

Administration of the Marine Mammal Protection Act of 1972

Annual Report

January 1, 1996 to December 31, 1996



**U.S. Department of the Interior
U.S. Fish & Wildlife Service
U.S. Geological Survey/
Biological Resources Division**

Marine Mammal Protection Act

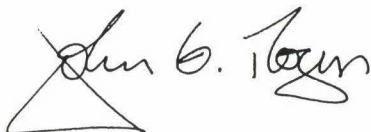
Report of the Department of the Interior

The Marine Mammal Protection Act of 1972 (16 U.S.C. 1361-1407, 86 Stat. 1027 (1972)), as amended (95 Stat. 979 (1981), 98 Stat. 440 (1984), 100 Stat. 3741 (1986), 102 Stat. 4755 (1988), and 108 Stat. 532 (1994)), states in Section 103(f) that:

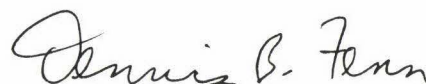
“Within six months after the effective date of this Act [December 21, 1972] and every twelve months thereafter, the Secretary shall report to the public through publication in the Federal Register and to the Congress on the current status of all marine mammal species and population stocks subject to the provisions of the 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(12)(A)(ii) 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 (manatees and dugong). Accordingly, published herewith is the report of the Department of the Interior for the period of January 1, 1996, to December 31, 1996, on the administration of the Marine Mammal Protection Act with regard to those mammals.

Issued at Washington, D.C.



Director
U.S. Fish & Wildlife Service
Dated 6/5/98



Chief Biologist
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Dated 6/18/98



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Washington, D.C. 20240

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Introduction

Authority

The passage of the Marine Mammal Protection Act of 1972, hereafter referred to as the Act, gave the Department of the Interior (Department) responsibility for manatees, polar bears, walruses, sea and marine otters, and dugong. Within the Department, the Fish and Wildlife Service (Service) is the primary agency responsible for managing these marine mammals and for enforcing the moratorium on taking and importing marine mammals and marine mammal parts. During 1996, the National Biological Service [now the Biological Resources Division of the U.S. Geological Survey (and hereafter referred to as USGS/BRD) as of October 1, 1996, pursuant to Secretarial

Order NO. 3202] was responsible for conducting marine mammal research.

The Service administers requests for waiving the moratorium and for the transfer of management authority to States, issues permits, enforces provisions of the Act, and publishes rules and regulations to manage marine mammals. The Service also 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 (ESA)-related responsibilities and maintains a close working relationship with the Marine Mammal Commission (MMC) and its Committee of Scientific Advisors. Prior

to Fiscal Year 1994, the Service conducted the marine mammal research program. Presently, the USGS/BRD has been charged with that responsibility; the Service closely coordinates with the USGS/BRD on marine mammal research needs.

During the period of time covered by this report, there were no significant changes to the listed status of any of the species of marine mammals whose management is the Service's responsibility. However, a significant die-off of endangered West Indian manatees did occur in southwest Florida during March and April 1996. The die-off, caused by neurotoxin produced by the red tide organism *Gymnodinium breve*, resulted in the death of 149 animals.

Species List

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

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

*The dugong is listed as endangered throughout its entire historic range except when it occurs in the United States.

Summary of the 1996 Program

Appropriations

For Fiscal Years (FY) 1996 and 1997, the Service's funding authorization was under authority of Section 116(b) of the Act as adopted in the 1994 amendments (108 Stat. 532) to the Act. Calendar Year 1996 covered by this report overlaps FY's 1996 and 1997; funds (in \$000) authorized for both years, as well as funds spent in FY 1996 and projected to be spent in FY 1997, are presented.

	Authorized	Expended	Projected
Fiscal Year 1996.....	\$9,000	\$3,891	—
Fiscal Year 1997.....	\$9,400	—	\$4,304

Marine Mammal Protection Act Expenditures

	Actual FY 96	Projected FY 97
<i>USGS/BRD Research and Development</i>		
Alaska sea otter.....	\$ 177	\$ 205
Polar bear.....	374	350
Misc. marine mammals (including polar bear, walrus, and sea otter).....	807	958
Total USGS/BRD Research and Development.....	\$ 1,358	\$ 1,513
<i>Management</i>		
Permit activities.....	\$ 100	\$ 115
Law enforcement activities.....	785	705
Other management activities.....	1,648	1,971
Total Management.....	\$ 2,533	\$ 2,791
Grand Total MMPA.....	\$ 3,891	\$ 4,304

Endangered Species Act Expenditures

Section 6 (Grants-to-States)

California — sea otter.....	\$ 0	\$ 0
Florida — manatee.....	0	0
Georgia — manatee.....	26	26
Total Section 6.....	\$ 26	\$ 26

Section 15 (USGS/BRD Research and Development)

Endangered/threatened otters.....	\$ 389	\$ 389
Manatee.....	483*	566*
Total USGS/BRD Research and Development.....	\$ 872	\$ 955

Section 15 (Management)

Consultation ¹	\$ 314	\$ 320
Recovery ¹	307*	358*
Hawaiian monk seal ²	76	76
Total Management.....	\$ 697	\$ 754
Grand Total ESA.....	\$ 1,595	\$ 1,735

* Includes \$152 in FYs 96 and 97 of Service manatee recovery funds transferred to USGS/BRD to support manatee research; Section 15 Recovery funds shown were reduced by \$152 in both FYs 96 and 97 to account for this transfer.

¹ Funded under authority of the ESA of 1973, as amended. Includes all endangered and threatened marine mammals for which the Service engages in consultation and recovery activities.

² Although the National Marine Fisheries Service (NMFS) has primary responsibility for Hawaiian monk seals according to Section 3(12)(A)(i) of the Act, the species utilizes the Hawaiian Islands, Johnston Atoll, and Midway Atoll National Wildlife Refuges. Funds reported are spent for monk seal activities on Refuge lands under authority of the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee).

Outer Continental Shelf Operations and Environmental Studies

In 1996, there were no Service actions to report for this activity.

Research and Development

The USGS/BRD conducted research under the Act during FY 1996 at several Centers and Field Stations. The Alaska Science Center (ASC) is responsible for polar bear, walrus, and northern (i.e., Alaska) sea otter research. The California Science Center (CSC) is responsible for work on southern sea otters. The Southeastern Biological Science Center (SBSC) is responsible for research on sirenians (manatees and dugongs). The Division of Cooperative Research administers additional research at cooperative units across the country funded by, and in support of, the needs of the Service, other USGS/BRD Research Centers, and other bureaus of the Department.

For each project active during FY 1996, the project title and summary, followed by highlights of FY 1996 accomplishments are given below by species. Previous results and accomplishments can be found in earlier publications.

1. Polar bear

A. Project Title and Summary:

Population definition and estimation of survival, recruitment, and number of polar bears in northwestern and northern Alaska.

During March and April, Alaskan polar bears captured in the western portions of Arctic Alaska are permanently marked. Assessment of critical population parameters are achieved through continued analyses of mark/recapture data, catch/effort data, and mathematical simulations. Work also includes the development and implementation of a U.S./Russian polar bear census.

1996 Activities/Accomplishments:

■ In 1996, four adult male polar bears were fitted with subcutaneously implanted satellite transmitters in a study to determine the feasibility of the technique for studying movements of free-ranging males.

■ A manuscript on the use of the double-count method for censusing polar bears was published.

■ The data base on polar bear movement patterns was expanded in 1996 and now includes the Barents and Kara seas in western Russia.

■ USGS/BRD researchers participated with the Service in the annual meeting of the Canadian Polar Bear Technical Committee.

■ A manuscript was prepared, submitted, and published on development of a methodology to assess habitat use when habitat types change in time and space. This method was developed for use in assessing polar bear and sea ice interrelationships in the Chukchi and Bering Seas.

■ Studies of polar bear and sea ice interrelationships are ongoing between Russian Academy of Science researchers and USGS/BRD researchers for a study area in western Russia. Remotely-sensed sea ice data from Russian satellites are being used to determine sea ice types for the Barents and Kara seas.

■ Studies of the genetic makeup of polar bear populations in Alaska are ongoing among USGS/BRD researchers using micro-satellite methods. USGS/BRD researchers are also collaborators in an international study of polar bear genetics, which includes cooperators from Canada, Denmark, Norway, and Russia.

■ A manuscript has been prepared and submitted on chlorinated hydrocarbon contamination of polar bears from Russia, Alaska, Canada, Greenland, and Norway. USGS/BRD researchers are collaborators with researchers from the other circumpolar nations which have polar bears.

B. Project Title and Summary:

Ecosystem dynamics of polar bears in the Polar Basin.

The goal of this project was to document the status of the polar basin ecosystem by quantifying the relationship between polar bears (the apical predator) and ringed seals (the principal prey of polar bears). The project was terminated early in FY 1996 because of limitations in available techniques. Work was refocused in "Population status and trends of polar bears in the Beaufort Sea" based on conversations and priority needs set by the Service. The goal of this project is to better determine the status of polar bears in the shared U.S./Canada Beaufort Sea population by defining populations and quantifying population dynamics.

1996 Activities/Accomplishments:

■ Assessment of population bounds of polar bears in the Beaufort Sea continues to be refined. Analysis of polar bear location data through measures of central tendency combined with clustering methods indicates a clear delineation between polar bears in the southern Beaufort Sea and polar bears in the northern Beaufort Sea near Banks Island, Canada. Location data of polar bears from the northeastern Chukchi Sea and locations from those captured in the southern Beaufort Sea do not show clear separation. This indicates an undefined degree of mixing between Chukchi and Beaufort stocks.

■ Work continues with co-workers of the Canadian Wildlife Service to develop a sound estimate of the population size of polar bears in the southern Beaufort Sea and provide technical advice to the North Slope Borough/Inuvialuit Game Council on polar bear population status. Population modeling software currently in use allows input of independent estimates of capture probabilities and survival.

■ USGS/BRD identified important habitat characteristics for terrestrial maternity dens. It was determined that coastal and river bluffs were the important landscape feature for more than 70 percent of terrestrial den sites. With this information, bluff habitat was

identified on high resolution aerial photographs of the coastal plain of northern Alaska between the Canada border and the Colville River, and digital maps of bluff habitat were created. Preliminary analysis shows that the distribution of bluff habitat is relatively uniform within this region. Ground-truthing of the digital map shows a high degree of accuracy, i.e., 23 of 25 bluffs were within 50 meters of the actual feature on the ground. The high accuracy demonstrates the potential value of this map as an indicator of where polar bears are likely to den.

■ A computer model of den habitat was generated through Geographic Information System (GIS) software using data collected at den sites and high resolution digital maps of coastal northern Alaska. Ground-truthing revealed the model was correct wherever it identified den habitat, however errors of omission were recognized. The degree of omission must be evaluated through a rigorous ground-truthing protocol. Improvement of the model may be achieved by refinement of existing digital maps.

■ Forward-looking infrared (FLIR) was investigated as a tool for detection of active polar bear maternity dens. Two man-made snow caves with heat sources were constructed in order to simulate polar bear maternity dens. The FLIR device detected both snow caves, thus suggesting its potential to locate polar bear dens while the dens are occupied by bears. Further testing of the effectiveness of FLIR is planned in the future; pregnant polar bears will be captured and equipped with radio collars. After these collared bears enter their maternity dens during late autumn 1997, attempts to locate the dens will be made using FLIR technology. During autumn 1996, an attempt was made to capture pregnant polar bears and equip them with radio collars. However, poor weather conditions during field work, plus the fact that winter arrived early in coastal northern Alaska, prevented the locating of target bears.

■ Published work includes: (1) Survival of female polar bears and their dependent young; (2) Population delineation of polar bears in Canada using satellite data; (3) Documentation of the movements of a polar bear from northern Alaska to Greenland; and (4) A general description of polar bear status and research in Alaska. A manuscript on movements and distribution of polar bears in the



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

Beaufort Sea is under revision following incorporation of data from Canadian researchers.

2. Alaska sea otter

A. Project Title and Summary:

Biological information necessary to establish a zonal management program for sea otters in Alaska.

In response to real and perceived conflicts between sea otters and commercial and recreational fisheries over shellfish resources, the implementation of a zonal management program for sea otters has been suggested. Movements, mortality, and reproduction of sea otters at Kodiak Island and Prince William Sound are monitored using instrumented sea otters. Genetic and enzyme variation within the sea otter population is determined through the analysis of tissue samples collected from captured sea otters.

1996 Activities/Accomplishments:

■ Several publications and presentations on genetic diversity in sea otter subspecies and populations have been completed. A manuscript entitled, "Population demographics and genetic diversity: case histories from remnant and reestablished populations of sea otters," is in the final preparation stage.

■ Studies under this project were in part the basis for two papers in the upcoming

Endangered Species Update on comparative demographics and status of sea otter populations. A manuscript entitled, "Life history plasticity and population regulation in sea otters," is in final preparation for submission to the journal *Ecology*.

■ Additional work comparing present genetic information with "ancient" DNA samples in sea otters is planned for the purpose of determining the extent of pre-exploitation stock separation. Sea otter bone samples from Aleut midden sites are available for analysis.

B. Project Title and Summary:

Interactions between sea otters and fisheries in Alaska.

Research is being conducted to assess: (1) sea otter diets with an emphasis on the importance of commercial species of shellfish; (2) the impacts of sea otter foraging behavior and activity on subtidal benthic communities, status of sea otter populations, and assessment of habitat; and (3) the recovery of the Prince William Sound sea otter population.

1996 Activities/Accomplishments:

■ The aerial survey methodology developed by NBS (now USGS/BRD) was implemented by the Service in sea otter surveys at Kodiak Island and Yakutat. The Service plans to continue the use of these methods in south central and southeast Alaska.

■ Aerial surveys in Glacier Bay National Park have documented the movement of sea otters into previously unoccupied habitat and guided the collection of sea otter foraging data in these areas. A group of at least 80 male sea otters was observed feeding on mussels, clams, and urchins. Various economically valuable species of crabs are being consumed at low rates, however sea otters have not yet found major concentrations of these species in newly occupied areas. Continued monitoring and observation work along with concurrent subtidal benthic surveys will provide information on the effects of sea otter predation on valuable invertebrate populations.

■ A pilot study to determine dive profiles of sea otters in southeast Alaska using pressure modulated sonic transmitters was successfully completed. The use of this technology provided the first dive profiles of free-ranging sea otters. This study indicated that sea otters forage profitably at depths of at least 69 meters (225 feet) and that ultra-sonic transmitters offer a practical means of monitoring foraging dives. The USGS/BRD plans to expand this work in FY 1997 to include time-depth recorders. This will provide continuous data acquisition to further evaluate foraging activity in relation to prey abundance, and the effect sea otters have on shellfish populations, including the importance of depth as a refuge from sea otter predation.

3. Miscellaneous Marine Mammals (work units which study several marine mammal species)

A. Project Title and Summary:

Use of DNA to define populations of birds, mammals, and fish of Alaska.

Analyses of mitochondrial and nuclear DNA in animal populations are evaluated to assess their usefulness in quantifying genetic relationships among animal populations. Animal movement patterns are compared with genetic patterns to determine information about current and past levels of gene flow and differentiation of subpopulations. Studies (involving the collection, archiving, and analysis of tissue) are conducted on sea otter, polar bear, and walrus.

1996 Activities/Accomplishments:

■ Molecular genetic laboratory analyses were completed for 263 polar bears.

Samples originated from the Chukchi and Beaufort Seas bordering Alaska and to a lesser degree from throughout the species' circumpolar distribution. Each individual was characterized at eight microsatellite loci. Analyses are being conducted to address issues of spatial genetic structuring at the population and individual level, and results are preliminary. With regards to populations, there is little evidence for spatial genetic differentiation between polar bears in the Chukchi and Beaufort Seas. All alleles observed in the Chukchi Sea were also found in bears from the Beaufort Sea and in similar frequencies. At the level of individuals, pair-wise estimates of genetic similarity are being used in conjunction with satellite telemetry data to ascertain whether the degree of genetic similarity between individuals is a function of movement patterns during each of several periods of the year (e.g., denning, breeding, foraging).

■ Estimates of the degree of population structuring of walrus in the Bering Sea would greatly assist efforts in management by ascertaining whether walrus which breed on the United States and Russian sides of the Bering Sea are part of one panmictic population or reproductively isolated and thus deserving of separate management consideration. The USGS/BRD's Alaska Science Center is leading a collaborative effort with the Institute of Arctic Biology at the University of Alaska-Fairbanks and the Service's Forensics Laboratory to assay walrus from several breeding ice flows in the Bering Sea. Maternally inherited mitochondrial-DNA and biparental inherited multi locus minisatellites (DNA fingerprints) were used to characterize individuals from several locations on the Russian (Anadyr and Koryak) and United States (Nunivak Island and St. Lawrence Island) sides of the Bering Sea. Data from all genetic markers show that walrus from different breeding areas do not differ in their genetic characteristics.

