet been received by the Service.

F. Project Title and 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 King's Bay for boating, diving, sailing and fishing are estimated at 600 per week day and 1,302 per weekend day. Manatee 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 King's 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.

Results to Date:

o Data from the initial year of study provided pilot information that will guide efforts in the second year of the expanded study.

5. Southern sea otter

A. Project Title and 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) was continued.

Results to Date:

o 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.

o Weekly searches of the northern San Luis Obispo County, California, area were made to re-identify individual sea otters.

o Observations on foraging behavior and diet were completed on sea otters in the Point Piedras Blancas and Point Buchon areas.

o Monthly beach walks along a 10-mile section of coast in northern San Luis Obispo County were continued to document marine mammal and bird mortality.

o The sea otter population continues to grow (growth was 8 percent between 1988 and 1989). The rate of growth of the sea otter population in California unaccountably is less than that registered for the species in Alaska.

B. Project Title and 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. Analyses of spatial variation were completed for plant and animal assemblages in kelp forests influenced by sea otters along the central California coast. Preparations were made for analyses of variation in surface kelp canopies. Data were prepared for analysis of red abalone populations. The annual late-summer lobster trapping survey was cancelled, and other progress was impeded by the need for project staff to respond to the Exxon Valdez oil spill.

Results to Date:

o The translocated sea otter population at San Nicolas Island has not yet had an effect on the structure or dynamics of the nearshore community.

o Studies of mainland sea otter habitats 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 and 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 otters translocations as a management tool. From September 1, 1988, to June 30, 1989, thirty-four sea otters were released at San Nicolas Island. All of these otters were fitted with flipper tags; miniature radio transmitters were attached to the flipper tags on each animal. Radio and visual surveys were conducted, both at the Island and along the coast where animals had originally been captured. Fewer sea otters than expected were transplanted, owing to reassignment of project personnel to respond to the Exxon Valdez oil spill.

Results to Date:

o A detailed discussion of the effort to translocate sea otters to San Nicolas Island appears in the section of this report entitled, "Sea Otter-Southern."

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 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 National Marine Fisheries Service for its consideration and appropriate action. However, under a National Marine Fisheries Service/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 to the Department of Justice for criminal action.

The translocation of southern sea otters from the central coast to San Nicolas Island began its third year in August. A total of 3 San Nicolas Island sea otters were found dead during 1989, all washed up on southern California beaches. Investigations to date have provided no clue to the deaths and X-rays and necropsies were negative. All of the carcasses were badly decomposed making it difficult to speculate as to the causes of death. The management/protection program instituted for the project with two wildlife officers continues with regular patrols both Island-based and open water with the patrol vessel "Sea Otter." Emphasis is placed on public contacts and compliance with U.S. Navy closures around the Island. Additionally, the wildlife officers are responsible for the containment of sea otters to within the management zone.

The Service conducted a number of investigations in the western United States during 1989. In Seattle, Washington, special agents received information that a subject had large numbers of sea otter pelts in his possession. The subject was contacted in a covert capacity and sea otter pelts were purchased. The person was arrested and the case is in the U.S. Attorney's office. Two separate investigations by special agents in Oregon resulted in seizure of walrus ivory and marine mammal parts. In California, an investigation uncovered an organized group that was capable of providing 800 to 1,000 sea

otter pelts a year for the illegal fur trade. Pelts sell in the United States for as much as $2,000 each, and in Europe for up to $4,500 each. Special agents in California arrested a subject for beating to death a sea otter that was found sick on the beach. The subject was found guilty, fined and spent time in jail. Substantial numbers of seizures resulted from port inspections at designated ports of entry. Lastly, three separate investigations involving dead sea otters are being investigated in California at present.

The majority of time spent in the southeastern United States was limited to administratively processing notices of violations for manatee boat speed and sanctuary infractions. Service special agents and support staff in Florida processed over 500 manatee notices of violation in FY 1989. Two potential problem areas involving manatees have recently been identified in the coastal water areas of Georgia.

At the end of 1989, the Service in Alaska had 57 pending Marine Mammal Protection Act cases. During the period, 39 new cases were opened and 30 cases were closed.

Several significant cases were investigated by agents in Alaska. The most noteworthy was the March 24 Exxon Valdez oil spill. Over 1,000 sea otter carcasses were recovered, and are currently stored as evidence.

A seven month investigation, beginning in December 1988, resulted in a twenty count Federal grand jury indictment against an Anchorage man and his wife. The couple was involved in a scheme to trade narcotics, firearms, and cash for raw walrus ivory using the wife's status as an Alaskan Eskimo to conceal the activity. Following a plea agreement, her husband, an illegal alien, was sentenced to 18 months in prison, fined $1,000, and forfeited approximately $22,000 worth of walrus ivory. He will be deported upon completion of his prison term.

The case against three Alaskan Natives who were apprehended in 1988 for the wasteful killing of nine walrus, was successfully adjudicated during this reporting period. Two of the individuals pleaded guilty, receiving fines, probation, and community service. A jury found the third person guilty. He was sentenced to three months in jail and a $550 fine; the case is currently under appeal. This is only the second instance where charges were brought under the wasteful take provisions of the Act, and the only case to go to trial.

Perestroika has resulted in an increased workload for the Service's Law Enforcement staff in Alaska. Easing of travel and trade restrictions between the Soviet Union and the United States has brought a flood of marine mammal imports from the Soviet Union into Alaska. Thus far, individual violations have been minor, and generally inadvertent. Service Law Enforcement agents in Alaska are working with appropriate officials to resolve these problems.

Polar bears in Alaska. U.S. Fish and Wildlife Service photo by Scott Schliebe.

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 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 presently are being developed for issuance of permits for enhancement of the survival or recovery of a species or stock.

During 1989, two new permits were issued for scientific research and six permits were renewed and/or amended (some more than once). One permit was issued for public display. Eight parties were registered, or renewed registration, as agents and/or tanneries and seventeen registrations were amended.

The following is a brief description of permit actions taken in 1989.

Scientific Research Permits

1. PRT-740507, U.S. Fish and Wildlife Service, Alaska Fish and Wildlife Research Center, Anchorage, Alaska, was issued 9/18/89 through 12/31/91, authorizing the take of sea otters in Alaska to assess the long-term impacts of the Exxon Valdez oil spill on otters. The permit authorizes take of up to 650 sea otters of which 275 may be instrumented with internal radio transmitters for purposes of monitoring their movements. Other activities authorized include drugging, tagging, blood and premolar extraction, and fat biopsy. This permit is currently the subject of litigation which is discussed in the "Litigation" section below.

2. PRT-740037, Envirosphere Company, Bellevue, Washington, was issued 9/27/89 through 12/31/90, authorizing take (i.e., harassment) of Pacific walrus in the Chukchi Sea, Alaska, during the course of aerial surveys and vessel observations.

3. PRT-719521, National Park Service, Bering Land Bridge National Preserve, Nome, Alaska, was renewed 3/29/89 through 3/31/90, authorizing take (i.e., salvage) of one dead polar bear.

4. PRT-719453, California Department of Fish and Game, Sacramento, California, was renewed 8/15/89 through 8/11/92 authorizing the continuation of Phase II and Phase III of a translocation project conducted in conjunction with the Service's southern sea otter translocation project. Phase I authorized the capture, tagging and translocation of up to 20 sea otters to determine the influence of the

release area and the release technique on their homing tendency, and was completed. Phase II authorizes testing the feasibility of maintaining an experimental boundary to prevent dispersal of sea otters by using non-lethal containment methods and to capture, tag and translocate sea otters that cross the designated experimental boundary. Phase III will involve non-lethal reduction in densities of otters in an experimental area to determine the effects on movements and range expansion and will be contingent upon the results of Phases I and II.

5. PRT-717318, U.S. Fish and Wildlife Service, Assistant Director for Fish and Wildlife Enhancement, Portland, Oregon, was renewed 8/15/89 authorizing the capture, tagging, blood sampling and tooth extraction (one premolar), of up to 70 southern sea otters per year through August 1992, and subsequent release or translocation to San Nicolas Island, California, provided no more than 250 sea otters total are translocated during the course of the translocation project (8/87 through 8/92). The permit was amended on 9/25/89 to authorize the use of passive implant transponder chips (PIT tags), and again on 12/26/89 to authorize the implantation of intraperitoneal radio transmitters in up to 20 sea otters per year (totaling up to 60) in order to monitor otters translocated to San Nicolas Island.

6. PRT-717015, Natural History Museum of Los Angeles County, Los Angeles, California, is a permit issued jointly by the Service and the National Marine Fisheries Service. The permit was renewed by the two agencies on 12/5/89 and 12/27/89, respectively, through 11/30/90, authorizing the importation and exportation of dead salvaged material of all Cetacea, Pinnipedia, Sirenia and marine otters.

7. PRT-690715, U.S. Fish and Wildlife Service, Alaska Fish and Wildlife Research Center, Anchorage, Alaska, was renewed 6/29/89 through 6/30/90 authorizing take of up to 35 walruses on the west coast of Alaska and the Bering and Chukchi Seas, and import of biological samples from Greenland, Canada, Norway and the Soviet Union. Take activities include drugging, tagging, radio tagging with satellite-linked transmitters, and administering Oxytetracycline HCL for protection from secondary pneumonia and to mark the teeth for future identification.

