

ANNUAL REPORT OF THE  
MARINE MAMMAL COMMISSION, CALENDAR YEAR 1988

A REPORT TO CONGRESS

Marine Mammal Commission

1625 I Street, N.W.

Washington, D.C. 20006

31 January 1989

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63  
64  
65  
66  
67  
68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100

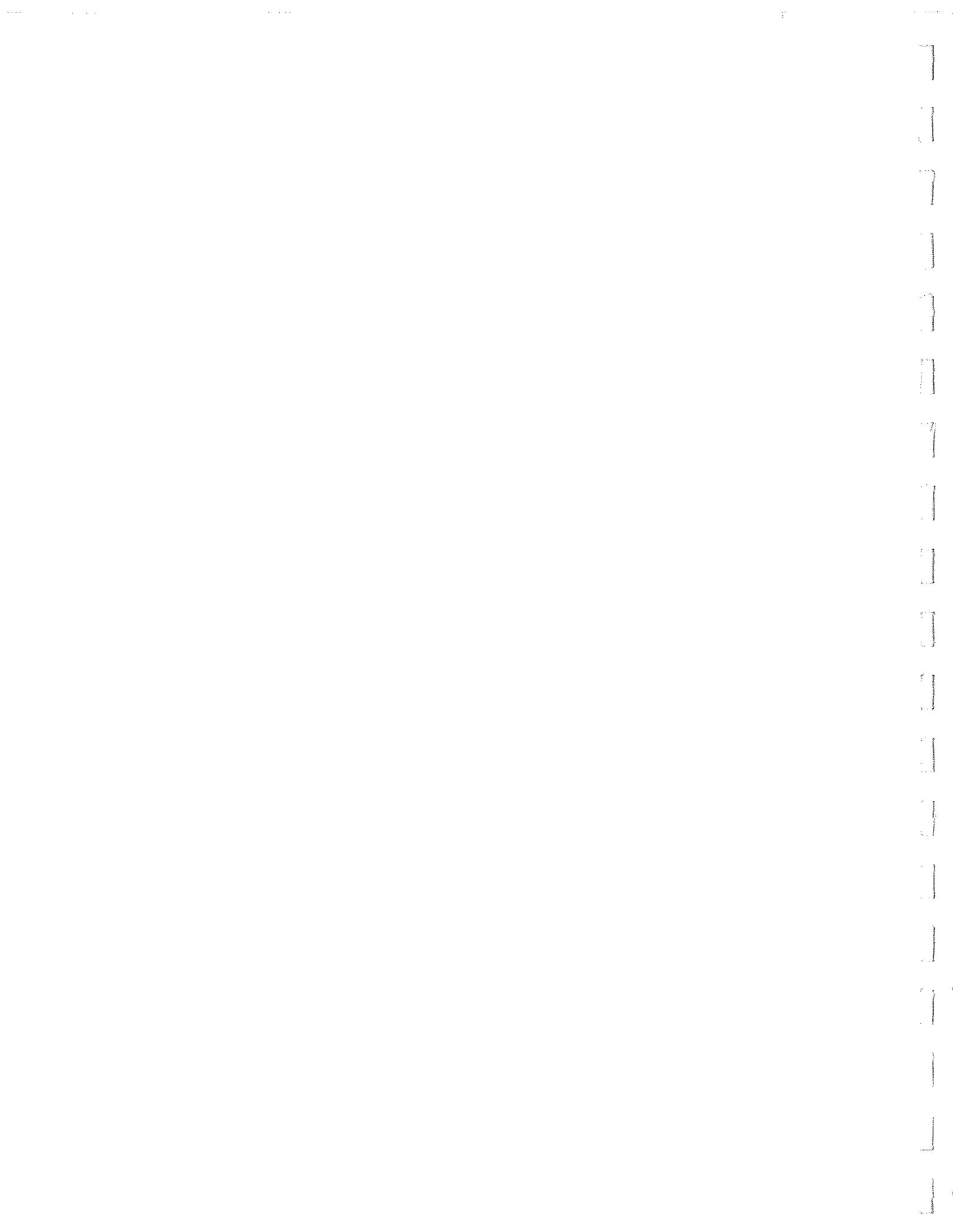
ANNUAL REPORT OF THE MARINE MAMMAL COMMISSION

CALENDAR YEAR 1988

I.	Introduction.....	1
	Background.....	1
	Personnel.....	1
	Funding.....	2
	The Report.....	2
II.	Reauthorization of the Marine Mammal Protection Act...7	
	Background.....	7
	Interim Exemption for Commercial Fishing.....9	
	Status Reviews and Conservation Plans.....11	
	The Tuna-Porpoise Program.....11	
	Research, Display, and Enhancement Permits.....13	
	Authorization of Appropriations.....14	
	Miscellaneous Amendments.....14	
	Reauthorization of the Endangered Species Act....14	
III.	Species of Special Concern.....16	
	West Indian Manatee ( <u>Trichechus manatus</u> ).....16	
	West African Manatee ( <u>Trichechus senegalensis</u> )...30	
	The California Sea Otter Population	
	( <u>Enhydra lutris</u> ).....	32
	Hawaiian Monk Seal ( <u>Monachus schauinslandi</u> ).....39	
	North Pacific Fur Seal ( <u>Callorhinus ursinus</u> ).....45	
	Stellar Sea Lion ( <u>Eumetopias jubatus</u> ).....53	
	Humpback Whale ( <u>Megaptera novaeangliae</u> ).....56	
	Right Whale ( <u>Eubalaena glacialis</u> ).....62	
	Bowhead Whale ( <u>Balaena mysticetus</u> ).....65	
	Hector's Dolphin ( <u>Cephalorhynchus hectori</u> ).....68	
	Gulf of California Harbor Porpoise	
	( <u>Phocoena sinus</u> ).....	69
	River Dolphins (Superfamily Platanistoidea).....71	
	Polar Bear ( <u>Ursus maritimus</u> ).....73	
IV.	Die-Off of Bottlenose Dolphins ( <u>Tursiops truncatus</u> )...77	
	Background.....	77
	Population Status.....	81
	Follow-on Activities.....	82
V.	International Aspects of Marine Mammal	
	Protection and Conservation.....	84
	Conservation and Protection of Marine	
	Mammals in the Southern Ocean.....	84
	International Whaling Commission (IWC).....	101
	Cartagena Convention.....	114
	Convention on International Trade in	
	Endangered Species of Wild Fauna and	
	Flora (CITES).....	117
	Arctic Research and Policy.....	119

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63  
64  
65  
66  
67  
68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100

VI.	Impacts of Marine Debris.....	131
	Background.....	131
	Domestic Activities.....	133
	International Activities.....	144
VII.	Incidental Take of Marine Mammals in the Course of Commercial Fishing Operations.....	148
	The Tuna-Porpoise Issue.....	148
	The Dall's Porpoise Issue.....	158
VIII.	Other Marine Mammal/Fisheries Interactions.....	164
	Summary of Commission Actions.....	165
	The 1988 Marine Mammal Protection Act Amendments.....	168