■ Genetic studies of sea otters have focused on completion of analysis and reporting of the effects of translocations on levels of genetic diversity in sea otter populations and on the collection of additional samples to address the Service's concerns regarding the extent of micro geographic population differentiation.

A paper has been drafted which quantifies the loss of genetic variability

in sea otter populations which were established from translocations. For a series of populations sampled across the north Pacific, present levels of mitochondrial DNA variation were highly correlated to minimum population size and to the number of years at the minimum population size. Results have significant implications for future management efforts for this species.

■ USGS/BRD is working closely with the Service's Alaska Region to facilitate collections of samples from the Service's subsistence monitoring program. The Service is interested in the extent of population structuring at microgeographic levels in order to interpret the effects of site-specific harvest levels on population size and viability. The USGS/BRD is further collaborating with Service personnel using molecular genetic approaches to sex individuals from tissues on the skulls and skins from the subsistence harvest. The Service is concerned that reporter bias in assignment of sex could compromise population models which use sex and age data to reconstruct population demographics.

B. Project Title and Summary:

Population status and trends in marine mammals in Alaska.

More feasible approaches to evaluation of the status and trends of marine mammal (walrus, polar bear, and sea otter) populations are being developed to replace present methods which are logistically difficult and very costly. Objectives to accomplish this include: (1) continued development and evaluation of survey methodologies; (2) construction of models to evaluate the dynamics of marine mammal populations; and (3) identification of characteristics of populations and individuals that enable assessment of population condition and status.

■ Budget limitations and scheduling difficulties prevented holding the workshop on census methodologies for marine mammals with varying sightability and availability. The workshop has been re-scheduled for FY 1997.

■ The joint effort between the National Marine Fisheries Service's Southwest Fisheries Science Center and USGS/BRD Alaska Science Center scientists on applying individual-based models to the Pacific walrus population data continued. The effort to finalize the

extensive data accumulated by the late Dr. Bud Fay was completed and the data are currently being analyzed by NMFS cooperating scientists. The results of this modeling effort will be included in the marine mammal census workshop in FY 1997.

■ Blood and tissue samples were again collected from sedated Pacific walrus at Cape Peirce, carcasses, and subsistence hunt kills. These materials are being analyzed to develop baseline blood serum chemistries of Pacific walrus. Future studies will include genetic characterization of the population, and trophic structure based upon stable isotope analyses of vibrissae.

C. Project Title and Summary:

Alaska Marine Mammal Tissue Archival Project (AMMTAP).

This study collects and archives representative marine mammal tissues for future contaminant analyses and documentation of long-term trends in environmental quality, potentially associated with oil and gas development in Alaskan waters. Collections are limited to freshly-killed specimens taken under rigorously controlled conditions by researchers associated with ongoing programs or subsistence hunters. Tissue samples are archived with the National Biomonitoring Specimen Bank, National Institute of Standards and Technology. Tissue aliquots are analyzed for quality control and the results published in annual reports and refereed journals.

1996 Activities/Accomplishments:

■ Work is proceeding as scheduled. Samples have been collected from a variety of marine mammals including ringed, spotted, harbor, bearded, and northern fur seals; Steller sea lion; beluga and bowhead whales; polar bear; and Pacific walrus.

■ One of the major accomplishments of this ongoing project is the number of partners that participate in various ways in the archiving of tissue samples. Major research collaborators include: Department of Fish and Oceans (Canada); University of Germany; the Service; North Slope Borough; State of Alaska; Kawerak, and TDX Corporations; Alaska Sea Grant Program; and the Cook Inlet Marine Mammal Advisory Committee.

■ Because the project is primarily an archival one, not every archived sample has been analyzed. However, aliquots of

some of the samples have been analyzed for chlorinated hydrocarbons and heavy metals in order to monitor changes in the samples during storage and to determine the baseline levels of contaminants in a few of the species. For example, contaminant loads, particularly PCBs and chlorinated hydrocarbons, in beluga whale blubber from the Chukchi are relatively high, a trend which is similar to observations in this species across the Canadian Arctic.

■ Future directions for this study include expansion of tissue collections geographically; inclusion of greater food web representation and human risk assessments; expansion of tissue banking to include brain and muscle tissue on a regular basis; and initiation analysis for compounds not routinely measured in AMMTAP samples (e.g., dioxins, coplanar PCBs).

D. Project Title and Summary:

Bering-Chukchi Sea Ecosystem Initiative.

The long-term objectives of this initiative are to investigate interrelationships among biotic and abiotic components of the Bering-Chukchi Seas ecosystem, with focus on certain species (major predators or herbivores of management concern) as indicators of ecosystem health, and to link those indicators with oceanographic factors that influence biological production. This broad initiative involves work on polar bears and Pacific walrus, as well as eiders, seabirds, and Arctic-nesting geese. The objectives of the polar bear/walrus work are: (1) to determine the ecological relationships between walrus, polar bears, their respective prey species and the sea ice habitats in the Bering and Chukchi Seas and to relate those ecological parameters to the trophic structure of the seas; and (2) to determine the ecological significance of radionuclide contaminants in the Russian Arctic and the potential of these contaminants for entering the Bering and Chukchi Sea ecosystems. Telemetry technology will be developed and used to define movement and habitat use patterns of polar bears and walruses; remote sensing data will be used to study sea ice characteristics and determine interrelationships with prey species; and standard sampling protocols and systematic sampling from harvested and beach-cast animals will be used to determine environmental contaminant levels. Biological sampling for

radionuclides will be conducted from selected sites from the Russian Arctic.

1996 Activities/Accomplishments:

■ Remotely sensed sea ice data and satellite locational data for polar bears in the Bering and Chukchi Seas are being analyzed to study sea ice habitat use and selection. A manuscript on the results of this study is in preparation.

■ The summer movements of satellite instrumented Pacific walrus are being studied to define at-sea feeding areas. The associated land-based haulouts have been identified and subsequent studies will examine the species composition of prey items in the identified feeding areas. Dive profile data have been collected from several Pacific walrus in conjunction with the satellite locational data.

E. Project Title and Summary:

Dynamics of Marine Ecosystems in the Bering and Chukchi Seas.

Suitable telemetry technology are being developed and used to define movement and habitat use patterns of top carnivores in the Bering and Chukchi Seas marine ecosystems. Emphasis is placed on interrelationships between seasonal sea ice habitats and prey species of the two apical predators using remotely sensed data on sea ice. Also potential impacts of environmental contaminants, including radio-nuclides and those related to oil and gas activities are being assessed. International cooperation will be accomplished through active participation in the North Pacific Marine Science Organization (PISCES), the Conservation of Arctic Flora and Fauna (CAFF) working group, and the International Northern Sea Route Programme (INSROP) during ecological investigations of the Bering and Chukchi Seas marine ecosystems. In FY 1995, the Alaska Science Center received competitive funding to enhance this effort with funds targeted to assess oil and gas exploration, development, and production impacts in the Bering and Chukchi Seas for the Minerals Management Service (MMS). Those results are included below.

1996 Activities/Accomplishments:

■ Capture protocols were refined for Pacific walrus at Cape Peirce and experimental GPS-linked satellite transmitters were attached to five adult males. The GPS-linked satellite transmitters functioned well, however,

readings at sea locations were rare. Several units functioned well into the ice season and locational data were collected on walrus hauled out on sea ice during the winter 1997. Dive data were again collected from several adult males at the Cape Peirce haulout and a manuscript is being prepared on these results.

- USGS/BRD Project staff attended the PISCES workshop in Canada in late summer and are working on finalizing reports.

- Bathymetry of the Bering, Chukchi, and Beaufort Seas has been digitized and a geo-referenced ArcInfo coverage has been developed for the areas.

- Work continued on the Pacific walrus International Database, with Russian cooperators preparing data for input into the database. A joint U.S.-Russia synthesis meeting is planned in FY 1997 to integrate the data from the two sides into one master database.

- Geo-referenced databases on bottom types, sediments, and benthic fauna have been located and metadata are being finalized for these data sources.

- Capture methodologies developed and relocation technologies developed to date for this project are being used to develop a proposal for a study of disturbance of Pacific walrus on sea ice by overflying helicopters. This research proposal was requested by MMS for use in their evaluation of potential petroleum lease sales in the Chukchi Sea. The proposal will be finalized during FY 1997.

4. Manatee and dugong

A. Project Title and Summary:

Ecological studies of manatees and dugongs.

This project conducts long-term research on the West Indian manatee in Florida and Puerto Rico, and maintenance of an active interchange with scientists and conservationists concerned with manatees throughout their range. The research emphasizes longitudinal studies of individually recognizable manatees to determine reproductive traits, annual rates of survival, and social structure, and determination of spatial and temporal patterns of manatee movements and habitat utilization through the use of satellite and conventional radio telemetry techniques. Other current studies include evaluating the success of reintroducing captive-

reared manatees to the wild, mapping of seagrass beds in Puerto Rico and Vieques, determination of manatee food habits through stomach contents analysis, and genetic structure of manatee populations.

1996 Activities/Accomplishments:

- Radio tracking field work was greatly reduced in 1996 and emphasis has shifted to data analysis. A total of 83 manatees (for 30,812 tag-days) were radio-tagged and tracked between the Florida Keys and southeast Georgia over a ten-year period (May 1986-May 1996). Between 18 and 26 individuals were tracked during each full year of the study for a median duration of seven months, and many were followed over multiple years. Problems and inconsistencies in the databases were identified and resolved. The information provided by this long-term radio-telemetry study has been, and will continue to be, valuable to managers who make regulatory and policy decisions to protect this unique marine mammal and its habitat from increasing human encroachment in Florida's coastal zone.

- In 1996, additions to the computerized PhotoCD-based Manatee Individual Photo-identification System (MIPS), brought the total to 1,037 known individuals with over 15,000 sighting histories. Plans for the development of a revised network-based MIPS began. The revised MIPS program is slated for completion in 1997 and will allow access to selected identity, feature, and image files by interested cooperators.

- Presentations on MIPS technology and protocols were made to the NMFS's Bottlenose Dolphin Photo-Identification Workshop in Charleston, South Carolina, in March 1996; and to the Army Corps of Engineers' Endangered Species Workshop in Atlanta, Georgia, in April 1996.

- During 1996, the Sirenia Project cooperated with the Service's Crystal River National Wildlife Refuge by supplying data, images, and artifacts for the Manatee Education Center scheduled to open at the Homosassa Springs State Wildlife Park in the Spring of 1997. MIPS images and data on selected known manatees will be included in an interactive program designed by Wilderness Graphics, Inc. for public use.

- Sirenia Project biologists worked with wildlife managers and veterinarians to

assess the effectiveness of the on-going captive manatee reintroduction program. Two four year old captive-reared manatees (Doc and Dakota) were radio-tagged and released in Biscayne Bay in late August. Project personnel have tracked and observed Doc and Dakota since their release, and assisted in recaptures of both to reassess their condition. Doc and Dakota both showed reductions in their blubber thickness after several months in the wild, as expected, but were within or above the normal range for wild male manatees, and were released at the capture sites. Both have been observed feeding and socializing with other manatees. One of the captive-reared manatees (Bertram) that was released at Blue Spring in 1995 returned to Blue Spring in November 1996. Because he lost his radio transmitter soon after his initial release, Bertram's reappearance at Blue Spring represented the first documentation that he had survived 1.5 years in the wild. He was recaptured and temporarily returned to captivity for observation; he will probably be re-released this spring.

- An adult female manatee (Sweet Pea) was rescued by the Service from Texas waters in December 1995. After spending five months in captivity, she was radio tagged and released in a joint tracking effort between the Florida Department of Environmental Protection (FDEP) and the Sirenia Project. After her release near Crystal River in April, she traveled to the northern Gulf of Mexico and used coastal areas of the Florida panhandle, particularly the St. Marks National Wildlife Refuge. In November, she started a long move south, swimming all the way down the west coast to the tip of Florida. Sweet Pea rounded Florida Bay and moved up into the South Miami area by December 1996. This documents the first move of a radio-tagged manatee between the west and east coasts of Florida.

- Color aerial photographs of Vieques (1994, 1:9600 scale) were obtained from the U.S. Navy, and used in conjunction with navigational charts to create a shoreline base map of Vieques. Benthic communities were mapped and verified at 300 ground-truth stations visited in May and October 1996. Digitized seagrass bed outlines will be combined with manatee telemetry location data collected from 1992-1996 to produce coverages that illustrate manatee habitat use patterns on Roosevelt Roads

Naval Station in eastern Puerto Rico and the neighboring island of Vieques.

■ During the catastrophic 1996 red tide epizootic in southwest Florida, samples of stomach contents were collected from carcasses and preserved by FDEP personnel. USGS/BRD personnel have examined stomach samples from 50 of the 149 manatees that died in this event. All content samples examined to date consisted primarily of seagrasses, indicating that these animals had been feeding in a marine or estuarine environment shortly before they died. Ingestion is one of the most likely ways in which manatees may be exposed to the red tide organism, *Gymnodinium breve*, thus stomach contents are an important clue in determining how manatees encounter brevetoxin.

■ A final report on the use of strip-transect aerial survey methods for monitoring manatee populations in Florida was completed in June. Corrected population estimates of the 160-km² survey area (the Banana River) ranged from 113-240 manatees. Mean population size differed between study years (1993: 125 manatees, 1994: 179 manatees; $P < 0.024$). Precision of annual estimates was high (CV < 0.05), indicating that the technique should be useful for monitoring manatee abundance trends in the Banana River. Power analysis demonstrated that with the stringent assumptions of CV = 0.05 and power = 0.75, an annual rate of change of 5 percent should be detected within 4 years. This study was a collaborative effort among FDEP, USGS/BRD, and University of Florida personnel, and is the first to use replicated strip-transect aerial surveys to estimate manatee population size.

■ Project biologists continued to provide technical advice to researchers in Belize, Mexico, and two sites in Brazil (the Amazon River and the northeastern coast) which recently started manatee radio tracking efforts. The study in Brazil is the first to apply satellite telemetry to manatees outside of the U.S. and Puerto Rico. Dr. Helene Marsh, Head of the Department of Tropical Environmental Studies and Geography at James Cook University in Australia, spent the months of December and January with the Sirenia Project. Dr. Marsh has over 20 years of research experience on dugongs, and her visit provided the opportunity for many fruitful exchanges of information with Project staff.



Chessie awaiting his release from Sea World of Florida. U.S. Fish & Wildlife Service photo by Jim Valade.

5. Southern sea otter

A. Project Title and Summary:

Population biology of sea otters.

The goals of this project are to evaluate trends in the California sea otter population and causes for its low rate of increase. A baseline of information on distribution and abundance is necessary to determine current and future population status, which is of particular importance to the Recovery Plan and delisting the threatened California sea otter population. The study obtains demographic and behavioral information for sea otters in California, and from several other populations of known status. Causes and consequences of differences among these populations will be evaluated and population modeling will be used in the analysis. The work is conducted through censuses, monthly surveys for beach-cast carcasses, and studies comparing demography and behavior of sea otter populations in California, Washington, and Alaska in order to understand the low growth rate in the California population. In addition, there are several associated studies of the effects of contaminants on sea otters.

1996 Activities/Accomplishments:

■ Survey data for the California sea otter population, accumulated from the early 1980's through 1994, has indicated a steady rate of increase of about 5 percent per year. However, the

population counts made in 1994 and 1995 suggested that the rate of increase of the California sea otter population might be declining. Information gathered in 1996 add further weight to that concern — total counts for both the spring (2,278) and fall (2,019) surveys in 1996 were lower than the 1995 spring and fall surveys (2,377 and 2,190, respectively). The possibility that the sea otter population in California is experiencing an altered growth trajectory is especially notable in view of the fact the recovery criterion, as proposed by the Southern Sea Otter Recovery Team, might not be achieved in the anticipated time frame.

■ Field research on sea otters in Washington continued. Sixteen otters were captured in the vicinity of Cape Alava in 1996, and twelve were surgically implanted with radio transmitters. The sex and age composition of the otters was again more favorable for meeting study objectives this year—only females and pups were captured. Monitoring of all instrumented otters continued. Data were collected on foraging behavior, reproduction, and movements. Time/activity budget data collection was resumed in 1996. A subtidal survey east of Cape Flattery was initiated to document changes in near shore communities as sea otters reoccupy the area. Effort to obtain foraging data was increased in the area to document sea otter prey preferences

in recently reoccupied habitat. The subtidal survey and increased foraging work were supported by the Olympic Coast National Marine Sanctuary.