8. PRT-690038, U.S. Fish and Wildlife Service, Alaska Fish and Wildlife Research Center, Anchorage, Alaska, authorizes take (i.e., immobilize, ear tag, tattoo, paint-mark, extract premolar) of up to 200 polar bears annually, of which 60 per year may be radio collared and instrumented with satellite packages. The permit was amended on 3/22/89 to authorize the importation and exportation of biological specimens between Canada, the Soviet Union and the United States. The permit was amended again on 10/23/89 to authorize the testing and use of bio-electrical impedance analysis (BIA), for measuring fat and fat-free body mass of individual bears captured under the permit.

Public Display Permits

1. PRT-731847, New York Zoological Society, Central Park Zoo, New York, New York, was issued 2/20/89 authorizing the importation of one polar bear from the Ruhr Zoo, Federal Republic of Germany, for public display.

Registered Agent/Tannery Permits

Four new registered agent permits were issued in 1989, and four were renewed, as described below. In addition, seventeen registered agent and/or tannery permits were amended on March 2, 1989, to incorporate additional recordkeeping and reporting requirements established by the Service's marking, tagging and reporting regulations that became effective on October 26, 1988.

1. PRT-742069, Gary B. Jones, Anchorage, Alaska, was registered as an agent on 12/22/89.

2. PRT-737707, Michael Allen Robuck, Anchorage, Alaska, was registered as an agent on 6/27/89.

3. PRT-736311, Kodiak Taxidermy & Gunworks, Kodiak, Alaska, was registered as an agent on 3/16/89.

4. PRT-733578, Roland Louis Quimby, North Pole, Alaska, was registered as an agent on 1/11/89.

5. PRT-713785, Northland Furs, Kenai, Alaska, was renewed registration as an agent on 4/5/89 (formerly PRT-683754).

6. PRT-706062, North Country Tanning, Anchorage, Alaska, was renewed registration as an agent and tannery on 3/7/89.

7. PRT-683423, New Method Fur Dressing Co., South San Francisco, California, was renewed registration as a tannery on 7/20/89.

8. PRT-681597, George L. Kritchen, Cordova, Alaska, was renewed registration as an agent on 12/22/89.

Litigation

A lawsuit was filed against the Service on November 13, 1989, by the National Society for Animal Protection, Clawson, Michigan, alleging that PRT-740507, issued to the Service's Alaska Fish and Wildlife Research Center (see the first entry under the "Scientific Research Permits" section above), is not in compliance with the Marine Mammal Protection Act and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The complaint charges that the research authorized by the permit is not bona fide and is duplicative of previous sea otter research, and therefore is not in compliance with the 1988 amendments to the Act. The case is pending.

INTERNATIONAL ACTIVITIES

Excess Foreign Currency Program

During this report period, the Service received no new congressional authorization for the use of excess foreign currencies, but continued to work in Egypt, Pakistan and India using carryover funds authorized in previous years. The establishment of the U.S.-India Fund (USIF) has allowed funding of

additional activities in India. The earlier congressional authorizations and use of USIF monies were requested under Section 8 of the Endangered Species Act, that allows such funds to be expended on projects deemed by the Secretary of the Interior to be necessary or useful for the conservation of endangered or threatened species.

The Service continued its support for the development of Ras Mohamed Natural Protectorate, Egypt's first marine park. It also sponsored the participation of the Director of the Egyptian Wildlife Service in an international meeting on wetlands in Leiden, the Netherlands, in June. Egypt has a considerable number of important wetlands which include a large portion of marine systems.

In India, the Service is supporting a major research project with the Bombay Natural History Society on the ecology of Point Calimere, an endangered ecosystem which has many marine components. The project is compiling basic biological data and looking at environmental perturbations. Information is designed to help make management recommendations.

US-USSR Environmental Agreement: Marine Mammal Project

In partnership with the National Marine Fisheries Service, the Service collaborated with the USSR Ministry of Fisheries and the USSR Academy of Sciences in a comprehensive program of laboratory and field research focusing on pinnipeds and cetaceans of mutual interest and importance. During 1989, sixteen American and Soviet scientists took part in eight exchanges.

In March, one Soviet scientist from the Institute of Evolutionary Animal Morphology and Ecology (USSR Academy of Sciences) visited the United States to continue development of methods to study cetacean populations on the basis of nonmetrical skull characteristics using Smithsonian Institution collections and those of the Southwest Fisheries Center.

Joint walrus work was carried out as planned in the protocol signed at the Ninth US-USSR Marine Mammal Working Group meeting, and included several exchanges. The first involved two Soviet specialists in Alaska last summer taking part in radio tagging of walrus along the ice edge of the Bering Sea. This was followed by walrus behavior and distribution studies along the Chukotka Peninsula from a Soviet aircraft, in which three American specialists participated. In July, three American scientists visited the Chukotka Peninsula for walrus ethology research on coastal rookeries. During this trip, six satellite transmitters and six VHF transmitters were deployed on walruses. Finally, last fall two Soviet specialists met in Alaska with their American colleagues to discuss future walrus work.

In early June, two Soviet biologists took part in northern sea lion studies in the Aleutian Islands and Gulf of Alaska as part of a range-wide survey of this species. The project represents the first time the entire range of northern sea lions has been surveyed during the same year, and was designed to be carried out in conjunction with a Soviet shipboard survey of this species in the Kuril Islands. Two American specialists participated in this survey.

In September, three Soviet specialists participated in a joint Sea Otter Workshop, in which both sides reviewed the latest data on sea otter distribution, abundance, conservation and management, as well as the effect of

the Exxon Valdez oil spill on sea otter populations off the south central Alaska coast. Proposals were made for joint work in the Commander and Aleutian Islands on sea otter and fur seals using a U.S. research vessel.

STATUS REPORTS

Polar Bear

The Service continued the collection of harvest information from polar bears taken in coastal villages for subsistence purposes. The kill during the 1988/89 period totaled 144 bears comprised of 86 males, 37 females, and 21 sex unknown (Table 1). The reporting period extends from July 1, 1988 to June 30, 1989. This period accurately reflects the period when sea ice and polar bears are available to hunters.

The kill was the second highest (the highest being 296 bears taken in 1983/84) since the beginning of Service collection of harvest data in 1980, yet was only 8 percent greater than the average for this period (133 bears). The

A female polar bear and her cubs in Alaska. U.S. Fish and Wildlife Service photo by Scott Schliebe.

TABLE 1. ALASKA POLAR BEAR HARVEST: JULY 1, 1988, TO JUNE 30, 1989.

VILLAGE	MALE	FEMALE	UNKNOWN	TOTALS
Kaktovik*	5	2	3	10
Nuiqsut*	2			2
Barrow*	19	1	10	30
Atqasuk*	1	1		2
Wainwright*	9	2	4	15
Point Lay	2			2
Point Hope	5	3		8
Kivalina		1		1
Shishmaref	20	6	3	29
Wales	3	6		9
Diomede	6	2	1	9
Savoonga	10	4		14
Gambell	4	9		13
TOTALS	86	37	21	144

* Denotes villages party to the Inuvialuit Game Council/North Slope Borough Polar Bear Management Agreement

TABLE 2. ALASKA MONTHLY POLAR BEAR HARVEST: JULY 1, 1988, TO JUNE 30, 1989.

	MONTH												
VILLAGE	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	TOTALS
Kaktovik*			1	6	1	1							9
Atqasuk*				2									2
Barrow*		1	2	3		2			3	2	15	2	30
Nuiqsut*				1							1		2
Wainwright*				3	4	1					7		15
Point Lay					2								2
Point Hope					1	2	1	3			1		8
Kivalina								1					1
Shishmaref						12	11	1					24
Wales						6	2	1					9
Diomede					1	1	4		3				9
Savoonga						8	5				1		14
Gambell		1			5	7							13
TOTALS		2	3	15	14	40	23	6	6	2	25	2	138
PERCENT		1.4	2.2	10.9	10.1	29.0	16.7	4.3	4.3	1.4	18.1	1.4	100

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

Note: Percent details may not add to percent total due to rounding. Total bears in Tables 1 and 2 do not agree because some bears in Table 2 did not have a date of kill assigned.

harvest occurred primarily in the months of October-January (67 percent) and May (18 percent)(Table 2). The sex ratio of known sex animals was 70 percent males and 30 percent females. Age analysis is ongoing and will be reported next year.

Polar Bear Management Agreement, Beaufort Sea

The Service continued to provide technical assistance to the North Slope Borough in implementing terms of the Polar Bear Management Agreement (Agreement) for the Southern Beaufort Sea agreement area with the Inuvialuit Game Council of Canada.

Alaska villages party to the Agreement (i.e., Kaktovik, Nuiqsut, Barrow, Atqasuk and Wainwright) harvested 59 bears during the reporting period (Table 1). This was 41 percent of the state-wide take. The total harvest exceeded the guidelines established in the Agreement (i.e., 38) although the reduced number of female bears harvested was within sustainable limits. Harvests for one village equaled the 5-year average while harvests for the other villages exceeded this average.

Of the bears harvested by the five villages, the sex ratio of known sex animals was 86 percent male and 14 percent female (i.e., 36 and 6 bears, respectively). Sex was unknown for 17 bears harvested during this period. The harvest of females occurred in the months of October (5) and November (1).

An important segment of the harvest by the five villages, 23 of 59 bears (39 percent), occurred during spring whaling activities in May. Nuisance bears were present in whaling camps and hunter interviews indicate that at least 5 bears killed in May were taken due to the danger they presented. Further, at least 6 of 9 (67 percent) Kaktovik bears taken during the fall were killed in or near the village and may have presented a hazard to residents. A Wainwright hunter killed a single bear in the entry to his home during October.

The 15 bears harvested during October accounted for 25 percent of the take, although the kill was far below the availability of bears during this period; bears were abundantly available on or near shore from Kaktovik to Wainwright during this period. A substantial effort, as part of the Agreement, was made by hunters during the fall of the year to avoid taking bears. Tannery records were examined to determine the number of polar bear hides being tanned through conventional tanning processes. The following is an annual account of hides commercially tanned:

1989* (16)	1986 (38)	1983 (6)	1980 (13)	1977 (unk.)**
1988 (67)	1985 (37)	1982 (3)	1979 (13)	1976 (9)
1987 (47)	1984 (53)	1981 (13)	1978 (9)	

* Information for 1989 is partial.
** Unk. signifies that information is unknown.

A general unexplained upward trend in the number of hides commercially tanned was detected.

Management Planning

The Service began development of a management plan for polar bear in 1989. A wide diversity of interests are involved as planning team members, including representatives from wildlife conservation and protection organizations, oil and gas industry, Native individuals and organizations, hunting and guiding organizations, Alaska Department of Fish and Game, and other Federal agencies. Participatory development of the plan and subsequent endorsement is the desire of the Service.

The plan is expected to provide long-range guidance for management of polar bears in Alaska. One of many objectives submitted at a scoping meeting requested that the plan address United States conformance to the International Agreement on the Conservation of Polar Bears. A working outline and schedule of writing assignments has been developed. A wide latitude in the content of the plan has been discussed including future management options that would require amending the Act. Public review of the working document is projected for late 1990.

Incidental Take

Oil and gas development activity continues to increase and expand into new offshore areas important to polar bears. Shell is drilling exploratory wells during the open water period in the Chukchi Sea. Texaco plans to drill during 1991-1993. Portions of three stratigraphic test wells were drilled during the summer of 1989. Results of these and future wells are expected to determine presence of recoverable reserves of oil.

Conoco, BP-Exploration, ARCO, Chevron, Exxon and Amoco are the operators in the Beaufort Sea. Offshore deep water wells are drilled from drill ships during the open water season (Shell, Texaco, Amoco) and the shallow water wells are drilled from gravel islands or submersible caisson drilling structures during the fall to spring period.

Under terms of Section 101(a)(5) of the Act, industry may choose to petition the Service for the development of regulations and obtain letters of authorization to incidentally "take" small numbers of marine mammals, including polar bears, in the course of their activities. The effects of the activity on the species of stock must be judged to be negligible and not to have an unmitigable adverse impact on the availability of the species or stock for subsistence uses. The Service has urged industry to apply for the development of specific regulations. Shell Western E & P, Inc., is expected to submit a request in early 1990. Harassment and other takes occurring prior to issuance of specific letters of authorization are not authorized. Full implementation of polar bear detection and deterrent programs awaits the development of incidental take regulations. (Note: On March 30, 1990, Shell Western E & P, Inc., submitted an application to the Service for specific regulations and a letter of authorization concerning the incidental take of polar bears and walrus during the course of oil and gas exploratory activities in Alaska State waters or on the Outer Continental Shelf in the Chukchi Sea adjacent to the coast of Alaska.)

The following are oil and gas related activities that involve the Service: (1) provide review and comments upon future Outer Continental Shelf lease

sales; (2) advise Minerals Management Service on the development of operator stipulations to minimize effects of industry on polar bears or their habitat; (3) coordinate with the Alaska Department of Fish and Game in development of polar bear awareness and educational materials and on-site interaction plans for industry; (4) provide on-site training and instruction to industry employees on worker behavior in polar bear habitat; (5) provide comments to operators on draft exploration plans; (6) participate with the Northwest Territories of Canada and the Alaska Department of Fish and Game in an industry hosted bear detection and deterrent workshop; and (7) provide comments, through the Alaska Department of Fish and Game, on polar bear awareness and interaction plans of industry (the State of Alaska, Department of Natural Resources, requires that operators develop approved polar bear awareness materials and interaction plans).

Additionally, the Service participated with industry in polar bear encounter and behavioral monitoring studies at two off-shore exploratory wells, and provided polar bear den locations to the Alaska Oil and Gas Association to reduce the potential for disturbance.

Alaska Issues Meeting

The Service participated in the annual Canadian Polar Bear Technical Committee meeting held in February 1989 in Victoria, British Columbia. Areas of mutual concern and the shared Beaufort Sea polar bear populations were topics of discussion. Research and management reports by each jurisdiction and the exchange of preliminary study findings results were presented.

Two Soviet scientists participated in polar bear research and management activities in Alaska during April 1989. The scientists also visited the villages of Little Diomede and Shishmaref to discuss polar bear ecology and hunting with Alaska Native hunters.

The Service participated with the Marine Mammal Commission and the Alaska Department of Fish and Game in a meeting to follow-up on a January 24-25, 1989, Marine Mammal Commission sponsored workshop in Anchorage to consider oil and gas industry and polar bear/human interactions. The purpose of the workshop was to identify and recommend Federal agency actions and coordination with the State that should be taken to protect polar bears and their habitat in Alaska and adjacent areas. The Marine Mammal Commission's workshop report is in preparation.

Sea otters in Alaska. U.S. Fish and Wildlife Service photo by the Alaska Fish and Wildlife Research Center.

Sea Otter-Alaska

Management of sea otters in Alaska involved three principal concerns in 1989: (1) activity related to a proposed rule that would prohibit the taking of sea otters by Alaska Natives for creating and selling handicrafts and clothing; (2) sea otter-commercial fisheries interactions; and (3) response to the Exxon Valdez oil spill and assessment of acute and long-term damage to sea otter populations in Prince William Sound and other affected areas.

Rulemaking on Handicrafts and Clothing

The Service interprets the Native exemption clause of the Marine Mammal Protection Act as allowing Alaska Natives to take marine mammals for the types of handicrafts and clothing items commonly and traditionally created prior to passage of the Act. The intent of Congress in passing the Act was to preserve existing Native uses of marine mammals rather than to promote the expansion of Alaska Native arts and crafts industries or the creation of new industries.

On July 27, 1988, U.S. District Court Judge Holland urged the Service to clarify previous policy guidelines relating to Native take of sea otters for handicraft purposes. The Service published in the Federal Register on

November 14, 1988, (53 FR 45788), a proposed rulemaking to amend 50 CFR Part 18. The proposed rule would not affect Native take for subsistence purposes, but would clarify that otters could not be taken for the creation and sale of articles of handicrafts and clothing. In the February 15, 1989, Federal Register (54 FR 6940), the Service extended the comment period on the proposed rule to April 13, 1989. In the May 31, 1989, Federal Register (54 FR 23233), the Service gave notice that the comment period was further extended until November 30, 1989, to allow time for public meetings to be conducted in 10 coastal Alaska locations within the range of the sea otter. Interest in this issue outside the state of Alaska prompted the scheduling of a public meeting in California as well.

Public meetings were held in Atka, Sitka, Klawock, Unalaska, Cordova, Anchorage, Homer, Kodiak, Dillingham, and Seldovia, Alaska, and in San Francisco, California, with a total attendance of 243 people. Anchorage had the largest attendance with 55 people, followed by San Francisco with 46, and Homer with 29.

A total of 2,250 written comments were received; 1,248 commenters supported the rule. Approximately 96 percent of the supportive comments were from outside Alaska. A total of 34 organizations submitted comments in support of the proposed rule. Written comments against the rule numbered 1002; all but two were from individuals or organizations in Alaska. Approximately 700 of these comments were signed petition forms. During the comment period, 22 comments were received from organizations and 12 from governmental agencies opposing the proposed rule. The Service intends to make a decision on this issue in early 1990 with a subsequent rulemaking to follow. (Note: On April 20, 1990, the Service published an Interim Rule in the Federal Register, 55 FR 14973, to prohibit the taking of sea otters by Alaskan Natives for use in creating and selling handicrafts and clothing.)