■ Field work on similar projects was begun at Adak and Shemya islands in the Aleutian archipelago with support from the Department of Defense and in collaboration with partners including the University of California at Santa Cruz, Alaska Maritime National Wildlife Refuge, U.S. Navy, U.S. Air Force, and USGS/BRD Alaska Science Center. The Adak Project was completed and a final report has been submitted to the U.S. Navy. This work has led to several unexpected findings. The first was high levels of organochlorines in sea otters at Adak Island. This finding has led to subsequent research, currently ongoing, in which USGS/BRD is endeavoring to determine the source of these compounds and their possible effects on sea otter populations. The second is that the sea otter population at Adak Island has declined precipitously (by at least 4 or 5 fold) during the past several years. Both the cause and extent of this decline are being investigated. There is some evidence that predation by killer whales is contributing to the decline. This may represent redirected foraging behavior by the whales following the virtual local extinctions of sea lions and harbor seals from the central and western Aleutian archipelago.

■ Range expansion of the Washington population to east of Cape Flattery, an area devoid of sea otters since the fur trade period, continues. Most notable is the winter movement of a group of about 20 females and pups into the area more protected from winter storms than the outer coast south of Cape Flattery. The July 1996 population survey provided a count of 430 which is nine percent greater than the 1995 count. The rate of population growth since 1989 is just over 11 percent whereas for the period prior to 1989 it was more than 20 percent. Thus, while the sea otter population in Washington continues to grow, the rate of population increase appears to be declining.

■ Information on sea otter birth rates and mortality are now available for comparison among Amchitka Island, Kodiak, and central California. These data demonstrate that age-specific birth rates are similar, but patterns of mortality vary substantially. Both Amchitka and California have pre-weaning mortality rates of about 50

percent, whereas the Kodiak rate is closer to 15 percent. Information obtained from Adak Island shows a similar though slightly elevated birth rate, but a high probability of increased mortality most likely explains the recent population decline in that area. Emigration, in particular, has been ruled out as an explanation.

■ Sea otters were successful in obtaining a food item on 88 percent of their foraging dives (N = 580) east of Cape Flattery in Washington, nearly identical to the rate of foraging success in 1995. Red sea urchins (*Strongylocentrotus franciscanus*) accounted for sixty percent of the prey taken, with clams accounting for 17 percent. South of Cape Flattery, in habitat occupied by sea otters for decades, sea urchins comprise about 0.2 percent of foraging records. Subtidal surveys conducted by the Washington Department of Fish and Wildlife and USGS/BRD indicate urchin populations have declined significantly in some areas east of Cape Flattery. As the period of occupation increases east of Cape Flattery the sea otter prey base undoubtedly will change and this change should be reflected by future foraging observations collected in the study. Sea urchins are expected to become less important as the otters diet becomes more catholic.

■ Five trips to San Nicolas Island were made in 1996 to monitor the translocated sea otter colony. The highest count of independent sea otters (17) since 1989 was obtained in 1996. Six births were documented, including the seventh pup born to a known individual. Distribution of otters is changing, with more observations off the north and northwest shores of San Nicolas Island. There is evidence of some recruitment to the colony, but most weaned pups are being lost either to mortality or emigration. This latter finding is surprising in view of: (1) the abundant food resources at San Nicolas Island; (2) the known tendency of weaned pups to remain within the confines of their parent population, usually near the natal site; and (3) the growth characteristics of relocated colonies of sea otters elsewhere within the species' range.

B. Project Title and Summary:

Interactions between sea otters and nearshore ecological communities.

The goal of this study is to evaluate the generality, breadth, and evolutionary consequences of the interactions

between sea otters, the benthic invertebrates on which they prey, and the kelp forest ecosystems in which these invertebrate herbivores graze and sea otters live. Work focuses on the role of sea otter predation on California habitats, but includes additional comparative studies across the Pacific rim and work on indirect influences on other food web components (e.g., coastal fishes, coastal-feeding sea ducks, subtidal asteroids, and kelp assemblages).

1996 Activities/Accomplishments:

■ A study involving sites in California, Australia, and New Zealand to test the hypothesis that the intensity of predation on benthic invertebrates is less in the southern than the northern hemisphere, was completed. Additional work on the generality of the sea otter's influence on kelp forests in California and Mexico was initiated.

■ Relationships between sea otters and kelp forest communities in British Columbia are similar to those that occur in southeast Alaska. In general, areas lacking sea otters have been deforested by urchin grazing and those with well established sea otter populations are characterized by well-developed kelp forests. The mechanism of change was found to be closely tied to the behavioral response of sea urchins to damaged conspecifics. Otters discard the uneaten exoskeleton of their prey which sink to the bottom. Living urchins flee from the remains of dead urchins, thus creating halos within which kelps rapidly recruit and grow.

■ A field study of the population structure and predatory role of subtidal sea stars at Attu Island was completed. This study involved a comparison of data gathered in the late 1970s and early 1980s when otters were absent from most of Attu, with data gathered in 1994, after otters had become reestablished. Long-term data show that the abundance of predatory sea stars declined by more than an order of magnitude following the recolonization by sea otters. Sea stars prey on mussels and barnacles, and thus the mortality rates of these invertebrates declined substantially with the arrival of otters. Both sea otters and sea stars have been shown to function as "keystone species". These findings are of basic interest to community ecologists because they have shown how the role of one keystone species can be altered by the influences of another.

■ Sea urchins are an important element of kelp forest ecosystems. The influence of unregulated urchin populations on these ecosystems can be dramatic because of the tendency of urchins to overgraze kelp stands. This tendency seems to depend most strongly on: (1) the extent to which urchin populations are limited by predation, and (2) sea urchin behavior. Over the last several years USGS/BRD work has begun to focus on the interaction between these two factors. Research on sea urchin refuging behavior shows that where fish predation is strong, the urchins hide during the day and come out at night to forage. Accumulating information suggests that this behavior is genetically fixed in tropical species (where predation intensity is strong) and genetically plastic in temperate species (where predation intensity is spatially and temporally variable).

■ A study of the influence of marine reserves within the Monterey Bay National Marine Sanctuary was completed. Results show that the density and size of rockfish (*Sebastes* spp.), a commercially and recreationally important group of species, are significantly greater in reserve than non-reserve areas.

■ Sea urchins are the main food staple of sea otters in many areas. Results from studies conducted over many years are beginning to show some intriguing

geographical patterns in the nature of interactions between sea otters and sea urchins. High density otter populations are capable of reducing the abundant urchin populations to local extinction in a single year. The USGS/BRD has found that urchin populations on oceanic islands are sustained by: (1) heavy annual recruitment, and (2) emigration from deep water. These processes are responsible not only for maintaining the urchins, but for sustaining remarkably high density otter populations. These processes seem changed along the continental margins, apparently due to changes in coastal currents (which transport urchin larvae away from shore) and the accumulation of shallow-water sediments which block the emigration of urchins from deep water. This may explain why equilibrium density sea otter populations are so much greater on oceanic islands than they are along the continental shelf of North America.

■ USGS/BRD studies at Amchitka Island have shown that whereas sea otter populations normally are maintained by coastal production, these food webs are occasionally massively subsidized from the oceanic realm in the form of inshore spawning migrations of smooth lumpsuckers. These episodic food subsidies appear to release the otter populations from food limitation, thus altering both their foraging behavior and demography.



*A female northern sea otter with her pup in Alaska.
U.S. Fish & Wildlife Service Photo.*

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 NMFS by making apprehensions and conducting investigations in cases involving endangered or threatened species under that agency's jurisdiction. Results of these efforts are referred to the NMFS for its consideration and appropriate action. However, under an NMFS/Service Memorandum of Understanding, the Service retains authority over those investigations that involve endangered or threatened species under the jurisdiction of the Department of the Interior. Violations are referred to the Department of the Interior's Office of the Solicitor for civil action or the Department of Justice for criminal enforcement action.

Service wildlife inspectors in the Pacific Region continued to closely monitor wildlife entering the country to detect the illegal importation of marine mammals and marine mammal products. Emphasis was placed on the designated wildlife Ports of Seattle, Portland, San Francisco, Los Angeles, and Honolulu. Ports of entry on the Washington-Canada border, the California-Mexico border, and at Agana, Guam, also received attention. Approximately 43 separate incidents involving the illegal importation of marine mammals were detected in 1996. Seizures involved products manufactured from whale, walrus, polar bear, seal, sea lion, dolphin, sea otter, and dugong.

Service special agents continued to actively investigate reports of illegal taking of southern sea otters along the California coast. The southern sea otter is listed as a threatened species under the ESA. In excess of 175 sea otter carcasses were either recovered or examined on the beach during 1996, four of which were determined to have been shot. Bullet fragments were removed and submitted to the Clark R. Bavin

National Fish and Wildlife Forensics Laboratory for ballistic examination. It should be noted that a large percentage of the carcasses were severely decomposed; and as such difficult, if not impossible, to examine for cause of death. Hand-held metal detectors have been provided to the "stranding network" in an attempt to identify those carcasses which may have been shot. It should also be noted that the carcasses examined were located in areas representing only about 25 percent of the southern sea otter's total range.

An investigation of the shooting of a southern sea otter near the Santa Cruz, California, harbor, culminated with the execution of a Federal search warrant on board a commercial fishing vessel in San Francisco Bay. Necropsy examination of the carcass, initially reported by the Coast Guard and recovered by California Fish and Game in the water near Monterey Bay, revealed the cause of death to be from shotgun wounds. A witness has provided a statement that the captain of this vessel admitted shooting the otter. Seized pursuant to the warrant were a shotgun and log books, which indicate the vessel was in the area on the day the carcass was recovered. The case has been presented to the U.S. Attorney and the filing of criminal charges is anticipated.

Seven investigations were conducted involving the illegal possession of walrus ivory originating from Alaska. Illegal ivory was forfeited in six of the investigations and two investigations further resulted in guilty pleas for violating the Act.

An Oregon commercial fishing fly dealer pled guilty in Federal court to a felony violation of the Lacey Act Amendments of 1981 for illegally transporting polar bear skins from Alaska for use in fabricating fishing flies. Sentencing is pending.

During the spring and summer months of 1996, Service special agents in Alaska investigated numerous reports concerning the wasteful take of walrus.

Between Naknek and Port Heiden, ten headless walrus were reported on the beach; agents were unable to land on the beach to investigate further.

It was reported that eighteen female walrus and 16 calves were seen being taken by two boats from Gambell, St. Lawrence Island. The boats returned with only 150 pounds of meat and all of the tusks. The two boat captains were cited and fined for wasteful take violations.

Twenty headless walrus were reported seen on an ice floe off Nome; no suspects were identified upon investigation.

Near Unalakleet, it was reported that a walrus had been killed and its flippers removed; a suspect has been identified and the investigation is pending.

During an aerial survey, 164 headless walrus were observed on the beach from Nome to Kotzebue. Of the 164 carcasses, 77 were observed in Kotzebue Sound.

Permits and Registrations

The Act prohibits the take or import of marine mammals and marine mammal products. Exceptions may be made under permits for scientific research, public display, import of sport-hunted trophies of polar bears taken in Canada, photography for educational or commercial purposes, beached and stranded marine mammals that are designated as non-releasable under the Act, or to enhance the survival or recovery of a species or stock. Another exception streamlines the permitting process for conducting scientific research by allowing a General Authorization for the take of marine mammals by Level B harassment in the course of bona fide scientific research.

In order to enable marine mammal hides to be tanned and to facilitate trade of products among Alaskan Natives, registered agent/tannery permits may be issued to non-Alaskan Natives (i.e., persons other than Alaskan Indians, Eskimos or Aleuts). Registered agents may purchase and sell raw parts and tanned skins from and to Alaskan Natives or other registered agents, provided that only authentic Alaskan Native handicrafts or clothing may be purchased or sold in interstate commerce. Raw parts may be transferred (not sold) to registered tanners for further processing. Registered tanners may transfer (not sell) parts received for processing to Alaskan Natives or registered agents only.

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. Applicable provisions are found 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. During 1996 the Service worked toward finalizing the regulations proposed in 1995, to establish application procedures and make legal and scientific findings to allow for the issuance of permits under section



A male Pacific walrus on Round Island Alaska. U.S. Fish & Wildlife Service photo, by Dana J. Seagars.

104(c)(5)(A) of the Act to import personal sport-hunted polar bear trophies taken in Canada. (Note: On February 18, 1997, the Service published a final rule in the FEDERAL REGISTER (62 FR 7302) authorizing the importation of polar bear trophies from five approved polar bear populations from Canada's Northwest Territories; the rule became effective on March 20, 1997. On June 12, 1997, as part of the Flood Relief Bill (H.R. 1871) signed into law by the President, section 104(c) of the Act was amended. The effect of the amendments was to suspend certain provisions of the 1994 Amendments to the Act regarding polar bears legally harvested prior to the enactment of the 1994 Amendments, thus expediting the issuance of permits to allow the importation of these trophies.)

Regulations will be developed for issuance of permits for enhancement of the survival or recovery of a species or stock, photography for educational or commercial purposes, and beached or stranded marine mammals that are designated as non-releasable under the Act.

During 1996 two new permits were issued, and four permits reissued for scientific research. Seven permits were issued for public display, including two that were reissued to correct the expiration date of the permit. Ten parties either registered or renewed their registration as agents and/or tanneries.

The following is a brief description of permit actions taken in 1996.

Scientific Research Permits

1. Permit 766818, reissued March 4, 1996, through September 30, 1996, to the Alaska Fish and Wildlife Research Center for scientific research of Alaskan sea otters and California sea otters as described in an earlier annual report.
2. Permit 782423, reissued September 25, 1996, through September 24, 2001, to the California Department of Fish and Game for scientific research of California sea otters as described in an earlier report.
3. Permit 791721, reissued May 20, 1996, through December 31, 1999, to the NBS (now USGS/BRD), Sirenia Project for scientific research of West Indian manatees as described in a previous report.
4. Permit 795477, reissued December 11, 1996, through December 31, 1997, to Florida Atlantic University for scientific research of two captive-born West Indian manatees as described in a previous annual report.
5. Permit 807412, issued February 8, 1996, through February 8, 2001, to Denver Zoological Gardens, Denver, Colorado, authorizes the import of up to 70 polar bear serum and/or milk samples surplus to the needs of Canadian scientific research projects, which have been freezer-banked in Canada.
6. Permit 814695, issued June 20, 1996, through June 20, 1997, to the Center for Coastal Physical Oceanography of Old Dominion University, Norfolk, Virginia, authorizes the import of tissue samples for scientific research related to environmental contaminants from one polar bear and one walrus that were legally hunted in Canada.

Public Display Permits

1. Permit 778099, was amended and re-issued effective February 29, 1996, through December 31, 1998, to extend the expiration date to be consistent with the FEDERAL REGISTER Notice. The re-issued permit authorizes the take of two walrus pups during Alaskan Native subsistence hunting in Alaska.
2. Permit 786616, was amended and re-issued effective April 8, 1996, through December 31, 1999, to Marine World Africa USA, Vallejo, California. This permit authorizes take from the wild of up to two young walrus that are orphaned during Alaskan Native subsistence hunting in Alaska.
3. Permit 805014 was issued April 8, 1996, for Victoria Spain of the Hofstra University, Axinn Library, Hempstead, New York, to import for public display in association with a university education program, a polar bear hide and a pair of pants made from a polar bear hide. Both polar bears were legally harvested by Native hunters in Canada.
4. Permit 808562, issued February 6, 1996, for the Point Defiance Zoo and Aquarium, Tacoma, Washington, to maintain one female polar bear recovered as a stranded, orphaned animal in Alaska.
5. Permit 811418 was issued May 3, 1996, for the Zoological Society of San Diego, San Diego, California, to import two female polar bears which were recovered as orphaned cubs in Canada.
6. Permit 814780 was issued June 24, 1996, for the Carnegie Museum of Natural History Section of Exhibits, Pittsburgh, Pennsylvania, to import one polar bear hide legally harvested in the Northwest Territories, Canada.
7. Permit 809222 was issued March 4, 1996, for the Cincinnati Zoo, Cincinnati, Ohio, to take up to four walrus calves orphaned as the result of the Alaskan Native subsistence hunt or are found stranded.

Registered Agent/Tannery Permits

1. Permit 681597, renewed the registration of George L. Kritchen, Cordova, Alaska, as an agent on October 23, 1996.
2. Permit 683423, renewed the registration of New Method Fur Dressing Co., San Francisco, California, as a tannery on March 14, 1996.
3. Permit 697867, renewed the registration of Bob McConnell, Jr., Anchorage, Alaska, as an agent on August 22, 1996.
4. Permit 723077, renewed the registration of Alaska Fur Exchange, Anchorage, Alaska, as an agent and a tannery on February 29, 1996.
5. Permit 732317, renewed the registration of the Eskimo Walrus Commission, Nome, Alaska, as an agent on October 15, 1996.
6. Permit 805487, Richard Marcus, Inc., Miami, Florida, was registered as an agent on January 24, 1996.
7. Permit 809257, Jenny Pompura, Anchorage, Alaska, was registered as an agent on February 24, 1996.
8. Permit 812648, Elizabeth R. West/Sitka Fur and Leather Taxidermy, Sitka, Alaska, was registered as an agent on April 8, 1996.
9. Permit 814420, Allan and Sophia Chase, Anchorage, Alaska, was registered as an agent and tannery on June 6, 1996.
10. Permit 822365, Ron Alleva, Anchorage, Alaska, was registered as an agent on December 6, 1996.

International Activities

US-Russia Environmental Agreement: Marine Mammal Project

The Service, the USGS/BRD, and the NMFS joined colleagues from the Russian State Fisheries Committee, the Russian Academy of Sciences, and the Russian State Committee for Environmental Protection in conducting marine mammal management and research activities in 1996.

A Russian specialist visited the U.S. in January to participate in the evaluation of historical records of sea otter hunting in Russian and U.S. waters, and for comparative studies of sea otter population dynamics and natural history.

In April a Russian biologist visited California for two weeks to join NMFS colleagues in studies of the northward migration of gray whales. Cow/calf surveys were conducted and a report presented by the Russian biologist on his continuing research on the Russian Native harvest of gray whales.

A three person delegation from Russia was hosted by the Service in Alaska during April for technical consultations regarding a proposed joint conservation and management agreement for the shared Bering/Chukchi Seas polar bear population.

Two Russian biologists traveled to Alaska for two weeks in August to participate in the tagging of harbor seals with NMFS colleagues and to conduct aerial surveys to develop a correction factor to be used in future aerial survey analyses.

A NMFS specialist joined Russian colleagues for three weeks in August-September for bowhead whale studies in the southern Shantar Archipelago (Okhotsk Sea).

For two weeks in September-October a Russian fur seal biologist worked with NMFS colleagues in Alaska on censusing and tagging of fur seals at St. Paul Island.

Five Russian polar bear biologists traveled to Anchorage in November-December for two weeks to cooperate with USGS/BRD colleagues in analyzing data received on 140 polar bears outfitted with satellite transmitter collars in the period 1990-1995.

Status Reports

Incidental (Small) Take During Oil and Gas Operations

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

June 14, 1996, marked the expiration of regulations originally published in the FEDERAL REGISTER in 1991 (56 FR 27443) and appearing at 50 CFR 18.111-119, which authorized the incidental, unintentional take of small numbers of polar bears and Pacific walrus during open-water oil and gas exploration in the Chukchi Sea. The regulations were issued on June 14, 1991, for a five year effective period; however, due to the lack of oil and gas industry interest in the Chukchi Sea, the regulations were not reissued. No LOAs were issued by authority of these regulations in 1996.

On November 16, 1993, the Service issued final regulations (58 FR 60402) for the incidental, but not intentional, take of small numbers of polar bears and Pacific walrus during oil and gas operations (exploration, development, and production) year-round in the Beaufort Sea and adjacent northern coast of Alaska. On August 14, 1995, the

Service modified and extended the regulations through December 15, 1998, [60 CFR 42805], for the full five year period allowable by the Act. LOAs are issued annually by the Service, after review and approval of applications from industry. During Calendar Year 1996, the Service issued nine LOAs under these regulations (Table 1).

Marking, Tagging, and Reporting Program

The Act placed a moratorium on the taking (i.e., harass, hunt, capture, or kill or attempting such actions) of marine mammals. Coastal Alaskan Natives were granted an exception and may legally harvest marine mammals for the purpose of continuing traditional lifestyles through subsistence and handicraft purposes. The Marking, Tagging, and Reporting Program (MTRP) was begun in October 1988 (pursuant to regulations at 50 CFR 18.23(f)) to monitor the subsistence harvest of polar bear, sea otter, and walrus by coastal Alaskan Natives. The MTRP collects biological information from the harvest and assists in controlling illegal activities in specified marine mammal parts. During 1996, MTRP staff traveled to 55 coastal villages to hold village meetings, hire and replace taggers, provide training, and work with hunters to gain better compliance with the MTRP regulations. To help inform village residents of the

MTRP rule, 15 school presentations were made during the village visits. The MTRP staff hired or replaced 19 taggers and added 2 new villages to the program.

The MTRP currently has 127 taggers and 41 alternates located in 96 villages throughout coastal Alaska (Table 2). Usually, local Native residents are hired and trained to work in their own villages to tag polar bear and sea otter hides and skulls, and walrus tusks. The MTRP employs 56 sea otter, 25 polar bear, and 78 walrus taggers. The number of taggers per village varies depending on the magnitude of the harvest. Some villages have several taggers for each species and a few village taggers tag more than one species where the harvest numbers are low. Numbered and color coded, locking tags are placed on all polar bear and sea otter skulls and skins presented for tagging. Premolar teeth are extracted for aging purposes from each bear and otter skull. A lead-headed wire tag is attached through a hole drilled in the root section of each walrus tusk tagged and a liquid marker (visible only under ultraviolet light) is applied to two sides of the tusk. Tag numbers, location and date of tagging, place of kill or find, sex, age, and measurements of specified parts are recorded by the tagger. Harvest data were reported from 60 villages during 1996.

Table 1. Letters of Authorization Issued During Calendar Year 1996 for the Beaufort Sea and Adjacent Northern Coast of Alaska.

<i>Date</i>	<i>Company</i>	<i>Activity</i>
05/15/96	BP Exploration (Alaska)	Open water seismic survey
10/31/96	Western Geophysical	Winter vibrioses survey
10/31/96	Northern Geophysical	Winter vibrioses survey
11/07/96	BP Exploration (Alaska)	Exploration activities
12/10/96	BP Exploration (Alaska)	Year-round oil and gas operations
12/11/96	BP Exploration (Alaska)	Exploration activities
12/20/96	BP Exploration (Alaska)	Development operations
12/24/96	Western Geophysical	Winter vibrioses survey
12/24/96	ARCO Alaska, Inc.	Exploration activities

Table 2. Alaska Villages With MTRP Taggers and Species Tagged.

<i>Village</i>	<i>Species*</i>	<i>Village</i>	<i>Species</i>	<i>Village</i>	<i>Species</i>
Adak	SO	Juneau	SO	Pilot Point	SO/W
Akhiok	SO	Kake	SO	Platinum	W
Akutan	SO	Kaktovik	PB/W	Point Hope	PB/W
Anchorage	SO/PB/W	Karluk	SO	Point Lay	PB/W
Angoon	SO	Kenai	SO/W	Port Graham	SO
Atka	SO	Ketchikan	SO/W	Port Heiden	SO/W
Barrow	PB/W	King Cove	SO	Port Lions	SO
Bethel	SO/W	King Island	W	Quinhagak	W
Brevig Mission	W	King Salmon	SO/W	Sand Point	SO/W
Chefornak	W	Kipnuk	W	Savoonga	PB/W
Chenega Bay	SO	Kivalina	PB/W	Seldovia	SO
Chevak	W	Klawock	SO	Seward	SO
Chignik	SO/W	Kodiak	SO/W	Shaktoolik	W
Chignik Lagoon	SO	Kongiganak	W	Shishmaref	PB/W
Chignik Lake	SO/W	Kotzebue	PB/W	Sitka	SO/W
Clarks Point	W	Koyuk	W	St. George	W
Cold Bay	SO/W	Kwigillingok	W	St. Michael	W
Cordova	SO/W	Larsen Bay	SO	St. Paul	SO/W
Dillingham	SO/W	Little Diomedea	PB/W	Stebbins	W
Egegik	SO/W	Manokotak	W	Tatitlek	SO
Elim	W	Mekoryuk	W	Teller	PB/W
Emmonak	W	Naknek	W	Togiak	W
English Bay	SO	Newtok	W	Toksook Bay	W
Fairbanks	SO/PB/W	Nightmute	W	Tuntutuliak	W
False Pass	SO	Nikolski	SO	Tununak	W
Gambell	PB/W	Nome	PB/W	Unalakleet	W
Golovin	W	Nuiqsut	PB	Unalaska	SO/W
Goodnews Bay	W	Old Harbor	SO	Valdez	SO
Homer	SO/W	Ouzinkie	SO	Wainwright	PB/W
Hoonah	SO	Pelican	SO	Wales	PB/W
Hooper Bay	W	Perryville	SO/W	Wrangell	SO
Hydaburg	SO	Petersburg	SO	Yakutat	SO

*Species Key: SO= sea otter PB = polar bear W = walrus

Sea Otter

Twenty-six sea otter taggers reported 596 otters being tagged in 1996 with several villages reporting a decrease in numbers of otters killed compared with the previous year (Table 3). The majority of the harvest was adult males (Table 4). Sea otter hides are used to make hats, gloves, slippers, blankets, and other arts and crafts. A few hunters trade sea otter hides for walrus ivory, polar bear, and seal skins or other items that are used in making crafts. Compliance to the tagging regulation by sea otter hunters appears to be high.

Polar Bear

Thirty-two polar bears were tagged in six villages during the 1995-96 hunting season (Table 5). Similar to sea otters, a majority of the harvest was adult males (Table 6). During the 1995-96 harvest year, the total number of bears tagged decreased as compared with the previous harvest year. Compliance by polar bear hunters to the tagging rule appears to be good.

Walrus

Thirty-five walrus taggers reported tagging 1,476 walrus in 1996 (Table 7). Adults of both sexes were harvested in similar numbers (Table 8). Walrus tusks sometimes become separated before

they are tagged. In order to accurately account for the harvest, a weight factor variable is added that interprets each record in terms of take. Estimation of the total harvest is made by summing this weight factor. Walrus records where only a single tusk was tagged is given a weight factor of 0.5, because the possibility exists that the second tusk may be tagged at a later date. For analytical purposes, the lower estimate is calculated with the assumption that single tusk-records in the database represent half of one walrus. The upper estimate is calculated assuming that each record represents a whole walrus. If all walrus tusks are tagged as pairs, the upper and lower bounds are equal.

Table 3. Sea Otters Tagged by Tagging Location and Year.

<i>Location</i>	<i>Pre-Rule</i>	1988	1989	1990	1991	1992	1993	1994	1995	1996	<i>Total</i>
Adak	0	0	0	0	0	2	0	0	0	0	2
Akhiok	1	0	0	0	0	0	0	0	0	0	1
Akutan	0	0	0	0	0	1	10	0	0	0	11
Anchorage	117	2	44	11	8	25	9	56	37	49	358
Angoon	0	0	0	0	0	0	4	39	56	0	99
Atka	0	0	0	0	0	0	0	2	0	0	2
Bethel	4	0	0	0	1	0	0	0	0	0	5
Chenega Bay	0	0	0	0	0	0	0	0	14	6	20
Chignik	1	0	9	5	0	0	0	6	0	0	21
Chignik Lake	0	0	0	0	0	0	0	2	0	0	2
Cold Bay	0	0	0	1	0	0	8	0	0	0	9
Cordova	31	0	12	9	34	13	50	120	171	173	613
Egegik	0	0	0	0	0	0	0	0	0	1	1
English Bay	0	0	0	0	0	0	17	6	0	12	35
Fairbanks	0	0	0	0	0	0	2	0	0	0	2
False Pass	0	0	0	0	0	0	0	0	10	3	13
Homer	18	22	9	9	0	0	25	14	0	24	121
Hoonah	0	0	0	0	0	51	230	7	0	0	288
Hydaburg	0	0	0	0	0	0	0	0	0	7	7
Juneau	11	0	1	26	0	14	27	93	21	3	196
Kake	0	0	0	0	0	0	18	2	3	5	28
Kenai	0	0	8	6	33	0	0	19	0	0	66
Ketchikan	2	0	0	0	0	194	83	6	0	3	288
King Cove	8	0	0	25	0	8	1	5	1	0	48
King Salmon	0	0	0	0	0	0	1	0	0	0	1
Klawock	57	3	118	10	74	4	220	19	52	25	582
Kodiak	157	0	31	16	5	27	120	6	30	41	433
Larsen Bay	31	0	0	0	17	14	2	16	7	77	164
Mekoryuk	5	0	0	0	0	0	0	0	0	0	5
Ouzinkie	0	0	0	0	0	0	29	0	0	0	29
Pelican	0	0	0	0	0	0	0	0	0	8	8
Perryville	0	0	0	0	0	2	2	0	0	0	4
Pilot Point	1	0	0	0	0	0	0	0	1	0	2
Port Graham	0	3	0	0	1	6	6	101	32	13	162
Port Heiden	1	0	5	0	0	1	0	1	2	7	17
Port Lions	11	0	0	1	0	0	0	23	3	18	56
Sand Point	0	0	1	0	0	0	0	0	0	0	1
Seldovia	0	0	1	0	0	12	20	8	0	0	41
Sitka	44	25	35	47	39	163	218	131	38	58	798
Tatitlek	0	0	0	0	19	27	4	0	0	0	50
Unalaska	0	0	0	0	0	0	5	0	0	0	5
Valdez	0	0	0	0	0	73	102	135	121	56	487
Wrangell	0	0	0	0	0	0	21	2	0	3	26
Yakutat	0	0	0	0	0	0	14	13	15	4	46
TOTALS	500	55	274	166	231	637	1,248	832	614	596	5,153

As a conservative approach to management, the upper estimate is considered to be the actual figure for the walrus harvest.

Hunter success varied greatly from village to village and between hunters. Many hunters reported poor weather and marginal ice conditions during the walrus migration making hunting conditions difficult. Often the villagers could hear or even see the walrus but because of bad ice conditions they were unable to get close to them.

Compliance With the MTRP Regulations

Compliance with the MTRP regulation by walrus hunters needs improvement. Despite an aggressive campaign by the MTRP staff and Law Enforcement for compliance, some walrus hunters still do not comply with the tagging rule. Village meetings, radio and newspaper announcements, letters, and posters were utilized to encourage the hunters in all villages to have every kill recorded. The most common reason for ivory not being tagged was that hunters carve their own harvested ivory. Some hunters do not see the use of tagging their ivory if they are going to use it themselves. In the past, when raw ivory was sold to the village store or registered agents, compliance with the rule was high.

Assessment of compliance is most often subjectively based on personal observation and discussions with village taggers and others. However, a recent study comparing the number of walrus observed by the Walrus Harvest Monitoring Project that were later tagged by the MTRP revealed that compliance may be as low as 50 percent. The Service feels that this is an unacceptable level, and is taking steps to increase compliance with the rule.

Enforcement of the MTRP regulations has been limited to only a few cases and those were related to other enforcement actions. However, information from the MTRP data base was valuable in several enforcement actions in past years. In most cases, enforcement has had a positive effect and heightened awareness.

Outreach Activities

Success of the MTRP depends on a village presence by the Service and routine contacts with taggers. The MTRP staff will continue to hold village meetings, train and retrain taggers as

Table 4. Sea Otters Tagged by Age Class, Sex, and Year.

	<i>Pre-Rule</i>	1988	1989	1990	1991	1992	1993	1994	1995	1996	<i>Total</i>
<i>ADULTS</i>											
Male	231	44	182	120	149	367	585	466	441	414	2,999
Female	88	9	35	15	44	172	426	166	97	81	1,133
Unknown	121	0	19	2	23	17	39	80	14	38	353
Subtotal	440	53	236	137	216	556	1,050	712	552	533	4,485
<i>SUBADULTS</i>											
Male	8	1	15	16	3	35	74	66	25	29	272
Female	8	1	2	9	5	25	55	25	18	20	168
Unknown	14	0	3	0	3	5	7	21	2	3	58
Subtotal	30	2	20	25	11	65	136	112	45	52	498
<i>PUPS</i>											
Male	1	0	2	3	0	6	7	5	5	5	34
Female	0	0	0	1	1	5	3	1	2	4	17
Unknown	6	0	1	0	1	2	3	1	8	2	24
Subtotal	7	0	3	4	2	13	13	7	15	11	75
<i>UNKNOWN</i>											
Male	0	0	1	0	2	1	0	0	0	0	4
Female	0	0	1	0	0	1	7	0	0	0	9
Unknown	23	0	13	0	0	1	42	1	2	0	82
Subtotal	23	0	15	0	2	3	49	1	2	0	95
<i>ALL AGES</i>											
Male	240	45	200	139	154	409	666	537	471	448	3,309
Female	96	10	38	25	50	203	491	192	117	105	1,327
Unknown	164	0	36	2	27	25	91	103	26	43	517
Grand Total	500	55	274	166	231	637	1,248	832	614	596	5,153

Table 5. Polar Bears Tagged, by Tagging Location and Harvest Year.^a

<i>Location</i>	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	<i>Total</i>
Anchorage	2	0	3	4	4	0	0	0	0	13
Barrow	12	31	14	14	22	24	28	10	14	169
Brevig Mission	0	0	1	0	0	0	0	0	0	1
Fairbanks	1	0	0	0	0	0	0	0	0	1
Gambell	25	13	10	11	4	4	28	9	0	104
Kaktovik	6	8	0	0	0	3	5	1	1	24
Kivalina	5	1	5	3	2	1	1	2	0	20
Kotzebue	0	0	4	0	0	1	1	0	0	6
Little Diomede	15	9	6	3	6	6	8	10	0	63
Nome	3	0	1	0	0	0	0	2	0	6
Nuiqsut	3	2	0	0	0	0	3	1	1	10
Point Hope	9	8	22	14	7	12	6	18	1	97
Point Lay	2	2	0	0	0	2	1	1	0	8
Savoonga	13	13	9	12	6	0	23	10	0	86
Shishmaref	13	23	14	6	3	5	5	16	2	87
Wainwright	9	13	7	6	3	4	10	6	13	71
Wales	5	9	3	3	2	3	1	2	0	28
TOTAL	123	132	99	76	59	65	120	88	32	794

^aHarvest year is from July 1 through June 30 of the following year.

necessary, work with Native leaders and organizations and expand the use of informational and educational materials that relate to the MTRP and other marine mammal issues.