Sea Otter/Commercial Fisheries Interactions

Field work was completed on a sea otter-commercial fisheries interaction study undertaken in the Cordova-Copper River delta area of Prince William Sound and jointly funded by the Service and the Sea Grant Marine Advisory Program, University of Alaska-Fairbanks. Objectives of the study (Sea Otter Abundance, Distribution, and Fishery Conflicts in Orca Inlet-Copper River Delta, Alaska) include: (1) documentation of rates of damage by marine mammals to netted fish and fishing gear; (2) assessment of incidental take of marine mammals in the salmon drift gillnet fishery; (3) documentation of the number and species of marine mammals taken and under what circumstances; (4) investigation of causes of mortality through necropsies of beached carcasses; and (5) development of means for reducing impacts between marine mammals and commercial fisheries. Data collected during the 1988 and 1989 field seasons demonstrate maximum monthly counts of otters increasing only slightly between 1988 and 1989. The eastward advance of otters across the Copper River delta is continuing with increasing numbers of animals utilizing certain driftnet areas in August and September. The weeks of peak otter presence in those driftnet areas did not coincide with peak driftnet activity. In areas where otter and driftnet activities overlapped, entanglement was usually avoided and mortality was low. Sea otter-driftnet overlap does not imply inevitable net encounter, entanglement or death. Sea otter pups appear more vulnerable to entanglement than do adults because of their relative inexperience with nets; sea otter-

driftnet conflicts were most frequent during months when maximum numbers of inexperienced animals were present. A small fraction of the driftnet fleet appears to be involved in driftnet-otter conflicts. Within the relatively high areas of conflict, less than one percent of vessels were involved in otter entanglements. The majority of sea otter mortality on the Copper River delta does not appear to result from driftnet fishing activities. The final report of this study will be available in 1990.

Exxon Valdez Oil Spill

Prince William Sound lies near the top of the 850 mile arc of the Gulf of Alaska that extends from the islands of southeast Alaska west to the Aleutian Islands. The Sound is one of the largest undeveloped marine ecosystems in the United States, and its many islands, bays, and fjords contribute to a shoreline which extends over 2,000 miles. On March 24, 1989, the oil tanker Exxon Valdez ran aground and ruptured its tanks on Bligh Reef, approximately 25 nautical miles southwest of the port town of Valdez. Eleven million gallons of North Slope crude oil spread throughout the southwest portion of the Sound and moved westward along the Kenai Peninsula, the Kodiak Archipelago and the Alaska Peninsula. Over 700 miles of shoreline were ultimately oiled.

The Service coordinated and oversaw response - cleanup activities related to the sea otter. Goals of this effort included: (1) providing guidance and assistance to Exxon and its contractors as appropriate; (2) ensuring that those engaged in sea otter capture and handling were covered by proper authorizations; and (3) ensuring that Exxon's efforts were commensurate with the threat to sea otter populations. The capture effort in the Sound commenced on March 27, 1989, with the use of two Exxon-chartered fishing vessels and intermittent access to an Exxon-chartered helicopter. Two more vessels staffed with California sea otter biologists and a second helicopter based in Seward were chartered on April 1, following Exxon's request for additional assistance. This effort expanded to a peak of 14 capture crews and associated air support out of Valdez, Seward, Homer and Kodiak as the oil spread beyond the Sound.

During the initial days of the spill, oil-affected otters moved out of the water and onto shoreline rocks and beaches in an attempt to warm themselves and groom. Many were already hypothermic and suffering the effects of heavy exposure to oil. Animals in such condition were captured by dip nets and held in a variety of enclosures (wooden crates, airline dog kennels, seiner fish holds) prior to transfer to rehabilitation centers. Other otters, not as severely oiled and still in the water, were netted and transferred to rehabilitation facilities as soon as possible. By the end of December 1989, 876 otters had been retrieved dead from the field; of 357 oiled otters retrieved alive and taken to rehabilitation centers in Valdez, Seward, Homer and Kodiak, 123 had died. Most of the detected mortality occurred in western and southwestern Prince William Sound and along the Kenai Peninsula. The deaths occurred from hypothermia, severe liver and kidney damage from ingesting oil, and emphysema from inhaling toxic aromatic compounds from the oil.

During the first six months following the oil spill, 37 otters were transported from Alaska to aquaria in the United States and Canada. Six otters were to be shipped to Sea World San Diego on April 3; one otter died at

the Anchorage International Airport. Four of the five surviving otters ultimately died at Sea World. Two otter pups shipped to Monterey Bay Aquarium survived and were eventually transferred to Vancouver Aquarium in British Columbia, Canada. On April 14, six otters were sent to Point Defiance Aquarium in Tacoma, Washington. Two otters died, and one was subsequently transferred to Sea World San Diego. On April 17, six more otters were shipped to Vancouver; two of those animals died. Four additional otters were sent from Alaska to Sea World San Diego on August 10, and on September 11, 13 pups were sent to an intensive-care facility at Point Defiance Aquarium. Two pups subsequently died at that facility, four pups were transferred to J.G. Shedd Aquarium in Chicago in late October 1989, and three pups were sent to Sea World San Diego. (Note: As of February 1, 1990, 25 otters remained alive in aquaria throughout North America: nine otters at Sea World San Diego, six otters at Point Defiance Aquarium, six otters in Vancouver, and four otters at Shedd Aquarium.)

In response to the oil spill, combined sea otter and marine bird surveys were initiated in Prince William Sound. The objectives of the study were: (1) to determine the effects of oil on sea otter densities and distribution in Prince William Sound; (2) to determine the net change in the otter population in the Sound relative to pre-spill abundance estimates; and (3) to estimate the size of the otter population in the Sound as a baseline for monitoring future population trends.

Three boat-based surveys were conducted in June, July and August 1989. Shoreline transects were sampled in a manner consistent with pre-spill surveys conducted in 1984-1985. Systematic surveys of offshore waters were also conducted in July and August. A winter survey of shoreline and offshore waters is scheduled for March 1990.

Walrus

Population Surveys

Cooperative surveys of the Pacific walrus population have been conducted by the United States and the Soviet Union every five years since 1975 with the next survey planned for August-September 1990. In July 1989 Service biologists and cooperators from the University of Maine worked with Soviet scientists in joint studies to test proposed improvements in survey design, methodology, and aircraft along the Chukotsk Peninsula and over the Chukchi Sea. Discussion of aerial survey methodology, timing and location for the 1990 joint census was held in October in Anchorage. At that meeting it was agreed that further meetings would be held in early 1990 in Khabarovsk, USSR, and Seattle, Washington, to further refine final details of survey design and logistic requirements.

Habitat Issues

In 1987 and 1988, the number of walrus hauling out at two locations in northern Bristol Bay (Round Island and Cape Pierce) during the non-breeding season declined substantially; in some areas by more than 60 percent. Observers on Round Island, Walrus Islands State Game Sanctuary, reported that noise generated by the yellow-fin sole fishing fleet (which began operating in the area in 1987 and continued in 1988) was quite loud, even from vessels as

U.S. Fish and Wildlife Service biologists (bottom, right of center) studying walrus in Alaska. U.S. Fish and Wildlife Service photo.

far as 5 to 10 miles from the Island. Based on this observation the Service, the Alaska Department of Fish and Game, the Eskimo Walrus Commission and other groups worked with the North Pacific Fishery Management Council (Council) to propose seasonal closures that would restrict yellow-fin sole fishing within various distances from walrus haulout sites in northern Bristol Bay. In December 1989, the National Marine Fisheries Service published a final rule implementing an amendment to the North Pacific Fisheries Management Plan to close a 12 nautical mile area around Round Island, the Twins, and Cape Peirce to fishing for yellow-fin sole for the 1990 and 1991 seasons. No fishing for yellow-fin sole occurred in the northern Bristol Bay region in 1989 because the industry reached its quota elsewhere earlier in the season. Interestingly, the number of walrus using Round Island was nearly double that reported in previous years; walrus numbers remained low at Cape Peirce. During this period the Service, with assistance provided by the Council, field tested techniques for monitoring potential acoustic affects of the closures on walrus in this region. The Service plans to continue cooperative programs to monitor walrus numbers at Bristol Bay haulout sites in 1990, and is considering options for more detailed studies in the 1991 season.

Management Planning

The Service began development of a long-range Walrus Management Plan. A planning team, comprised of representatives from the Alaska Department of Fish and Game, the Eskimo Walrus Commission, the oil and gas industry, the fishing industry, the conservation community, and various experts in walrus biology, met in March. The team developed a draft outline for the plan and a preliminary task schedule for completing the plan. Progress on the plan was delayed considerably because many team members were detailed to work on various aspects of the Exxon Valdez oil spill.

Harvest Monitoring

The Service continued to monitor the spring walrus harvest in six villages in the Bering Sea (Table 3). The number of walrus retrieved by Alaskan Natives in these villages totaled 489 animals (251 males, 156 females, and 82 calves). Biological samples were acquired through the village harvest monitor program; these samples will be analyzed for reproductive, contaminant and age determination data as part of a continuing assessment of the structure of the harvest and condition of the animals. A preliminary review of the Service's walrus harvest monitoring program from 1980-1989 was conducted and presented in a poster session at the Eighth Biennial Conference on the Biology of Marine Mammals. The 1989 harvest was the lowest in the 10-year period reviewed and about 80 percent below the 10-year mean harvest of 2,483 animals. A late, but rapid breakup of ice in the northern Bering Sea resulted in a very short spring hunting season in 1989. Walrus generally were unavailable to hunters as animals traveled north toward the Bering Straits through areas offshore of the ice-blocked hunting villages. Data collected through the Service's Marking, Tagging and Reporting Program indicated that additional walrus were taken primarily from mainland-coastal villages during the fall 1989. The Service is presently revising the sampling design of the village harvest monitoring program and the Marking, Tagging and Reporting Program to improve accuracy of total annual harvest estimates.