Because of the extensive exposure of the MTRP staff throughout coastal Alaska, MTRP personnel are often called upon by other programs in the Service that need an introduction to, or assistance working in, a village. The MTRP staff will continue to provide information that is obtainable only by being acquainted with the residents of the remote villages and/or familiarity with traditional village life.

The Marine Mammals Management Office's quarterly "Marine Mammal Bulletin" continues to be distributed to all taggers and other interested people. The Bulletin has proven to be valuable tool in disseminating pertinent information in a timely manner to a state-wide village audience.

Sea Otter-Alaska

The Alaska sea otter program included the following activities during this period: (1) expansion of the biological monitoring program resulting in training 28 Native hunters in necropsy techniques; (2) ongoing work with the Alaska Sea Otter Commission; (3) mortality assessment of a die-off in eastern Prince William Sound; (4) cooperative work with the USGS/BRD on implementation of survey methodology; (5) conservation plan summary; (6) continuation and expansion of the MTRP program to include tissue collection for genetics analysis; (7) conducting a survey of sea otter distribution along the outer coast of the Gulf of Alaska between Prince William Sound and southeast Alaska in conjunction with the Minerals Management Service; (8) work with the Alaska Scientific Review Group on stock assessments; (9) work with the USGS/BRD, Alaska Science Center on Exxon Valdez oil spill restoration

projects; and (10) placement of one stranded animal in a zoo in Holland.

Biological Monitoring Program

The Service continued to work with the Alaska Sea Otter Commission and the USGS/BRD Alaska Science Center on the refinement and implementation of a program resulting in the sampling of hunted animals for contaminants and life-history studies. The Service developed and implemented a rigorous training program which trained approximately 20 Native hunters in sampling methodology during this period. Sea otters from 5 regions (Aleutian Islands, Prince William Sound, Resurrection Bay, Kachemak Bay, and southeast Alaska) totaling 71 animals were necropsied and sampled as part of this program.

Alaska Sea Otter Commission

The Alaska Sea Otter Commission and the Service continued to work together on development of regional and local

Table 6. Polar Bears Tagged by Age Class, Sex, and Harvest Year.^a

	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	Total
<i>ADULTS</i>										
Male	12	5	28	41	25	25	28	37	11	212
Female	8	3	13	6	5	10	15	11	1	72
Unknown	0	0	0	0	0	2	5	2	7	16
Subtotal	20	8	41	47	30	37	48	50	19	300
<i>SUBADULTS</i>										
Male	1	2	27	12	12	13	26	17	9	119
Female	0	0	7	7	13	3	10	10	3	53
Unknown	0	1	0	0	0	1	2	0	1	5
Subtotal	1	3	34	19	25	17	38	27	13	177
<i>CUBS</i>										
Male	3	0	4	2	1	5	7	2	0	24
Female	0	0	2	0	0	2	6	4	0	14
Unknown	0	0	0	0	0	2	1	1	0	4
Subtotal	3	0	6	2	1	9	14	7	0	42
<i>UNKNOWN</i>										
Male	58	78	6	5	0	2	4	4	0	157
Female	38	31	1	1	3	0	14	0	0	88
Unknown	3	12	11	2	0	0	2	0	0	30
Subtotal	99	121	18	8	3	2	20	4	0	275
<i>ALL AGE CLASSES</i>										
Male	74	85	65	60	38	45	65	60	20	512
Female	46	34	23	14	21	15	45	25	4	227
Unknown	3	13	11	2	0	5	10	3	8	55
Grand Total	123	132	99	76	59	65	120	88	32	794

^a Harvest year is from July 1 through June 30 of the following year.

Table 7. Walrus Harvest Estimate, From MTRP Data, by Tagging Location and Year.

<i>Location</i>	<i>Pre-Rule</i>	<i>1988</i>	<i>1989</i>	<i>1990</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>Total</i>
Anchorage	294	0	37	19	19	3	2	13	14	3	404
Barrow	1	1	11	7	23	22	31	16	10	8	130
Bethel	13	0	10	18	18	22	13	7	0	1	102
Brevig Mission	3	0	0	6	1	27	4	2	0	1	44
Chevak	11	0	2	1	2	4	4	3	0	0	27
Chignik	1	0	0	0	0	0	0	0	0	1	2
Chignik Lake	2	0	0	0	0	0	0	0	0	0	2
Clarks Point	8	0	1	0	14	5	0	0	3	0	31
Cold Bay	0	0	0	0	0	1	1	1	0	0	3
Cordova	13	0	0	0	0	0	0	0	0	0	13
Dillingham	25	0	10	15	5	8	24	48	37	61	233
Egegik	0	0	0	0	0	1	0	2	0	3	6
Elim	0	0	0	2	4	0	1	0	1	0	8
Emmonak	0	0	0	0	0	0	3	0	0	0	3
Fairbanks	9	0	2	0	0	0	2	1	0	0	14
Gambell	12	4	188	756	629	403	464	521	287	667	3,931
Golovin	1	0	0	0	1	3	0	1	1	1	8
Goodnews Bay	4	0	2	1	1	2	0	2	0	0	12
Homer	0	0	0	0	2	2	2	0	0	0	6
Hooper Bay	3	0	1	15	5	3	2	3	1	1	34
Kaktovik	0	0	0	0	0	0	1	0	0	0	1
Kenai	2	0	0	0	0	0	0	0	0	0	2
Ketchikan	1	0	0	0	0	0	0	0	0	0	1
King Island	2	0	0	7	77	346	28	12	0	117	589
King Salmon	3	0	0	1	3	2	2	0	2	0	13
Kipnuk	3	0	0	3	1	1	2	5	1	23	39
Kivalina	0	0	46	0	0	1	0	0	1	0	48
Kodiak	2	0	0	0	0	0	0	0	0	0	2
Kongiganak	1	0	3	0	4	6	3	6	5	0	31
Kotzebue	30	0	0	0	3	0	0	0	0	19	52
Koyuk	0	0	0	2	5	0	0	0	1	0	8
Kwigillingok	3	0	0	2	1	6	0	1	1	0	14
Little Diomedea	3	0	1	236	532	84	91	372	197	85	1,601
Manokotak	3	0	1	0	0	0	0	2	0	0	6
Mekoryuk	23	0	4	14	49	22	25	7	10	8	162
Naknek	3	0	0	3	1	1	1	0	0	1	10
Newtok	0	0	0	0	0	0	0	0	1	0	1
Nome	50	0	1	15	39	14	16	19	4	46	204
Perryville	0	0	1	0	0	0	0	0	0	0	1
Pilot Point	0	0	0	0	1	0	0	0	0	0	1
Platinum	20	0	9	5	2	10	3	0	3	0	52
Point Hope	3	0	2	5	0	5	5	6	0	0	26
Point Lay	0	0	0	0	0	0	1	1	4	4	10
Port Heiden	5	0	0	0	2	4	5	1	3	12	32
Quinhagak	0	0	0	0	3	0	0	0	0	0	3
Sand Point	1	0	0	1	9	0	0	0	0	0	11
Savoonga	424	0	221	198	520	546	302	157	377	294	3,039
Shaktoolik	0	0	0	0	0	0	0	0	0	2	2
Shishmaref	490	0	122	87	35	69	42	5	12	48	910
Sitka	15	0	0	0	6	0	0	0	0	0	21
St. George	1	0	0	1	1	0	0	0	0	0	3
St. Paul	0	0	0	2	1	1	5	0	1	1	11
Stebbins	0	0	1	5	17	0	8	0	0	0	31
Teller	0	0	0	0	0	3	11	1	4	0	19
Togiak	13	1	9	25	6	6	24	32	9	36	161
Toksook Bay	4	0	0	0	2	1	2	1	0	2	12
Tuntutuliak	0	0	0	0	2	1	2	5	4	0	14
Tununak	1	0	0	0	0	0	0	1	0	2	4
Unalakleet	6	0	1	5	5	0	0	2	2	0	21
Wainwright	4	0	43	0	32	33	44	68	83	23	330
Wales	10	0	10	10	81	15	3	0	8	1	138
TOTAL	1,526	6	739	1,467	2,164	1,683	1,179	1,324	1,085	1,476	12,649

Table 8. Walrus Harvest Estimate, From MTRP Data, by Age Class, Sex, and Year.

	<i>Pre-Rule</i>	<i>1988</i>	<i>1989</i>	<i>1990</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>Total</i>
<i>ADULTS</i>											
Male	603	6	351	518	883	705	600	499	472	643	5,280
Female	235	0	215	530	894	732	425	714	475	585	4,805
Unknown	585	0	154	55	63	103	78	50	13	29	1,130
Subtotal	1,423	6	720	1,103	1,840	1,540	1,103	1,263	960	1,257	11,215
<i>SUBADULTS</i>											
Male	26	0	6	21	39	53	22	28	20	36	251
Female	5	0	2	4	16	7	6	6	11	14	71
Unknown	49	0	3	8	6	6	10	1	4	14	101
Subtotal	80	0	11	33	61	66	38	35	35	64	423
<i>CALVES</i>											
Male	0	0	0	0	58	1	3	1	0	0	63
Female	0	0	0	0	61	0	2	0	0	0	63
Unknown	1	0	4	331	144	74	32	25	90	155	856
Subtotal	1	0	4	331	263	75	37	26	90	155	982
<i>UNKNOWN</i>											
Unknown	22	0	4	0	0	2	1	0	0	0	29
Subtotal	22	0	4	0	0	2	1	0	0	0	29
<i>ALL AGES</i>											
Male	629	6	357	539	980	759	625	528	492	679	5,594
Female	240	0	217	534	971	739	433	720	486	599	4,939
Unknown	657	0	165	394	213	185	121	76	107	198	2,116
Totals	1,526	6	739	1,467	2,164	1,683	1,179	1,324	1,085	1,476	12,649

management plans; collection and use of traditional Native ecological knowledge; sharing of scientific information; implementation of the biological monitoring program; implementation of the Marking, Tagging, and Reporting Program; and Commission input into certain ongoing Service activities.

Mortality Assessment in Eastern Prince William Sound

An unusually heavy winter die-off of sea otters was reported by local residents in the Cordova area of Prince William Sound. Necropsies were conducted on several sea otters, carcass surveys were conducted on local beaches, and population surveys were done. Although the presence of an unusual parasite was noted in several of the dead animals, it was not considered to be a cause of mortality. The cause of death for all animals examined was likely starvation. Additional symptoms which were noted were likely caused by, or related to, weakening due to insufficient food. It is likely that this increase in mortality was a normal population response to reduction in food resources resulting from high population numbers over an extended time period.

Cooperative Work with USGS/BRD on Implementation of Survey Methodology
The Service continued to work with USGS/BRD, Alaska Science Center, on implementation of the survey design developed for state-wide survey efforts of sea otters in Alaska.

Conservation Plan Summary
Following the completion of the Service's Conservation Plan for Sea Otters, the Service developed a brochure-style version of the plan which was completed and printed during this period.

Continuation and Expansion of MTRP Program to Include Tissue Collection for Genetics Analysis

An additional voluntary element was added to the information collected from Native hunters. This is a small tissue sample to be used in current and future genetic studies. Immediate plans include an analysis of the reporting of sex information from hunted animals which is scheduled to be completed in 1997.

Survey of Sea Otter Distribution Along the Outer Coast of the Gulf of Alaska
The Service completed a survey of sea otter distribution along the outer coast of the Gulf of Alaska between Prince

William Sound and southeast Alaska in conjunction with the Minerals Management Service as part of the development of an Environmental Impact Statement for an adjacent lease sale.

Work with the Alaska Scientific Review Group on Stock Assessments
The Service worked with the Alaska Scientific Review Group and the NMFS on the development of guidelines and protocols for stock assessments. Additionally, the Service continued to evaluate the status of sea otter stocks in Alaska. Originally completed and disseminated to the public in October 1995, the Service intends to update and revise the stock assessment for Alaska sea otters in 1997. This process will include public notification and a review period according to provisions in the Act.

Work with the USGS/BRD Alaska Science Center on Exxon Valdez Oil Spill Restoration Projects
The Service provided continuing support to the USGS/BRD Alaska Science Center and the Exxon Valdez Trustee Council on restoration projects following the oil spill. These projects consider the mechanisms and extent of recovery of

sea otter populations injured as a result of the spill.

Placement of Stranded Sea Otter

One sea otter pup was picked up from Prince William Sound, believed to be abandoned by its mother. It was maintained by Service staff until it was successfully placed at a zoo in Holland.

Pacific Walrus

Bilateral Agreement for the Conservation of Pacific Walrus

A single stock of walrus occurs in the waters off Alaska and eastern Russia. Both nations share common interests with respect to the conservation and management of this walrus population. The need to address international conservation issues such as assessing the status and trend of the Pacific walrus population as well as Native subsistence needs and impacts resulting from oil and gas exploration and development, shipping, commercial fishing, and other activities are recognized priorities for Government officials and Native leaders from both countries. In 1995, meetings were held in Petropavlovsk, Kamchatka, Russia to discuss possible bilateral agreements for walrus conservation and management, and a protocol of intent was signed. The protocol acknowledged the mutual interest in developing bilateral government-to-government and Native-to-Native agreements to provide for the conservation, research, habitat conservation, and Native subsistence use of the Pacific walrus population. It was agreed to continue discussions on developing government and Native agreements in the future. Progress continued in 1996. Russian biologists provided the Service with a draft government-to-government agreement for review, and draft Native-to-Native agreement was presented for review to the Eskimo Walrus Commission by its counterpart Russian Native organization.

Co-Management with Alaska Natives

Recognizing the importance of marine mammals as resources for subsistence, and materials for handicrafts made by Alaskan Natives, the 1994 amendments to the Act included provisions for funding cooperative management measures for these species. Native organizations, Federal agencies, and State agencies are developing cooperative management agreements and plans to guide future resource management practices, with the goal of increasing involvement of Alaskan Natives in the development of



*A northern sea otter in Alaska.
U.S. Fish & Wildlife Service photo.*

management policies, prioritization of research needs, and collaboration on monitoring programs and research projects.

In 1996, the Service and the Eskimo Walrus Commission (EWC) initiated the development of a framework for preparing cooperative management agreements and for the transfer of cooperative management funds between these organizations. The framework is anticipated to define shared responsibilities for execution of the walrus conservation program. Negotiations for a comprehensive cooperative management agreement and development of specific cooperative management projects are ongoing.

In addition to developing co-management programs, the Service and the EWC signed a memorandum of understanding outlining procedures for identifying potential law enforcement issues, releasing statements to the media, and informing Native hunters on matters concerning the Act's provisions prohibiting wasteful take of walrus.

Cooperative Agreement for Managing Subsistence Walrus Hunting on Round Island, Bristol Bay, Alaska

Last year marked the second year of the resumption of subsistence walrus hunting on Round Island, Walrus Islands State Game Sanctuary, Bristol Bay, Alaska. A 35-year prohibition on hunting

was amended in 1995 after the Alaska State Board of Game adopted a proposal to resume hunting on Round Island from the village of Togiak. Consequently, in 1995, the Service entered into a cooperative management agreement with Native hunter organizations (the Qayassiq Walrus Commission (QWC) and the Eskimo Walrus Commission (EWC)), and the Alaska Department of Fish and Game (ADFG) which outlined a co-management approach for the harvest of walrus on the island. According to the agreement, Natives observed a self-imposed limit of ten walrus and restricted their hunting season to the month of October 1996. Hunt activities were monitored by the Service, the ADFG, and the Native walrus commissions to assess the impact of the harvest on walrus abundance and behavior (please refer to *Walrus Harvest Monitoring Project* section).