Marking, Tagging and Reporting Program

An amendment to the Marine Mammal Protection Act in 1981 provided the Service with authority to promulgate regulations establishing a Marking, Tagging and Reporting Program for marine mammals harvested by Alaska Natives. Final regulations were published on June 28, 1988, and became effective on October 26, 1988. This action assists the Service in monitoring the subsistence and handicraft/clothing harvest of polar bear, sea otter and walrus, and in obtaining essential biological data necessary to manage these species. The rule should also help control the illegal take, trade and transport of specified raw marine mammal parts. Coastal Alaska Natives (Eskimo, Aleut and Indian) are now required to report their harvest of polar bear, sea otter and walrus, and to present the skulls and skins of polar bears and sea otters and walrus ivory tusks within 30 days of harvest to a designated Service representative for marking and tagging. As often as practical, these taggers are Native village residents who are under contract with the Service to provide information including date and place of kill, sex, age, tag numbers, date of tagging and tagging location. A tooth is extracted from bear and otter skulls for age determination, and measurements of skull length and width

are recorded. Length and circumference measurements are recorded for walrus tusks.

Specified parts including skulls and hides of sea otters and polar bears and walrus tusks taken between December 21, 1972, and October 26, 1988, and which had not yet been converted into Native handicrafts or clothing were required to be marked and tagged by May 1989.

The Marking, Tagging and Reporting Program has 86 trained taggers located in the following 67 listed locations throughout coastal Alaska: Adak, Akhiok, Akutan, Anchorage, Atka, Barrow, Bethel, Brevig Mission, Chenega Bay, Chevak, Chignik, Clarks Point, Cold Bay, Cordova, Craig, Dillingham, English Bay, Fairbanks, Gambell, Goodnews Bay, Homer, Hoonah, Hooper Bay, Juneau, Kaktovik, Kenai, Ketchikan, King Cove, King Island, King Salmon, Kivalina, Kodiak,

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

TABLE 3. NUMBERS OF WALRUS RETRIEVED BY ALASKAN NATIVES IN THE SPRING HUNT AS OBSERVED IN THE U.S. FISH AND WILDLIFE SERVICE HARVEST MONITORING PROGRAM (SEAGARS ET AL. 1989).

VILLAGE	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Gambell	556	961	942	642	1,499	949	816	1,241	888	297
Savoonga	456	662	167	624	1,011	580	607	233	87	90
Little Diomede	709	808	558	166	1,043	1,208	759	334	700	49
Wales	68	128	119	67	271	521	131	115	110	52
Nome-King Island	500	759	717	637	157	271	336	154	140	1
TOTALS	2,289	3,318	2,503	2,136	3,981	3,529	2,649	2,077	1,925	489

Kotzebue, Larsen Bay, Little Diomede, Manokotak, Mekoryuk, Naknek, Nikolski, Nome, Nuiqsut, Old Harbor, Perryville, Pilot Point, Platinum, Point Hope, Point Lay, Port Graham, Port Heiden, Port Lions, Quinhagak, Saint Paul, Sand Point, Savoonga, Seldovia, Seward, Shishmaref, Sitka, Stebbins, Tatitlek, Togiak, Unalakleet, Unalaska, Wainwright, Wales, Yakutat and Yoksook Bay. Of the 86 trained taggers, 64 are Alaskan Native village residents, 3 are non-natives living in villages, and the remaining 19 are Service employees working at Service field stations.

During 1989, extensive travel and numerous meetings and training sessions were necessary to introduce and explain the new regulations to Alaskan Natives. During the first year of implementation, the Marking, Tagging and Reporting Program enjoyed a good level of acceptance and compliance. It is the responsibility of the hunter or possessor of the harvest specified parts to present them for reporting and tagging. However, a major factor in determining the level of compliance lies with the individual resident tagger and the amount of time and effort he/she is willing to exert on behalf of the program. A few hunting seasons and possibly some law enforcement may be required to achieve full compliance. Other factors or elements of implementation that have contributed to the success of the Marking, Tagging and Reporting Program include:

(1) close coordination and frequent updates with Native leaders including the Eskimo Walrus Commission, North Slope Borough Department of Wildlife Management, the Sea Otter Commission, Kodiak Native Association, Tlingit and Haida Tribal Councils, Alaska Department of Fish and Game, and marine mammal specialists throughout Alaska;

(2) a high level of support and encouragement by the above-mentioned agencies. These organizations were very influential in providing names for potential taggers, in distributing Marking, Tagging and Reporting Program information, and in providing other assistance as necessary;

(3) extensive exposure and travel by the Marking, Tagging and Reporting Program Coordinator to coastal villages to conduct meetings and training sessions to introduce the new program;

(4) extensive advertisement and coverage of the Marking, Tagging and Reporting Program by the media, including newspapers, television and radio, and special bulletins, video tapes, and hundreds of large and small posters at village stores, airports, post offices and other public buildings;

(5) quarterly distribution of a Marking, Tagging and Reporting Program Newsletter to all taggers and specified Native leaders containing timely articles and information concerning the program, answers to commonly asked questions, and other pertinent information; and

(6) payment for services rendered. Each contract tagger that provides service to the Marking, Tagging and Reporting Program receives a minimum payment, or is reimbursed for the individual items tagged, whichever is greater.

Continued success of the Marking, Tagging and Reporting Program and increased compliance will depend on frequent Service presence in villages, continued development of information and education and news media materials, continued coordination with and cooperation from Native leaders, village residents, contracted taggers, the hunters themselves, and feedback on how collected data are being used in marine mammals management activities.

Harvest data have been collected from 46 villages. Several villages collect information on both walrus and polar bear and a few locations are reporting harvest figures for both walrus and sea otters.

Sea otter hunters have reported a total of 763 otters, of which 448 are prerule (animals taken between December 1972 and October 1988). Harvest summaries for sea otters reported are shown in Table 4 and Figure 1. A majority of otters harvested by the Alaskan hunters are male, probably because of their larger size and the hunters' reluctance to kill females with pups.

A total of 1,807 walrus have been reported harvested (Table 4 and Figure 2) as follows: 1,197 adults, 154 subadults, 28 calves and 428 unknown age animals. (Note: The marking and tagging information is for the State-wide harvest while the walrus harvest monitoring program is for the spring hunt in selected villages). No walrus tusks were tagged in Calendar Year 1988 because contract village taggers had not been recruited.

The Service has collected polar bear harvest information since 1980, based on a harvest year from July 1 to June 30 (see "Polar Bear" section of this report). During Calendar Year 1988, 152 polar bear were tagged by the Marking, Tagging and Reporting Program (Table 4 and Figure 3). The harvest data for 1989 are incomplete.

TABLE 4. SUMMARY OF THE TOTAL NUMBER OF ANIMALS TAGGED IN THE MARKING, TAGGING AND REPORTING PROGRAM AS OF DECEMBER 31, 1989.

YEAR	SEA OTTERS	WALRUS	POLAR BEARS
Pre-Rule[1]	448	1,057	23
1988	52	0	152
1989	263	750[2]	75[2]
TOTALS	763	1,807	250

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

Sea Otter-Southern

The southern sea otter in California is an extant population of the species that once ranged throughout the northern and eastern Pacific Coast. In the mid-1700's, the sea otter was recognized as a valuable fur-bearing 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