Work with the Alaska Scientific Review Group on Pacific Walrus Stock Assessment

The Service worked with the Alaska Scientific Review Group and the NMFS on the development of guidelines and protocols for a Pacific walrus stock assessment. Additionally, the Service continued to evaluate the status of this stock. In 1997, the Service will begin to update the stock assessment for Pacific walrus which was originally completed and disseminated to the public in October 1995. This process will include public notification and a review period according to provisions in the Act.

Pacific Walrus Range-Wide Survey

At 5-year intervals between 1975 and 1990, the United States and Russia collaborated on aerial, ice-edge walrus surveys to attempt to assess the status and trend of the Pacific walrus population. These surveys provided the best available estimates of the walrus population. However, because of methodological problems such as the inability to determine the number of walrus present but under water (and undetectable to observers) during counts and the extreme variability of the distribution of walrus aggregations, the reliability of the estimates and their utility for determining population trend are limited. Re-evaluation of aerial survey data indicated that with current methods, the amount of effort required to detect population trend is impractical. Because of these limitations and the expense, range-wide surveys have not been repeated since 1990.

Research to resolve questions about the proportion of animals hauled out on ice, their movement patterns, and habitat needs are underway. It is anticipated that results of this work will be useful in improving survey techniques, and that another range-wide walrus survey will be conducted in the next few years. In addition to evaluating and improving aerial survey techniques, alternative methods for evaluating status and trend of the walrus population, including monitoring changes in animal body condition, reproductive parameters, and other potential population indices are being examined (please refer to *Walrus Harvest Monitoring Project* section).

Bristol Bay Walrus Haulout Monitoring
During the summer months of 1996, the Service continued to monitor walrus numbers at three of the four largest terrestrial walrus haulout grounds in North America: Round Island, Cape Peirce, and Cape Newenham. Continuing the Round Island cooperative management program with the ADFG, Service and State biologists made 94 consecutive daily counts of walrus on Round Island between May 6 and August 14, and resumed efforts between September 24 to October 31. The high count occurred on July 25 when 6,331 walrus were observed. This number is slightly lower than the peak of 7,804 reported in 1995, but is slightly larger than the 5-year average of 5,540 animals.

Staff of the Togiak National Wildlife Refuge monitored walrus numbers at Cape Newenham and Cape Peirce. At Cape Newenham, counts were made daily between June 1 and August 11, and sporadically between August 16-24. The high count for Cape Newenham was 1,280 walrus on July 13. At Cape Peirce, refuge biologists made daily walrus counts between May 3 and October 30; and recorded a peak of 3,105 animals on October 6, 1996. Although the high count in 1996 was 69 percent lower than the high count in 1995, refuge biologists report a general trend of increasing walrus numbers at Cape Newenham and Cape Peirce.

The Service continued observations of walrus and their reactions to human activities on and near terrestrial haulouts to assess effects of activities such as tourism, commercial fishing, and Native subsistence hunting on walrus' haulout use. Biologists stationed on Round Island studied walrus' reactions to activities associated with the summer

visitor program and the autumn subsistence hunt. They made 216 hours of observations in the summer and 37 hours in the fall. In 1996, walrus did not consistently react to human activities. However, in some cases, walrus reacted to human activities by leaving the beach. Hunting activities invariably cleared the beaches of all walrus. Data on conditions leading to walrus disturbances are being analyzed, and the Service hopes to use this information to manage human activities on and around terrestrial haulouts.

Walrus Harvest Monitoring Project

The Service continued two programs to monitor the size and structure of the U.S. walrus harvest. The MTRP assessed the number of walrus harvested at all coastal Alaska villages through the collection of tusk registration certificates by village taggers. The Walrus Harvest Monitoring Project (WHMP) monitored the spring harvest in the villages of Gambell, Savoonga, Diomedes, and Wales. These communities are responsible for 60-80 percent of the annual reported United States walrus harvest. Service and village technicians worked together to collect information on the size and demographics of the spring harvest by conducting hunter interviews and collecting biological samples. This information was used to assess the size and composition of the harvest and to study aspects of walrus population dynamics and life history. Samples collected through the WHMP included teeth for age determination, adult female reproductive tracts to determine reproductive status, and occasional anomalous tissues which were used to identify specific pathologies.

During the 1996 spring harvest, WHMP monitors recorded 1,234 walrus landed in Gambell, Savoonga, Diomedes, and Wales. This harvest was 31 percent lower than the average annual harvest level of 1,781 reported for the years 1980 through 1995. Teeth from 291 walrus were collected for determining the age structure of the harvest. Harvested walrus ranged in age from 3 to 44 years. Ninety-one adult female reproductive tracts were collected. The sex ratio of the recorded harvest was 1.8 females: male.

In 1996, a technical report was produced which summarized the results of field and laboratory investigations of the age-sex composition and reproductive status of walrus harvested between 1994-1996. A total of 3,423 harvested walrus were

recorded during spring subsistence hunts in Alaska at the Native villages of Little Diomedes, Gambell, Savoonga, and Wales. The sex ratio of the harvest was 1.8 females: male. On average, sampled females were younger than sampled males. Examination of sampled female reproductive tracts indicated the mean age of first birth was approximately 7 years. On average, the proportion of mature females bearing a calf per annual cycle was 59 percent. Comparisons with previously reported data suggest that the present population may be below the carrying capacity of its environment.

Round Island Subsistence Walrus Harvest

October, 1996 marked the second year of the resumption of subsistence walrus hunting on Round Island, Walrus Islands State Game Sanctuary, Bristol Bay, Alaska. This year, the Bristol Bay Native Association contributed resources for transporting hunt monitors to the island. Between September 28 and November 1, one biologist from the Service and one from the ADFG were stationed on Round Island to monitor walrus responses to hunting activities and to collect biological information from harvested walrus. Hunters participated in the hunt monitoring program by coordinating hunting activities with walrus behavioral observations and by providing the Service with biological samples collected from harvested walrus.

This year, 6 of the 10 allotted walrus were harvested from Round Island. Samples collected from each animal included: teeth for age determination, tissue samples for histological and genetic studies, and samples for the Alaska Marine Mammals Tissue Archival Project (AMMTAP). The AMMTAP is an interagency project dedicated to the collection and long-term storage of marine mammal tissues suitable for determining levels of organic and inorganic toxic substances.

Hunted walrus fled the beaches in response to the presence of hunters or shooting. Walrus returned to deserted haulouts within 3 days after hunting activities. At this time, limited hunting in the late fall does not appear to affect long-term use of the Round Island haulouts.

Polar Bear

Harvest Summary

The Service's MTRP continued to collect information from polar bears taken by

Table 9. Village Polar Bear Harvest, Alaska 1995/1996.

<i>Village</i>	<i>Male</i>	<i>Female</i>	<i>Unknown</i>	<i>Total</i>
Kaktovik*	—	1	—	1
Nuiqsut*	1	—	—	1
Barrow*	11	2	1	14
Atqasuk*	—	—	—	0
Wainwright*	5	—	8	13
Point Lay	—	1	—	1
Point Hope	1	1	3	5
Kivalina	—	—	—	0
Shishmaref	1	1	—	2
Wales	—	—	—	0
Ageklekak	—	—	—	0
Diomede	—	—	—	0
Savoonga	—	—	—	0
Gambell	—	—	—	0
Total	19	6	12	37
Percent	(51.4)	(16.2)	(32.4)	(100)

*Denotes villages party to the NSB/IGC management agreement. The harvest season extends from July 1, 1995, to June 30, 1996.

Native hunters for subsistence purposes during the past year. The 1995/96 Alaska kill was 37 bears consisting of 19 males, 6 females, and 12 with sex unknown (Table 9). This was the lowest recorded harvest since the Service began collection of harvest data in 1980. A general reduction in harvest rates has been evident in recent years. The mean annual harvest from 1990/91 to 1995/96 was 77 bears which is below the preceding ten-year annual harvest of 131 bears from 1980/81 to 1989/90.

Statewide, harvests occurred in every month except July and October. The peak monthly harvest, which occurred during the period between March and May, accounted for approximately 50 percent of the kill. The combined months of November to May, when the pack ice is in proximity to shore, accounted for 86.4 percent of the harvest. The harvest from the Alaska region of the southern Beaufort Sea (29 bears) represented 78 percent of the total statewide harvest. Normally, 75 percent of the bears harvested in Alaska come from the Chukchi/Bering Seas population and 25 percent from the Beaufort Sea population. The harvest from the Chukchi/Bering Seas stock has been reduced in recent years while the harvest from the southern Beaufort Sea has remained stable.

The sex ratio of polar bears of known-sex harvested during the 1995/96 harvest season favored males (76 percent male and 24 percent female). This represents an increase in the proportion of males taken in the harvest when compared to the long-term sex ratio average of 66 percent males to 34 percent females.

Age analysis for the previous year was completed during this reporting period. The age class of 62 bears in the 1994-95 harvest based on age determinations from tooth annuli for completed years of life was 24 adults, 28 subadults, and 10 cubs. Cubs are 0-2.3 years, subadults are >2.3-5 years, and adults are >5 years old. The mean age for females (6.7 years) and males (6.5 years) in the harvest for the 1994/95 season was close to the long term average of 7.2 and 6.4 years, respectively. Complete sex and age information was obtained from 72 percent of the kill during the 1994/95 season.

Harvest Characteristics

A biological sampling program began in fall/winter 1996-97 to coincide with the polar bear harvest period. The objectives of the program are to determine heavy metal concentrations in the muscle, liver, and kidneys, levels of methyl mercury in muscle tissue, and organochlorine concentrations in fat tissue of adult male polar bears. Although levels of methyl mercury in

muscle tissue were addressed in the original proposal, the main focus was on heavy metal concentrations in the liver and kidney and organochlorine levels in adipose tissue. Following discussions with the Native community, which was primarily interested in contaminant levels in food that is consumed, the proposal was modified to include muscle tissue to the list of samples to be examined for levels of heavy metals. Adult males were selected to reduce variation in contaminant levels due to sex and age. Levels of organochlorines have been shown to be more variable in females due to changes in fat utilization and storage associated with the time of year. Unlike males, females are able to pass certain PCB congeners to their cubs during pregnancy and while nursing. The proportion of males:females in the harvest is approximately 2:1 and thus, obtaining samples from adult males will be quicker. Restricting the sample collection to males will not encourage hunting of adult females, the most important age class with respect to population dynamics. To determine if contaminant levels vary with respect to population stocks and/or local areas, samples are being collected from northern and western Alaska.

In October 1996, biologists visited 11 coastal villages in Alaska to distribute the sampling kits, explain the program objectives, and review the biological sampling protocol with polar bear hunters. Visits to two additional villages are planned for January 1997.

Polar Bear Management Agreement, Beaufort Sea

The polar bear harvest in 1995/96 in Alaska villages party to the NSB/IGC Agreement was 29 animals: 17 males, three females, and nine of unknown sex. This total is below the 38 bear allocation. The harvest of known-sex animals (19/29) was 85 percent male and 15 percent female. Fifty-nine percent of the harvest occurred in December 1995, and in April and May 1996. Two bears were killed outside of the prescribed season which extends from September 1 to May 31. Teeth continue to be aged through the Canadian Wildlife Service laboratory. Age analysis for the previous harvest year was completed during this reporting period. The mean age for females (n=19) and males (n=36) harvested during the 1994/95 season was 7.1 years and 6.47 years respectively.

The North Slope Borough and Inuvialuit Game Council meeting of Joint

Commissioners and Technical Advisors is tentatively scheduled for April 10-11, 1997, in Alaska.

U.S./Russia Den Survey Workshop

Currently there is no reliable estimate of the number of bears in the Chukchi/Bering Seas population. To determine the effects of ongoing subsistence polar bear harvests in Alaska and the existing and proposed future polar bear takings in Russia, it is imperative to have scientifically reliable population estimates. Due to the low density of polar bears, logistics, and expense associated with conducting a joint U.S./Russian survey along the ice edge, a comprehensive U.S./Russian population survey is not feasible at this time. However, the high density of polar bears denning on Wrangel Island, Herald Island, and the mainland on the Chukotka Peninsula, Russia, provides a unique opportunity to gather scientific data that may provide an index for the Chukchi/Bering Seas population.

A workshop was held from December 2-6, 1996, to evaluate previous den surveys and standardize protocols for conducting future polar bear den surveys on Wrangel Island, Herald Island, and the mainland on the Chukotka Peninsula in Russia. The Service, USGS/BRD, the Wrangel Island Nature Reserve, and the All-Russia Research Institute for Nature Conservation participated in the workshop. Proceedings of the workshop are being developed.

A study plan to test several den survey methodologies is in development and a pilot survey is tentatively planned for the spring of 1998. The objective of the aerial and ground surveys is to sample a wide range of denning habitats in order to develop a standardized operating protocol for future den surveys. The survey design should allow for comparisons between years while allowing for some flexibility due to weather and/or logistical changes, within and between years. In addition, results from this initial survey may provide insight into previously collected data.

The entire coastline on Wrangel and Herald Islands, and the northern coast of the Chukotka Peninsula may also be surveyed. In addition to the coastline surveys on the northern coast of the Chukotka Peninsula, there may be an inland survey to detect dens located inland from the coastal areas.

Habitat Conservation Strategy-Carcass Surveys

One objective of the Habitat Conservation Strategy for Polar Bears in Alaska (Strategy) issued by the Service on August 14, 1995, was to develop and implement measures to conserve polar bear feeding habitat. In Alaska, marine mammal carcasses represent tons of potential food for polar bears and may be particularly important for the survival of females with cubs and younger bears during the fall. To document the abundance and distribution of marine mammal carcasses, primarily Pacific walruses, bearded seals (*Erignathus barbatus*), ringed seals (*Phoca hispida*), beluga whales (*Delphinapterus leucas*), and bowhead whales (*Balaena mysticetus*), an aerial survey was conducted in September 1996 along the Alaska coast from Nome to Barrow. A total of 178 carcasses (168 walruses, 10 seals) were recorded. Compared to the survey in September 1995, the number of walrus carcasses observed more than doubled and the number of seals and whales seen decreased. Future plans include development of a study plan to evaluate the energetic value and utilization of carcasses by polar bears.

Co-Management With Alaskan Natives

The 1994 Amendments to the Act included a new Section 119 authorizing the Service, on behalf of the Secretary of the Interior, to "...enter into cooperative agreements with Alaska Native organizations to conserve marine mammals and provide co-management of subsistence use by Alaska Natives." The provisions authorize appropriation of funds up to \$1 million each year from 1994 through 1999 to carry out the purposes of the Section. By the end of Calendar Year 1996, \$250,000 was appropriated to the Department to implement Section 119.

During 1996, the Service along with the Indigenous People's Council for Marine Mammals (IPCOMM), the NMF'S, and the USGS/BRD made significant progress to develop an umbrella "Memorandum of Agreement for Negotiation of Marine Mammal Protection Act Section 119 Agreements." The purposes of this agreement include providing a foundation and direction for developing Section 119 cooperative agreements, and providing a mechanism for the dispersal of funds to support efforts for the co-management of subsistence use of marine mammals in

Alaska. Efforts to complete this umbrella MOA continued into 1997.

Also during 1996, to govern the use of the \$250,000 appropriated to the Department for co-management activities, the Service worked closely with the Alaska Nanuq Commission (ANC), the Eskimo Walrus Commission (EWC), and the Alaska Sea Otter Commission (ASOC) to develop individual cooperative agreements effective through September 30, 1997. The purpose of each agreement is to implement Section 119 of the Act for the conservation of polar bears, walrus, and sea otters by involving subsistence users through the individual Commissions. Individual "Scopes of Work" were also being developed as an integral part of each Agreement: (1) to identify the co-management projects to be funded; (2) to identify the responsibilities and work to be performed by each party; and (3) to identify associated costs. By year's end, these Agreements were near completion. (Note: Agreements for Fiscal Year 1997 with the ANC to fund \$90,000 in projects, and the EWC for \$80,000 in projects were signed into effect on February 19, 1997; while the Agreement with the ASOC for \$70,000 in projects was signed into effect on March 5, 1997. The Service retained the remaining \$10,000 to administer this co-management effort.)

Review of the 1973 Agreement on the Conservation of Polar Bears

Section 113 of the Act, as amended in 1994, directed the Secretary of the Interior (Secretary) to review the effectiveness of U.S. implementation of the 1973 international Agreement on the Conservation of Polar Bears (Treaty); and, in consultation with the contracting parties (i.e., Canada, Russia, Norway, and Denmark), to review the effectiveness of international implementation of the Treaty, and to establish a process to conduct future reviews. Additionally, Section 113 of the Act directed the Secretary to consult with the Russian Federation on the development and implementation of enhanced cooperative research and management programs for polar bear conservation in Alaska and Russia.