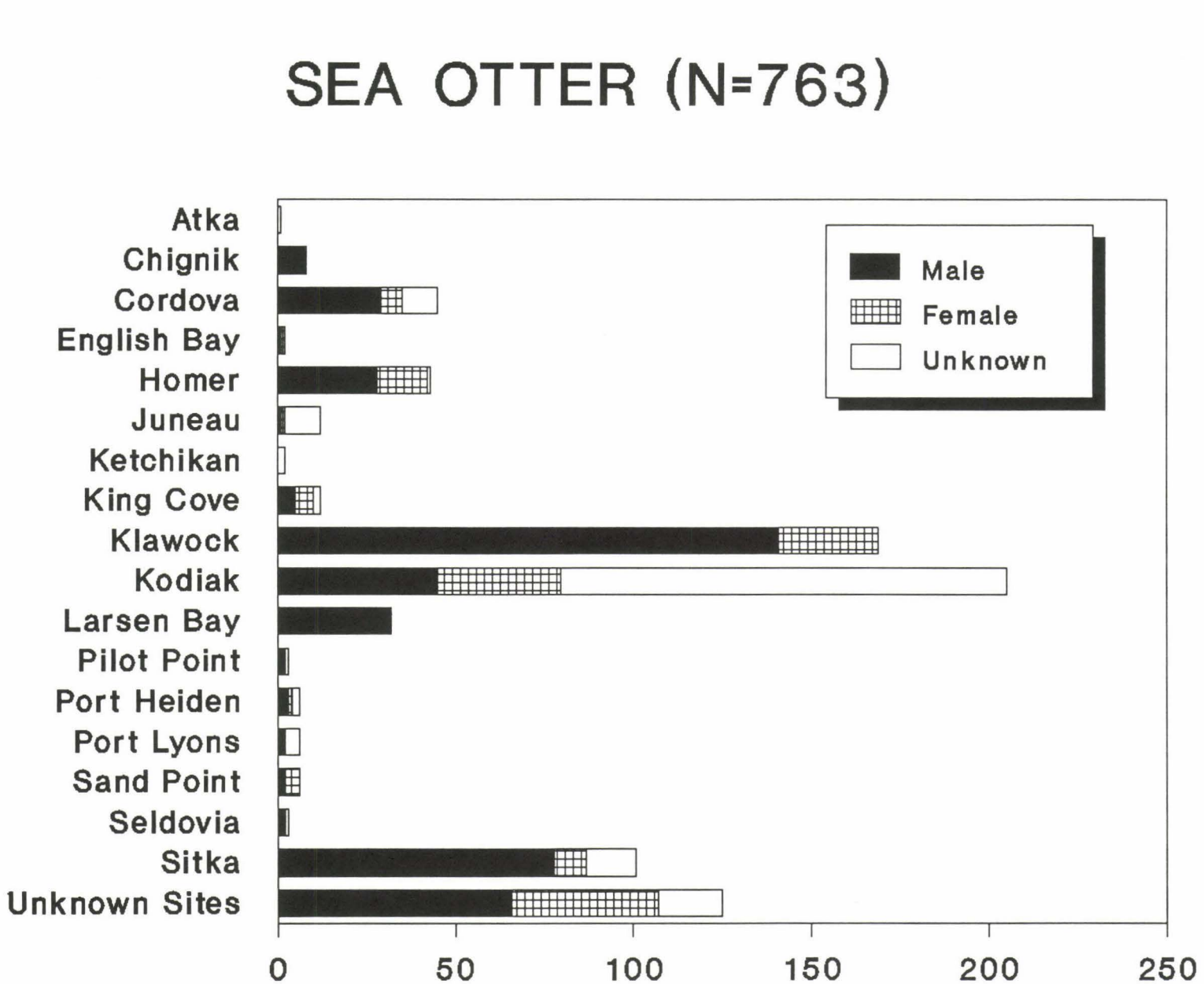


Figure 1: Villages where sea otters were harvested through 1989.

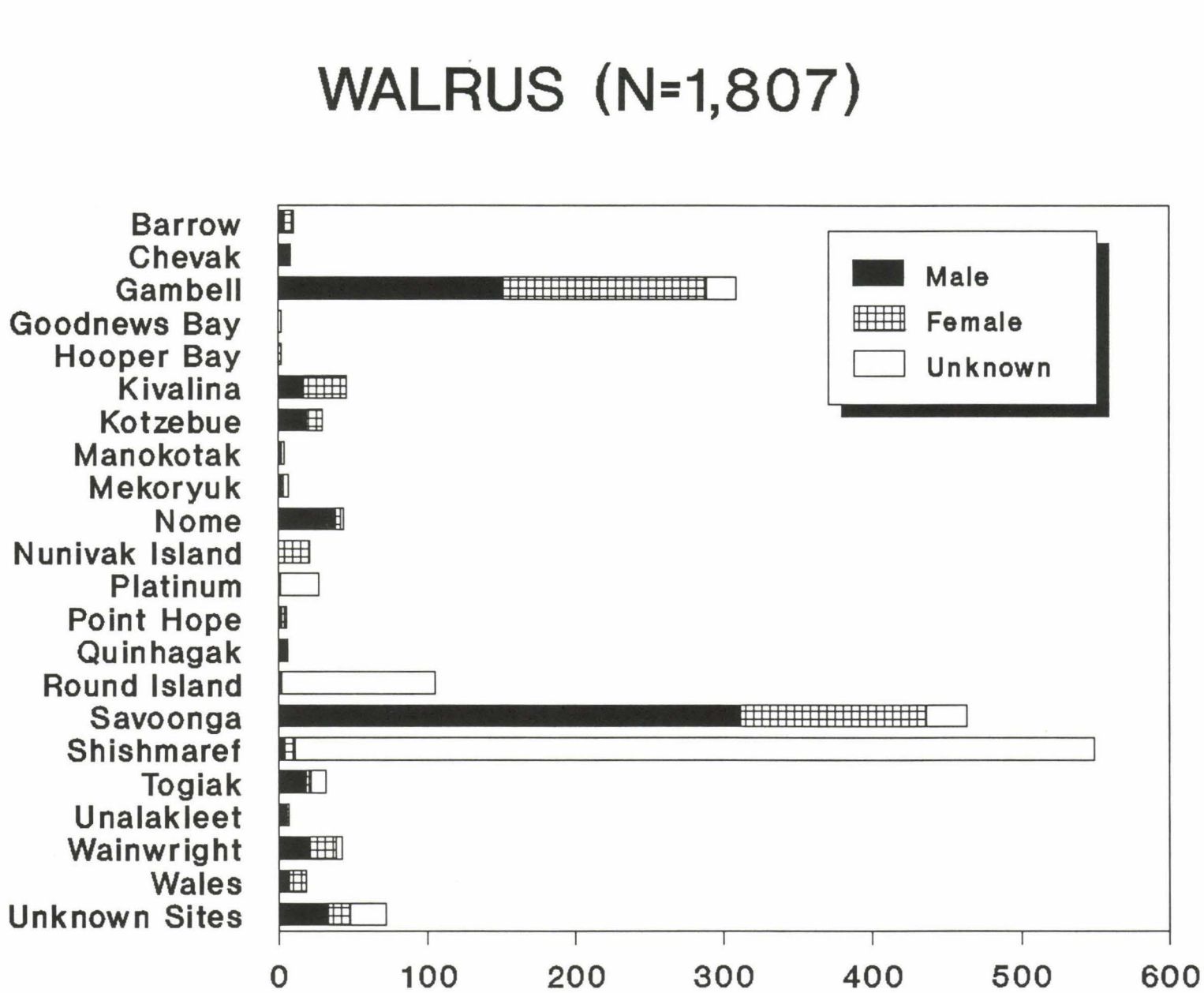


Figure 2: Villages where walrus were harvested through 1989.

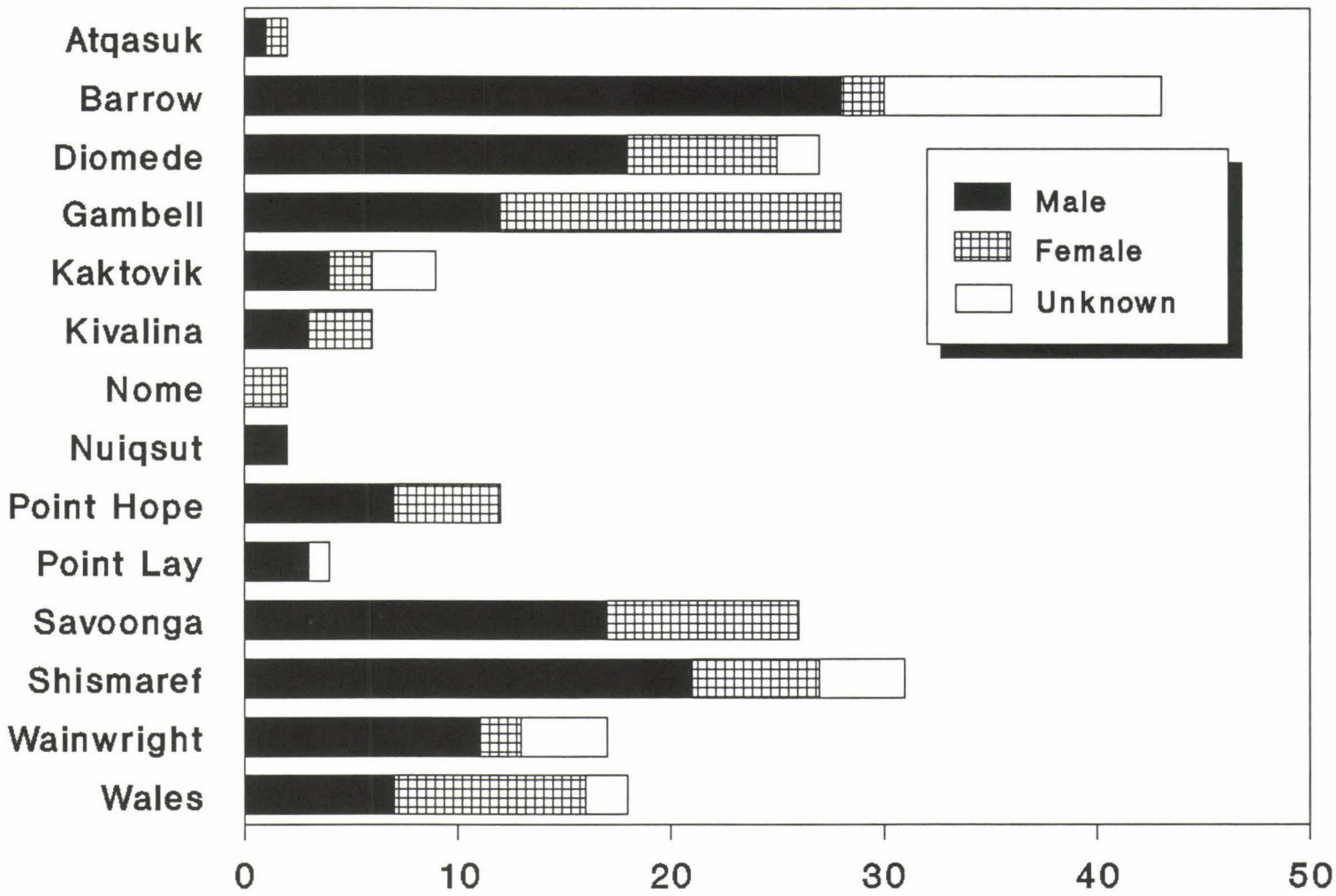


Figure 3: Villages where polar bears were harvested through 1989.