The Service initiated a review of the effectiveness of U.S. implementation of the Treaty, by conducting two workshops in June and August 1995. Participation at these meetings included representatives from the Department, the Department of State, the MMC, the

Alaska Nanuq Commission, Native organizations, and conservation organizations. A draft Service report was developed in late 1995 and submitted for formal review as required by the Act to the Department of State and the MMC.

Efforts to finalize this report continued during 1996, and a final draft report was developed in late 1996. By the end of 1996, the report was still undergoing review in the Department. The Service's review of the effectiveness of international implementation of the Treaty will begin following completion of the report assessing U.S. domestic compliance.

U.S./Russia Bilateral Polar Bear Agreement

Consistent with Section 113 of the Act and the Treaty, the United States and Russia are considering the development of a bilateral treaty for the management and conservation of the shared polar bear population in the Chukchi/Bering Seas. Presently management of this shared population occurs independently by each country. Following the dissolution of the U.S.S.R., illegal, unregulated hunting in Russia's eastern territories is believed to result from increasing economic pressures. There is concern that the continued illegal take or the potential opening of lawful harvest seasons in Russia, combined with the legal harvest in Alaska, could depress the Alaska-Chukotka polar bear population in the absence of a science-based coordinated management program involving Alaska and Chukotka Native user support and implementation.

Discussions continue between officials of both countries to develop a conservation agreement. The primary purpose of a bilateral agreement would be to provide for effective conservation and management of the polar bear population in the Chukchi/Bering Seas through regulation of take and conservation of habitat. The Service prepared a draft Environmental Assessment (EA) regarding this proposal. On July 19, 1996, the Service published a FEDERAL REGISTER notice of public availability of the draft EA and 60-day comment period on the environmental effects of a proposed U.S./Russia Bilateral Polar Bear Treaty (61 FR 37761). Two public meetings were held to promote discussion on the draft EA, one on August 14, 1996, in Anchorage and the other on August 21, 1996, in Washington D.C. In addition, public meetings were held in the coastal



A female polar bear with cub in Alaska. U.S. Fish & Wildlife Service photo.

Alaskan communities of Gambell, Savoonga, Wales, Shishmaref, Wainwright, and Barrow.

Three primary alternatives for entering into conservation agreements are discussed in the EA. Alternative 1 describes the status quo or "no action" by the U.S. government. Alternative 2 describes the development of government to Native agreements within each country. Alternative 3 describes a U.S.-Russia agreement which would involve cooperative management measures through a companion agreement between the Alaska and Chukotka Natives.

Alternative 3, the preferred alternative, was selected and provides the basis for developing a unified and comprehensive management program which includes provisions for regulation of take (harvest limits), enhanced bio-monitoring and research opportunities, increased habitat protection, and non-consumptive as well as consumptive uses. Alternative 3 describes a bilateral management scenario where a government-to-government agreement establishes the guiding framework and ultimate oversight role for an Alaska-Chukotka Native-to-Native agreement. Harvest limits would be established by an international joint commission composed of one Federal and one Native representative from each country. Harvest limits would be binding. Joint research and management, population and harvest monitoring, enforcement, and habitat protection would be the primary elements of the agreement. Alternative 3 provides the most

comprehensive and coordinated conservation program for the Alaska-Chukotka polar bear population. The agreement would provide guidance for Russian and American governments and Native entities to manage the shared population, and it would support Russian efforts to curb threats to polar bears associated with illegal unquantified hunting and lack of enforcement. A government-to-government bilateral agreement would also ensure closer coordination and involvement in management decisions by the primary users, namely the Native peoples of Alaska and Chukotka.

The 60-day comment period associated with this FEDERAL REGISTER notice closed on September 17, 1996. At year's end, the Service was evaluating comments submitted during the public review period and revising the EA as appropriate. Early in 1997, the Service expects to finalize the EA, after which a formal application will be submitted to the Department of State requesting authority to open negotiations with the Russian Federation. If approved, the negotiating position of the U.S. will be determined through the State Department's Circular 175 process. A delegation will be formed by the Service and the Department of State to represent U.S. interests in negotiating an agreement. (Note: On March 12, 1997, the Service issued its final EA with Finding of No Significant Impact. The document is entitled, "Development of Proposed Treaty-U.S./Russia Bilateral Agreement for the Conservation of Polar Bears in the Chukchi/Bering Seas.")

Stock Assessments

As required by Section 117 of the Act, as amended in 1994, the Service during 1995 completed Stock Assessment Reports for all marine mammal species under Service jurisdiction that occur in the United States. These include Pacific walrus, polar bears and sea otter in Alaska, sea otters in Washington State and California, and manatees in the southeastern United States. Notice of their completion and public availability was announced in the FEDERAL REGISTER on October 4, 1995 (60 FR 52008). These reports contained information regarding the distribution and abundance of the stocks, population growth rates and trends, estimates of human-caused mortality from all sources, descriptions of the fisheries with which the stocks interact, and the status of each stock.

The provisions of Section 117 also require the Service, consistent with any new information that indicates that the status of a stock has changed or can be more accurately determined, to revise these reports annually for strategic stocks (as defined in Section 3(19) of the Act) of marine mammals and every three years for stocks determined to be non-strategic. In accordance with these statutory provisions, during 1996 the Service reviewed all eight of its final Stock Assessment Reports from 1995, and determined that it would be appropriate to revise Reports for the southern sea otter in California, the northern sea otter in Washington State, and the Florida and Antillean stocks of West Indian manatees from the southeastern United States and Puerto Rico, respectively. Although the Service has decided to revise these Reports, the status of the four stocks has not changed; both West Indian manatee stocks and the southern sea otter stock in California are still classified as strategic, while the northern sea otter stock in Washington State is still classified as non-strategic. For polar bear, Pacific walrus, and northern sea otter in Alaska, the Service determined that no significant new information was available that would provide substantial benefit to these stocks, or necessitate revising their Stock Assessment Reports during the review cycle. At year's end, work was underway to develop draft revised stock assessment reports and a FEDERAL REGISTER notice to announce their completion and availability to the public for review and comment. (Note: On April 25, 1997, the Service published a FEDERAL

REGISTER notice at 62 FR 20201 to announce the availability of these draft revised stock assessment reports; the 90 day comment period for this notice expired on July 24, 1997.)

Sea Otter-Southern

Sea otters historically ranged throughout the north Pacific from Hokkaido, Japan, through the Aleutian Islands, the Alaskan peninsula, and south along the Pacific coast to Baja California, Mexico. In the mid-1700's, sea otters were recognized as a valuable fur-bearing animal and were subject to an intense commercial harvest. By the early 1900's, the species had been extirpated from most of its historic range except for 13 remnant populations, including one numbering approximately 50 individuals in central California. This remnant population in the near-shore waters of California is referred to as the southern sea otter, and was first recognized as a subspecies in 1904. The historical sea otter population size in California is estimated to have numbered 16,000-18,000 individuals. Today, the southern sea otter population numbers over 2278 (Table 1) and its range extends between Pigeon Point, San Mateo County, to Purisima Point, Santa Barbara County.

The Service listed the southern sea otter as threatened under the Endangered Species Act in 1977 because of its small population size, limited distribution, and its risk of exposure to oil spills throughout its range. The most serious threat to the southern sea otter is a major oil spill from a tanker in the waters in the vicinity of its range.

The USGS/BRD, the California Department of Fish and Game (CDF&G), and the Service continued the spring and fall population surveys in 1996. The area surveyed included the entire 220-mile long established range of the southern sea otter, from Point Ano Nuevo in Santa Cruz County to the Santa Maria River in San Luis Obispo County, plus additional peripheral habitat. The number of otters counted during the spring 1996 survey was 4.2 percent below the spring 1995 count (Table 10). Although the low spring 1996 count was probably influenced to some degree by poor weather conditions, the stagnant rate of increase in independent sea otters since 1993 (spring surveys) is cause for concern. This concern is not alleviated by two consecutive years of record high mortality (as indicated by beached sea otter carcasses). Spring counts are consistently higher than fall

counts, and this is thought to be the result of more favorable sighting conditions in the spring than in the fall. Most otters are sighted between Ano Nuevo, San Mateo County and Avila Beach, San Luis Obispo County.

Translocation of Southern Sea Otters

Between 1987 and 1990, 139 southern sea otters (31 males, 108 females) were translocated to San Nicolas Island, off of southern California, in an effort to establish a second breeding colony. The purposes for establishing a second colony were two-fold: (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 near shore community. The latter information is particularly important in attempting to understand the characteristics and impacts of a sea otter population stock at its optimum sustainable population level as defined in the Act.

Public Law 99-625 provides the authority and establishes the guidelines for carrying out the translocation program. The regulations designating the colony as an experimental population (50 CFR 17.84) established the boundaries of a Translocation Zone to which otters would be translocated and given protection similar to that of the source population, and a Management Zone to be maintained otter-free by non-lethal means.

Status of Colony

Sea otters surveys are conducted at San Nicolas Island every other month by the Service and the USGS/BRD. During 1996, counts of independent otters ranged from 12 to 17. By the end of 1996, 42 pups are known to have been born at the island. Because pups are not marked, assessment of recruitment into the population is difficult. Reproduction at the island is continuing and during 1996, 4 different pups were observed at San Nicolas 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. 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.

Since 1987, 20 independent (10 males, 10 females) sea otters and 4 dependent pups have been captured in the Management Zone. Eleven of the otters had been translocated to San Nicolas Island, four had apparently swam down from the mainland range, and nine either swam down from the mainland range or

were born in the Management Zone or at San Nicolas Island. Two of the otters mentioned above were captured and removed from the Management Zone twice.

In February 1993, all sea otter containment activities were halted following the deaths of 2 independent otters that died shortly after their release in the mainland. Concern was raised regarding the requirement that sea otter containment activities were being conducted by non-lethal means. An

evaluation of containment techniques proved to be inconclusive, and recommendations were made to continue sea otter containment activities with minor modifications. Since 1994, sea otter containment activities have been limited due to the unavailability of funds within both the Service and Department.

During 1996, the Service received only a few reports of sea otters in the management zone. Reports of sea otters were coordinated with the Department. Although the containment activities have been substantially decreased since 1993, it appears that no other sea otter colonies have been established in the designated Management Zone.

Law Enforcement

Sea otters have been intentionally harassed, shot, clubbed, and found drowned in legally and illegally set commercial fishing gear in past years. Service law enforcement officers conduct surveillance operations, investigations and seek prosecution of individuals who harm sea otters.

Three sea otters were known to have died of gun shot wounds this year. These animals likely represent a fraction of southern sea otters killed annually by malicious activities. Two other otters were found with healed bullet wounds which were not the cause of death. As of the end of 1996, six incidences of shooting are currently under investigation by Service law enforcement agents. However, evidence required to bring such a case to court is often lacking.

Incidental Take Within the Mainland Range

Several lines of direct and indirect evidence indicate that incidental drowning of sea otters in gill and trammel entangling nets has been a significant source of mortality. The State of California entered into a cooperative agreement with the NMFS to assist with the monitoring program required under the 1988 amendments to the Act. In Monterey Bay and Morro Bay, up to three NMFS observers are stationed to document incidental take. In 1996, no mortalities of southern sea otters were attributed to entanglement in a fishing net. In summation, from June 1982 to December 31, 1996, a total of 75 otters have been observed or otherwise known to have drowned in legally set commercial fishing nets: 6 in 1982, 6 in 1983, 16 in 1984, 12 in 1985, 3 in 1986, 5 each in 1987 and 1988, 11 in 1989, 9 in

Table 10. Comparison of Southern Sea Otter Counts Since Spring 1982.^a

Season	Number of Independent Otters	Number of Pups	Total
1982 Spring	1,124	222	1,346
Fall	1,204	147	1,351
1983 Spring	1,156	121	1,277
Fall	1,060	163	1,223
1984 Spring	1,180	123	1,303
Spring ^b	1,151	52	1,203
Fall	No survey		
1985 Spring	1,119	242	1,361
Fall	1,065	150	1,215
1986 Winter ^c	1,231	181	1,412
Spring	1,358	228	1,586
Fall	1,091	113	1,204
1987 Spring	1,435	226	1,661
Fall	1,260	110	1,370
1988 Spring	1,504	221	1,725
Fall	No survey		
1989 Spring	1,571	285	1,856
Fall	1,492	115	1,607
1990 Spring	1,466	214	1,680
Fall	1,516	120	1,636
1991 Spring	1,700	241	1,941
Fall	1,523	138	1,661
1992 Spring	1,810	291	2,101
Fall	1,581	134	1,715
1993 Spring	2,022	217	2,239
Fall	1,662	143	1,805
1994 Spring	2,076	283	2,359
Fall	1,730	115	1,845
1995 Spring	2,095	282	2,377
Fall	2,053	137	2,190
1996 Spring	1,963	315	2,278
Fall	1,858	161	2,019

^a In 1992, all survey data since Fall 1982 was reviewed and counts were corrected as appropriate.

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

^c Experimental.

1990, 0 in 1991 and 1992, 1 each in 1993 and 1994, and 0 in 1995 and 1996.

California Senate Bill #2563, which provides additional restrictions on the use of gill and trammel nets in coastal waters, was enacted in 1990 and promulgated on January 1, 1991. This bill prohibits the use of gill and trammel nets in waters shallower than 30 fathoms between Waddell Creek in Santa Cruz County and Point Sal in Santa Barbara County. The 30 fathom contour was selected based on analysis and recommendation by the Service using data obtained during a study by the Minerals Management Service. The analysis indicated that currently only an extremely small number of sea otters use waters deeper than 30 fathoms. The Service recommended to the NMFS that a 30 fathom closure should be implemented to likely reduce the incidental take of sea otters to near zero. The State legislation has significantly reduced the number of sea otters found drowned in fishing nets. The NMFS and the CDF&G will continue observations of the set-net fishery occurring in waters outside this restricted area.

The small group of sea otters, currently found at Purisima Point, Santa Barbara County, are at risk of incidental take. Purisima Point is between Point Sal and Point Conception, Santa Barbara County, an area in which no restriction of gill or trammel net fishing exists for the protection of sea otters. Observations of set-net fishing activity in this area is not convenient and therefore not typically covered by the NMFS's observer program. The Service has requested that the CDF&G enact an emergency closure and close the area to set-net fishing. The CDF&G has chosen not to close the area because there is no direct evidence that sea otters are being taken by the set-net fishery in the area.

The crab and lobster pot fisheries continue to be a concern as a source of mortality for otters. Sparse data and anecdotal records indicate that southern sea otters are incidentally taken in the pot fishery. Sea otters are known to be taken occasionally in Alaska's crab pot fishery. Alaska's pot fishery utilizes different types of gear and is not directly comparable to the California fishery however. The Service continues to evaluate incidental take in crab and lobster pots.

A live finfish (trap) fishery is increasing along the coast. Traps for finfish are set

within the kelp beds near shore. In areas where this fishery occurs, the number of beach cast carcasses has increased. The Service is concerned about the potential impact from this fishery on the southern sea otter population.

Sea Otter Mortality

Over 100 sea otter carcasses wash ashore every year. In 1996, 179 southern sea otter carcasses were recovered from beaches. This represents a record high number of recovered beachcast carcasses. The previous records of 153 and 157 carcasses were set in 1981 and 1995, respectively. During July 1995, the first mass mortality event observed for southern sea otters occurred in Monterey Bay, Monterey County. Eleven dead or moribund southern sea otters were found within 10 miles of each other within a one week period. All carcasses were necropsied at the National Wildlife Health Center (NWHC) in Madison, Wisconsin. The causes of death of the otters in Monterey Bay have remained undetermined. However, preliminary analyses have ruled out numerous potential causes of mortality such as poisoning, and diseases that are commonly known to occur in sea otters.

The NWHC has conducted necropsies on fresh, beach cast sea otter carcasses since 1992. The immediate goals of this program are to identify the major causes of death in sea otters and to establish their relative frequencies. The necropsy program at the NWHC is expected to continue into 1997.

As of March 1994, 88 southern sea otter carcasses have been necropsied by pathologists at the NWHC. Most sea otter deaths have been attributed to infectious diseases (42 percent). These diseases include coccidioidomycosis (6.8 percent), acanthocephalan peritonitis (15.9 percent), protozoal encephalitis (11.4 percent), and other diseases (7.9 percent). Other sources of mortality include various types of trauma such as shark bite and lacerations (18.2 percent), emaciation (11.4 percent), tumors (3.4 percent), and various conditions of mechanical or functional impairment including esophageal impaction, intestinal perforation, and intestinal volvulus (9.1 percent). The cause of death of 15.9 percent of animals is undetermined at this time.