A watchful sea otter. U.S. Fish and Wildlife Service photo by Mike Boylan.

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, the British Columbia and Baja populations by 1920 had also been extirpated.

In 1913, the California State Legislature protected the sea otter from exploitation, although there were apparently very few sea otters left in California. 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 1970's and mid-

1980's, little or no growth in numbers was observed, although the range had 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. The primary reasons for the southern sea otter listing were its greatly reduced population size and limited distribution along the central California coast. An additional reason for listing was the potential threat of oil contamination, accidently spilled from tanker traffic which has been increasing along California's central coast. The sea otter is physiologically vulnerable to being oiled. Oiled fur loses its ability to insulate against the cold ocean water, and this loss of insulation results in hypothermic shock and often death. (Note: The Exxon Valdez oil spill has demonstrated that sea otters are also at significant risk of death from ingestion of petroleum hydrocarbons or inhalation of the oil's toxic aromatic compound vapors.)

The California Department of Fish and Game (Department) and the Service again conducted spring and fall surveys in 1989. 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 5). The 1989 fall count was also the highest fall count to date. 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 increased dispersement throughout the range and to the greater abundance of bull kelp during the fall, which obscures some otters. In the spring, when the sea otters are less dispersed and there is little bull kelp to obscure them, 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 level.

Public Law 99-625 provides the authority and establishes the guidelines for carrying out the translocation program. The Final Environmental Impact Statement and rulemaking were distributed by the Service in May 1987. The final rule establishes the boundaries of a Translocation Zone where otters would be translocated and given protection similar to that of the parent population, and it also establishes a Management Zone which would 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

TABLE 5. COMPARISON OF SOUTHERN SEA OTTER COUNTS CONDUCTED SINCE THE SPRING OF 1982.

SEASON	NUMBER OF INDEPENDENT OTTERS	NUMBER OF PUPS	TOTALS
1982 Spring	1,124	222	1,346
Fall	1,194	144	1,338
1983 Spring	1,131	120	1,251
Fall	1,082	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

* California Department of Fish and Game aerial survey with ground truth stations.

form of zonal management, as recommended by the Marine Mammal Commission (Commission) in 1980.

Analysis of data obtained during the initial year of the translocation program 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's 1988 Annual Report to Congress.

In June of 1989, near the end of the second year of the translocation program, 20 sea otters remained of the 103 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. 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, the Department's sea otter program, the National Marine Fisheries Service, and the Commission staff.

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 Department effectively coordinated the capture, transport and release of sea otters. 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 (Aquarium) where they were held for observation and examined by an experienced sea otter veterinarian. All otters were held a minimum of one day to monitor their behavior and minimize stress. From the aquarium, the otters were flown by charter plane directly to the Island and released.

Status of Colony

One hundred and thirty-five sea otters (31 males and 104 females) were translocated to the Island during the period August 24, 1987, to November 30, 1989. As of early December 1989, the disposition of 40 sea otters that are no longer at the Island is known or suspected as follows. Twenty-seven sea otters left the Island and returned to the parent population. Two 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. By November 1989, only 12 otters were known to remain at the Island leaving 83 otters unaccounted for (See Table 6).

Summary of Mortality and Natality

During the calendar year covered by this report, there were five sea otter mortality reports within the Management Zone. Three carcasses were recovered, two near Newport Beach and one in San Diego. Carcasses were not found for the remaining two reports. Necropsies were performed on all three and the cause of death was reported as unknown. Incidental drowning in fishing gear is suspected in some of the cases. A total of five pups are known to have been born on the Island. During the third translocation year, three pups were observed on the Island. In two cases, the mother and pup were observed for several days, after which the mother was seen alone. The pups are assumed to

be dead. As of the end of December 1989, one dependent pup was still observed on the Island.

Containment

The containment program is designed to prevent sea otters from colonizing the Management Zone through a cooperative effort between the Service and the Department. Surveys continue to indicate that no sea otter colonies are being established in the Management Zone. The containment operation, as outlined in the Translocation Plan and the Service's Containment Plan, consists of three interrelated and interdependent activities; surveillance of the Management Zone, the capture of sea otters in the Management Zone, and post-capture relocation.

During the period covered in this report, the Service received 31 potential sea otter sightings from individuals and Government agencies. Sea otters were verified in the Management Zone for 25 reports. Six reports were not verified due to the length of time since the original observation. Capture efforts were initiated on three occasions, one was a successful capture and two capture efforts were cancelled by weather. Eighteen sightings involved sea otters either leaving the area prior to the arrival of the capture team or moving through the Management Zone. These animals have apparently left the Management Zone. The remaining four reports were duplicated sightings of sea otters already reported.

Twenty-one surveys were conducted in search of sea otters. There were 10 aerial surveys, 9 vehicle surveys and 2 boat surveys. Based on the results of these surveys and reports from the public, the Service concludes there are no colonies of sea otters becoming established in the Management Zone. The Cojo Cove and the Point Conception areas continue to be the site of movement of otters back and forth across the Management Zone boundary. Nine of the sightings were reported from the Cojo Cove area.

Law Enforcement

Concern for the welfare of southern sea otters has warranted law enforcement activities. Sea otters have been intentionally harassed, shot, clubbed, and drowned in legally and illegally set commercial fishing gear in past years.

Since 1987, the Service has employed two Wildlife Officers specifically for law enforcement and containment needs associated with the Service's sea otter translocation program. These officers monitored sea otter activity and boat traffic around the Island using Questar telescopes from shore and rigid-hull inflatable boats when patrolling near-shore waters. Occasional patrols of the surrounding Management Zone were conducted with the Service vessel "M/V Sea Otter." Contacts were made with commercial and recreational boat operators to solicit cooperation and discourage adverse interactions with sea otters. The Service's research biologists on the Island have also monitored boat activity in areas where sea otters were located.

There has been little evidence to indicate any malicious activities directed towards sea otters on the Island. This is probably the result of surveillance activities and patrols around the Island. Another reason may be that otters

TABLE 6. FATE SUMMARY OF SEA OTTER INTRODUCTION TO SAN NICOLAS ISLAND, NOVEMBER 30, 1989.

CUMULATIVE NUMBER	YEAR 1 (11 AUG 87 THROUGH 11 AUG 88)	YEAR 2 (12 AUG 88 THROUGH 11 AUG 89)	YEAR 3 (12 AUG 89 THROUGH 30 NOV 89)
Identified at SNI in last month of period ((% of cumulative total taken to Island))	16 ((23.2%))	35 ((28.0%))	12 ((8.9%))
Returned to Mainland	13	20	27
Population (Male/Female)	(3/10)	(4/16)	(6/21)
[Adult.Juvenile, 35 lbs]	[8/5]	[9/11]	[13/14]
Returned to mainland & captured	1	1	2
	(0/1)	(0/1)	(0/2)
	[1/0]	[1/0]	[2/0]
Died at San Nicolas Island	3	3	3
	(3/0)	(3/0)	(3/0)
	[1/2]	[1/2]	[1/2]
Died at mainland	2	2	5
	(0/2)	(0/2)	(0/5)
	[2/0]	[2/0]	[4/1]
Died in fishing gear	3	3	3
Subtotals	38	64	52
Taken to Island	69	125	135
Fate unknown	31 ((44.9%))	61 ((48.8%))	83 ((61.5%))

tend to disperse as boats move into their area and therefore are not easy targets.

Incidental harassment of translocated otters continued to be a concern. Vessel activity around the Island ranged between 0 and 14 sport and commercial fishing boats. Sea otters on the Island often reacted to the presence of boats working nearby. This type of disturbance was most prevalent during fall with the opening of lobster season. Also, in the fall of 1989, sea urchin boats, driven by poor weather conditions in Northern California and high sea urchin prices, came to the Island. Good weather conditions combined with increased boat traffic increased in incidental interactions between sea otters and boats. It is unknown whether this type of disturbance has contributed to dispersal of otters from the Island, but it may be a significant factor in contributing to sea otter dispersal.

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.

On February 2, 1989, commercial sea urchin divers were observed shooting from their boat by both a Service officer and the Department wardens. The divers admitted to shooting and were informed of the State regulation prohibiting the use of firearms in the Translocation Zone. Two weapons were seized by the Department wardens, and citations were issued for violation of commercial fishing regulations.

Early in 1989, three persons were successfully prosecuted in Federal Court for a shooting incident involving sea otters near Cayucose, San Luis Obispo County, in August of 1987. Of 92 sea otters found dead this year in the mainland range (Point Ano Nuevo to Purisma Point), at least 3 died of gunshot wounds. Information about any otter suspected of dying from illegal activities was turned over to State and Federal agents for investigation.

Incidental Take Within the Mainland Range

Several sources of direct and indirect evidence indicate that incidental drowning of sea otters in gill and trammel entangling nets has been, and continues 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. Three observers made shore-based observations of gill net fishing activities from Monterey to Morro Bay. Eleven sea otters were reported to be killed in these nets in 1989. Emergency closures of certain areas resulted from these reports.

The State of California imposed emergency closures and protective legislation appears to have reduced the number of otters entangled in legally set nets, but no conclusion can yet be drawn on whether, or how much the population growth rate will change. Department biologists estimate that in spite of current legislation, at least 25 otters become entangled and drowned annually in nets that are set legally. The Service's evaluation of the incidental take issue (Biological Opinion to the National Marine Fisheries Service, 1989) concluded that gill and trammel net fishing for halibut in 30 fathoms or less would result in the likely take of sea otters wherever the fishing activity overlapped sea otter distribution.

ln summation, from June 1982 to December 31, 1989, a total of 64 otters were observed drowned or otherwise known to have drowned in commercial fishing nets; 6 in 1982, 8 in 1983, 16 in 1984, 12 in 1985, 3 in 1986, 5 each in 1987 and 1888, and 11 in 1989.

Section 7 Consultations

Pursuant to Section 7 of the Endangered Species Act, 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 1989, the Service completed one formal interagency Section 7 consultation involving the sea otter in California. That Opinion was issued to the

National Marine Fisheries Service evaluating the proposed commercial fishing exemption program implementing the 1988 amendments to the Marine Mammal Protection Act. The Opinion concluded that gill or trammel net fishing for halibut and trap fishing for lobster in water depths of 30 fathoms or less throughout the sea otter range would result in the likely take of sea otters. The Service recommended that wherever these fisheries overlapped with sea otter distribution (except the Management Zone), authorized fishing be restricted to water depths greater than 30 fathoms. In the case of lobster fishing, the Service also recommended an alternative to the fishing depth restriction involving the development of a sea otter exclusion device for lobster traps. The Service strongly recommended these restrictions be in place by the time the exemption program was initiated.

The Service is currently in formal Section 7 consultation with the U.S. Coast Guard 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 will be considering oil spill risk to sea otters (and other listed species) from vessels, especially oil tankers and barges. In 1989, the Service also completed one formal interagency Section 7 consultation. This Opinion (1-6-90-FW-1) was issued to the Assistant Director, Fish and Wildlife Enhancement, Washington D.C., from the Acting Regional Director, Region 1, Portland, Oregon, and evaluated the proposed surgical implantation of radio transmitters in up to 20 sea otters scheduled for translocation on the Island. The Opinion concluded that the otters would not likely be jeopardized by the proposed implants.

The Service issued one conference report to the U.S. Navy. This report (1-6-88-TA-144) evaluated a proposed project which involved the testing of target accuracy of missiles launched by aircraft from the Pacific Missile Test Center, Point Mugu to the Island. The report recommended several mitigating measures to avoid adverse affects to the sea otters.

Section 6

The Service provides funding for sea otter conservation to the California Department of Fish and Game (Department) through Section 6, Grant-in-Aid to the States, of the Act. The Department uses these funds to obtain an index of sea otter mortality and to determine the 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 Department cooperates with the Service in the capture operations for translocation and containment and in conducting spring and fall population counts discussed earlier. In addition, Department biologists conducted bimonthly aerial censuses of the range peripheries to determine changes in distribution and seasonal abundance.

West Indian Manatee

The Florida Department of Natural Resources continued the Manatee Salvage/Necropsy Program. A total of 174 dead manatees was collected in 1989

in the southeastern United States. Florida accounted for 166 cases, and 8 occurred in Georgia. Causes of death were categorized as collisions with boats or barges (52), crushing or drowning in locks or canal gates (3), other human-related (5), perinatal (37), other natural (32), and examined but undetermined (42). In addition, 4 dead manatee reports were verified, but the carcasses were not recovered. Total mortality and boat/barge-related mortality were higher than any year since the salvage/necropsy program was

A boat-killed West Indian manatee. U.S. Fish and Wildlife Service photo.

first started by the Service in 1974. Thirty percent of all manatee deaths in 1989 were attributable to boat/barge collisions, and 34 percent of the manatee deaths were human related.

Fourteen injured manatees were rescued for rehabilitation during 1989; seven died, two were released, and the remaining five were held for further observation.

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. With a population increasing at a rate of over 800 residents a day, Florida recently became the fourth most populous State in the Nation. By the year 2000, it is

expected to rank third. 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.

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 in the last 3 years.

Problems resulting from the ever-expanding population of boaters cannot be addressed through one agency's actions or by isolated, small-scale initiatives. This year the Florida Department of Natural Resources, with the Service's assistance, proposed and implemented a broad range of specific actions to protect the manatee and its habitat. These include new boat speed zones (including statewide maximum speed limits), preserve areas, habitat protection, awareness and education programs, and mechanisms for coordination with other governmental entities and interest groups.

The Service provides funding for manatee conservation to the Florida Department of Natural Resources through Section 6, Grant-in-Aid to the States, of the Act. 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 powerboat 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.

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.

On May 2, 1989, the Florida Manatee Recovery Team completed the revision of the Florida Manatee Recovery Plan which was originally approved on April 15, 1980. It has been approved by the Service and delineates reasonable actions believed required to place the species in the best possible position for recovery.

Radiotelemetry field work on manatees continued on Florida's eastern coast. Twenty-one manatees were radio tracked during 1989. 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 1989, satellite-monitored platform terminal transmitters (PTTs) were used on 12 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.

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 continued. This research is a cooperative effort by the Service, the National Marine Fisheries Service, and the Florida Department of Natural Resources. Light sampling designs and seagrass productivity, distribution, biomass and species composition investigations were implemented. Manatee grazing impacts were studied in winter 1988-89.

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 1989. Stomach content analyses for manatee food habit studies also continued and provided the Service and cooperators with valuable information on food types and preferences.

Condemnation proceedings to acquire approximately 13 acres of water bottoms adjacent to the Crystal River National Wildlife Refuge for a manatee sanctuary were filed in Federal Court in 1986, and the case was finally adjudicated in December 1988. The Court awarded the owner $15,000 for the water bottoms, eliminating the need to annually lease them during the winter months to provide critical warm water refugia and an inviolate sanctuary in Kings Bay, Crystal River, Florida. The condemnation was finalized on January 4, 1989.

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.

The Service and the State of Florida intensified habitat protection efforts in 1989, and committed to vigorously pursuing habitat acquisition projects in the Crystal River area. The State completed plans under its Conservation and Recreational Lands Program to acquire 150 acres of land surrounding the warmwater spring at the head of the Homosassa River. The Service completed its planning efforts to acquire approximately 3,000 acres at the mouth of the Homosassa River adjacent to the Chassahowitzka National Wildlife Refuge, and with a $650,000 add-on appropriated by Congress purchased a site for the manatee interpretive/education center. The site contains 3.3 acres including two waterfront lots, a residence and a boat shed.

A major portion of the Crystal River National Wildlife Refuge staff's time in 1989 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 increased from 99 in 1987-88, to 134 in 1988-89.

Dugong

The collaborative dugong research with biologists at James Cook University of North Queensland, Townsville, Australia, has been completed. Techniques were developed for tracking individual dugongs using buoyant, tethered, conventional and satellite radio transmitters, and applied to six dugongs caught off the North Queensland coast. The dugongs were caught by bull-dogging or hoop-netting and tracked for between one and 16 months. All spent most of their time in the vicinity of inshore seagrass beds using overlapping home ranges of 4 to 23 square kilometers. These results support the Great Barrier Reef Marine Park Authority's policy of conserving dugongs by giving a high level of protection to some inshore seagrass beds that support large numbers of animals. A full report on this dugong research, entitled "Development and application of conventional and satellite radio-tracking techniques for studying dugong movements and habitat use", will be published in early 1990 in the journal, "Australian Wildlife Research."

Hawaiian Monk Seal

The Service cooperates regularly with National Marine Fisheries Service 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. As part of production and population surveys, Service biologists worked with National Marine Fisheries Service 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.

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.