Stranding and Rehabilitation Program

The Monterey Bay Aquarium has been the primary facility involved in the

rescue and rehabilitation of stranded southern sea otters. In 1994, the Service authorized a second facility, The Marine Mammal Center of Sausalito, California, to rescue and rehabilitate stranded southern sea otters for the purpose of returning them to the wild.

Rehabilitated sea otters that lack the skills to survive in the wild are placed in permanent housing in a number of facilities. During 1996, those facilities included the Monterey Bay Aquarium, Sea World of San Diego, Oregon Coast Aquarium, and the New York Aquarium.

Section 7 Consultations Under the Endangered Species Act

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. The Service received no requests for formal consultation.

Section 6 of the Endangered Species Act
No section 6 funds were provided for the southern sea otter in 1996.

Oil Spill Activities

The Service's sea otter oil spill contingency plan is still in draft and needs to be revised to incorporate pertinent aspects of the Federal Oil Pollution Act of 1990, and California Senate Bill #2040 which created a new oil spill division within the CDF&G. The ramifications of both Federal and State legislation have yet to be realized or applied to the existing document. The Service, in coordination with the CDF&G, plans to update and make final the contingency plan in 1997.

Guadalupe Oil Field

The Union Oil Company of California (Unocal) has operated the Guadalupe oil field in San Luis Obispo County since 1953. A thinning agent, called K-D diluent, which has been used to improve oil production, has been found to be the source of extensive contamination in and around the oil fields, including the local marine environment. A minimum estimate of 35-40 million gallons of diluent have been released into the soil, ground water, and local marine environment in the past 34 years. Full determination of the extent of contamination is underway. The southern sea otter is one of several listed species that may have been affected by these releases. Under the provisions of laws such as the Comprehensive Environmental Response Compensation

and Liability Act and the Oil Pollution Act, the Service since 1994 has participated as a trustee representative on this matter for the Department's trust resources.

Avila Beach Oil Spill Settlement

Unocal and the trust resource agencies, the Service and the CDF&G, reached a settlement agreement for \$100,000 to be used for sea otter restoration activities resulting from natural resource damages sustained during the 1992 oil spill near Avila Beach, San Luis Obispo County. Approximately 60 otters were in the Avila Beach area at the time of the spill. At least four sea otters came in contact with the oil. Two were found dead, covered with oil; one was captured and died while being transported to a rehabilitation facility (this otter apparently died of coccidioidomycosis although it was oiled at time of capture); and one oiled otter was captured, cleaned, and released.

Potential projects for settlement monies for sea otter restoration are currently being identified and evaluated.

Sea Otter-Washington State

Enhydra lutris kenyoni historically ranged throughout the Aleutian Islands, originally as far north as the Pribilof Islands and in the eastern Pacific Ocean from the Alaska Peninsula south along the coast to Oregon (Wilson et al. 1991). This subspecies was extirpated from most of its range during the 1700's and 1800's as the species was exploited for its fur. In 1969 and 1970, a total of 59 sea otters captured at Amchitka Island, Alaska, were released in Washington State (Jameson et al. 1982).

The reintroduced population was not surveyed between 1970 and 1977. In 1977, the Service surveyed the coast and counted only 19 sea otters. The population was surveyed again in 1978, every other year from 1981 through 1989, and annually since 1989 using combined aerial and ground counts. Based on the 1996 spring survey (actual count), the minimum size of this population is 430 animals, a 9 percent increase above the 1995 count of 395 sea otters. At present, the Washington population ranges from Neah Bay south to Destruction Island.

Sea otters are susceptible to drowning in Washington's coastal gill net and crab pot fisheries. Currently, documented incidental takes of sea otters in the gill net fisheries are rare. One sea otter was killed in a tribal chinook salmon set-net

in the vicinity of the mouth of the Ozette River on the north Washington coast. However, as the sea otter population expands, mortality in crab pot and tribal set-net fisheries may increase. Other sources of human-caused mortality affecting this population are not well documented. In recent years in the State, an uncertain number of sea otters may have been killed by small oil spills.

Native Americans of the Pacific northwest have treaty reserved hunting and fishing rights. Several tribes have asserted that their reserved hunting rights apply to sea otters. Currently, there is no harvest of sea otters by these Native Americans, although some interest to develop such a program has been expressed.

West Indian Manatee

The West Indian manatee in Florida represents the northernmost and largest remaining component of a manatee population once found throughout the Caribbean basin. Physically isolated from its counterparts, the manatee in Florida has historically been viewed as rare and declining in number. Because of this perception, the manatee was first afforded protection by the State of Florida in 1893. It is now variously protected by the State of Florida's Manatee Sanctuary Act of 1978, the ESA, and by the Act.

As a Federally listed endangered species, efforts to recover the species are guided by the Service's manatee recovery program. This program, through the revised Florida Manatee Recovery Plan of 1996, coordinates Federal, State, local and private manatee recovery efforts. Recovery activities incorporate both research and management efforts. Research efforts have focused on monitoring the status of the manatee and its habitat and on better defining various components of its life history. Management initiatives have concentrated on protecting essential manatee habitat and reducing human-related causes of manatee mortality. National wildlife refuges have played an integral role in the manatee recovery process.

More than 20 years of manatee research and management initiatives have shown that the manatee's future depends upon a better understanding of its status and life history, and on better protecting the manatee and its habitat from direct and indirect impacts. The protection of these essential components in the face of an increasing human population, development, and use of water craft underscores the need to continue to balance the needs of the manatee with its human neighbors.



A manatee transfer at the soft release pens in the Banana River at the Merritt Island National Wildlife Refuge, Florida. U.S Fish & Wildlife Service photo by Jim Valade.

Status

A total of 416 manatees died in 1996. This represents the largest number of manatees known to have died in a calendar year since 1974, when records were first kept. There were many contributing factors to this extraordinary statistic. Between early March and late April 1996, one hundred and forty-nine manatees died in an epizootic in southwest Florida. These deaths were attributed to neurotoxins produced by the red tide organism, *Gymnodinium breve*. While the event contributed significantly to the total number of deaths recorded in 1996, the year was also the worst year on record for human-related mortalities. Sixty manatees (60) were struck and killed by water craft, ten were crushed by water control structures and one drowned in a storm water pipe.

The Florida Department of Environmental Protection (FDEP) coordinates a series of synoptic aerial surveys during peak cold periods. These surveys focus on warm water aggregation sites and are used to assess manatee abundance. Two surveys were flown in 1996, one on January 9-10 and the other on February 18-19. During the January survey, 2,274 manatees were counted while the February survey yielded a count of 2,639 manatees. The February count represents the highest count of the species to date. The survey coordinator for the FDEP attributed the count to "near-perfect survey conditions."

Based on historical surveys of warm water aggregation sites, the USGS/BRD's Sirenia Project Manatee Individual Photo-identification System, aging studies, and other sources of information, early models suggested that the manatee population was stable but declining within certain areas of its range (especially along Florida's east coast). In light of the 1996 survey results and further analyses of these databases, the FDEP has suggested that the manatee population had slowly been increasing in all areas of the State through 1995. FDEP has further suggested that, if trends observed before the epizootic continue, it will take a number of years for the population to return to pre-epizootic levels.

Management

Manatee behavior and habitat have been closely monitored for more than 20 years through the carcass salvage program, USGS/BRD's photo-identification

system, aerial surveys, tracking projects, and other studies. These studies have provided a wealth of information, most of which has been made available to managers through a variety of media, including Geographic Information Systems (GIS). This data is used to develop population models and to assist Federal, State, and local agencies to protect manatees from direct threats such as water craft and water control structures and from indirect threats such as habitat loss. The Service's recovery program coordinates research activities and is actively involved in management issues identified by these efforts.

In 1996, the Service participated in the NMFS's Atlantic Scientific Review Group activities, pursuant to Section 117(d) of the Act. The group updated stock assessments and potential biological removal figures and continued its evaluation of fisheries' impacts on marine mammal stocks, including those of Florida and Antillean manatees. Recovery program efforts to evaluate the impact of the blue crab fishery on the Florida manatee and of coastal net fisheries in Puerto Rico continue. Each year, many Florida manatees are entangled in crab fishery float lines; injuries and mortalities are known to occur. Coastal net fisheries involving gill nets in Puerto Rico continue to account for a significant number of Antillean manatee mortalities in this area.

Comprehensive manatee protection plans are being developed on a county-wide basis throughout Florida. These plans address ways to reduce human impacts to manatees. At this time, these plans are in varying stages of completion. Twelve of the thirteen counties involved in this process have either permanent or interim county-wide speed restrictions in effect and the remaining county is partially protected in certain critical areas. The counties are also addressing guidance on boat facility siting, recommendations for limiting boat densities in certain areas, sea grass protection, etc., and most counties have summarized these documents in draft form. The FDEP has taken a primary role in this initiative and is supported in its efforts by the Service.

Service efforts to protect manatee habitat rely heavily on Section 7 of the ESA. The Section 7 process involves a Service review of Federal actions for impacts to listed species, including the manatee. The manatee recovery

program has been directly involved in efforts to maintain safe and reliable warm water refuges at wintering sites used by manatees. These efforts have included initiatives to shut down unreliable sites and to ensure that essential sites operate safely during the winter.

Water control structures are a persistent source of manatee mortality. Manatees are crushed or impinged by these structures, which are owned and operated by the South Florida Water Management District (SFWMD) and the U.S. Army Corps of Engineers (Corps). The Service is an active participant in the interagency group that seeks to reduce structure-related mortality. Current initiatives include pressure-sensitive reversing door mechanisms, similar to those on elevator doors, that are fitted on the edges of gate and lock doors. Piezoelectric film strips and acoustic ladder arrays are being tested on various structures.

Besides addressing manatee mortality and habitat protection, recovery efforts also support a manatee rescue and rehabilitation network. Injured or sick manatees often require some form of assistance. In 1996, fifty rescues were completed. A network of rescue teams has been developed and each team responds as necessary. Manatees requiring rehabilitative care are typically taken to one of five authorized facilities for treatment. The recovery program helped Mote Marine Laboratories in Sarasota, Florida, with their efforts to develop a rehabilitative care facility. In addition, due to serious statewide overcrowding problems, the Service has taken steps to identify other out-of-State facilities capable of operating rehabilitative care facilities. Fifty-four manatees were in rehabilitation facilities as of the end of 1996.

In 1994, the Service initiated a "soft-release" program in which long-term captive manatees are returned to the wild. The program involves the temporary introduction of these captives into a series of pens located in the Banana River in Brevard County, Florida. Manatees held in these pens are exposed to native forage and wild, free-ranging manatees. After an acclimation period, the manatees are released to the wild. No manatees were staged in 1996 due to a lack of vegetation in the soft-release pens. However, two animals that had previously been staged and returned

to captivity were released in south Florida.

A revised recovery plan for the Florida manatee was completed in 1996. Efforts to update the recovery plan were initiated in 1992. A drafting committee, selected by the recovery team, submitted a recommended revised Florida Manatee Recovery Plan to the Service in 1993. This draft was reviewed and amended by the Service in 1994. In December 1994, the Service advertised the availability of the document for public review. The document was advertised twice and, in late 1995 at the conclusion of the review period, the plan was again modified and was subsequently submitted to the Service's Regional Director for approval. It was approved on January 19, 1996.

A draft contingency plan for catastrophic manatee rescue and mortality events was completed in late 1996. It is intended to be used as a complementary document along with the *National Contingency Plan for Response to Unusual Marine Mammal Mortality Events* that was completed by the NMFS, in coordination with the Service, in September 1996. In addition, the State of Florida is expected to develop their own contingency plan to govern their response during a catastrophic manatee mortality event. (Note: The Service's final "Contingency Plan for Catastrophic Manatee Rescue and Mortality Events" was issued on April 1, 1997.)

Research

Research activities continued to focus on monitoring the status of the manatee and its habitat, and on better defining various components of its life history. Studies conducted in 1996 included mortality assessments via the manatee carcass salvage program, population assessments by aerial survey and photo-identification studies, and telemetry studies. Details are provided in the RESEARCH AND DEVELOPMENT section of this report.

Manatee mortality assessments are provided by FDEP's Marine Mammal Pathobiology Laboratory, in St. Petersburg, Florida. This program spearheaded efforts to assess the cause of the 1996 epizootic in southwest Florida. Between March and April, 158 carcasses from this area were collected, posted, and sampled. The Service provided an on-site coordinator to facilitate Federal involvement. In addition, J.N. "Ding" Darling National

Wildlife Refuge (NWR) provided facilities and support for the salvage effort, which was further assisted in the field by recovery staff and statewide ecological services personnel. Funds were provided to supplement laboratory investigations and to conduct a program review of epizootic events.

The USGS/BRD Sirenia Project maintains a catalog of individually identified manatees. The catalog (the Manatee Individual Photo-identification System) relies on manatee identifications based primarily on scars caused by boat propellers and provides an additional data base by which trends in abundance can be evaluated. As of 1996, 1,037 manatees had been identified and nearly 16,000 sighting/resighting records were in the catalog.

Tagged, rehabilitated animals were monitored in south Florida. They appear to be adjusting well. Recaptures and medical monitoring has confirmed their good health. Two of the rehabilitated animals provided the first documented evidence of manatees traveling between Florida's east and west coasts.

Refuges

The refuge network in Florida provides manatees with elements critical to their recovery. Refuges, such as the Crystal River NWR, provide essential wintering habitat for manatees that use the Gulf coast. On Florida's east coast, refuges provide important summer-use areas for manatees in the St. Johns River and coastal regions. Refuge managers at these sites have adopted management plans that promote the protection of manatees and their habitat. These plans incorporate many initiatives including, but not limited to, public education, law enforcement, and support for research.

The refuges have active manatee education programs with displays and handouts to educate the public about manatee conservation. The Crystal River NWR has partnered with FDEP and the Florida Game and Fresh Water Fish Commission to develop a manatee education center at the State's Homosassa Springs State Nature Attraction, a Service authorized manatee rehabilitation facility. The J.N. "Ding" Darling NWR has also helped with local efforts to develop a manatee viewing and education center on the Orange River in Fort Myers. Refuge biologists assist with efforts to assess manatee distribution and abundance by aerial surveys and are actively involved

in manatee rescue/rehabilitation programs.

Summary

The long range recovery goals for the Florida manatee, as required by the Act, are to maintain the health and stability of the marine ecosystem, and to return to, and maintain, an optimum sustainable population level. Despite serious mortality problems, significant progress was made toward this goal. Recovery team members furthered efforts to reduce water craft- and water control structure-related mortality. Various habitat conservation initiatives promoted and enhanced essential manatee habitat areas. Researchers continued to identify manatee habitat and to assess manatee distribution, abundance, and the status of the manatee.

Hawaiian Monk Seal

Service personnel from the Hawaiian Islands National Wildlife Refuge cooperate regularly with NMFS personnel on various research and recovery actions recommended in the Hawaiian Monk Seal Recovery Plan. Hawaiian Islands National Wildlife 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 NMFS researchers on Refuge islands tagging weaned monk seal pups, resighting tagged seals and reporting seals entangled in marine debris. They also conducted regular population censuses of monk seals at French Frigate Shoals and Midway Atoll, as well as intermittent surveys on other Refuge islands.

Midway Atoll National Wildlife Refuge was officially transferred to the Department from the U.S. Navy on October 31, 1996. In addition to the transfer of ownership and jurisdiction, Midway Atoll NWR was open to public visitation beginning in August 1996. Its designation as a national wildlife refuge, as well as environmental clean-up operations, significantly improved prospects for restoring a major breeding colony of monk seals at Midway Atoll. Refuge staff served as on-site monitors to prevent disturbance to Hawaiian monk seals during clean-up and public use activities on the atoll. Orientations were conducted for all visitors or new residents/employees to educate them on

wildlife laws and the efforts of the NMFS and the Service to protect and work towards recovery of this species. Refuge staff opportunistically assisted the NMFS by tagging weaned pups whenever NMFS personnel were not present, and they conducted beach counts on Sand Island from October through December.

Service staff actively patrol and remove nets and other entangling debris from Refuge beaches and reefs to reduce the likelihood of entanglement of monk seals. Seals occasionally became disoriented or entrapped behind the deteriorating seawall at Tern Island. Refuge staff freed entrapped seals.

The Service funded the Army Corps of Engineers to produce a report outlining options for shore protection at Tern Island. The report (due during Fiscal Year 1997) will provide options and cost estimates for shore protection measures intended to reduce erosion and minimize entrapment of Hawaiian monk seals.

Refuge staff served on the NMFS Animal Care Committee.

Observations of other marine mammals, including spinner dolphins, bottlenose dolphins and humpbacked whales were logged in station, camp and expedition records following sightings.

The activities described here are funded through the normal refuge operations budget. No specific funding from other sources is received.

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