IX.	Marine Mammal Management in Alaska.....	171
	Marine Mammal Species Reports.....	171
	Background Information on Transfer of Management.....	173
	Federal Marking and Tagging Regulations.....	175
	Litigation.....	176
X.	Outer Continental Shelf Oil and Gas Development.....	179
	Proposed OCS Lease Sale #91 (Northern California).....	179
	Proposed OCS Lease Sale #96 (North Atlantic)....	181
	Proposed OCS Lease Sales #118 and #122 (Gulf of Mexico).....	182
	The Minerals Management Service's Environmental Studies Program.....	183
	Small Take Exemption.....	186
XI.	Research and Studies Program.....	188
	Survey of Federally-Funded Marine Mammal Research.....	188
	Research Program Reviews, Workshops, and Planning Meetings.....	189
	Commission-Sponsored Research and Study Projects.....	189
XII.	Marine Mammals in Captivity.....	202
	Animal Welfare Act Amendments.....	204
XIII.	Permit Process.....	206
	Application Review.....	206
	Working Group on the Permit System.....	207
	Issues Concerning Lethal Take for Public Display.....	208
Appendix A:	Commission Recommendations: Calendar Year 1988.....	210



Appendix B: Reports on Commission-Sponsored Activities Available from the National Technical Information Service.....219

Appendix C: Selected Literature Published Elsewhere Resulting from Commission-sponsored Activities.....226

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63  
64  
65  
66  
67  
68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100

## CHAPTER I

### INTRODUCTION

#### Background

This is the sixteenth Annual Report of the Marine Mammal Commission, covering the period from 1 January through 31 December 1988. It is being submitted to Congress pursuant to section 204 of the Marine Mammal Protection Act of 1972.

Established under Title II of the Act, the Marine Mammal Commission is an independent agency of the Executive Branch. It is charged with the responsibility for developing, reviewing, and making recommendations on actions and policies for all Federal agencies with respect to marine mammal protection and conservation and for carrying out a research program.

#### Personnel

The Commission consists of three part-time Commissioners who are appointed by the President and confirmed by the Senate. The Marine Mammal Protection Act requires that the Commissioners be knowledgeable in marine ecology and resource management. During 1988, the Commissioners were Robert Elsner, Ph.D., Fairbanks, Alaska; William W. Fox, Jr., Ph.D., (Chairman), Miami, Florida; and Francis H. Fay, Ph.D., Fairbanks, Alaska. In May 1988, Dr. Fox replaced Dr. Elsner as chairman of the Commission.

The Commission's full-time senior staff members are: John R. Twiss, Jr., Executive Director; Robert J. Hofman, Ph.D., Scientific Program Director; David W. Laist, Policy and Program Analyst; Sherburne B. Abbott, Assistant Scientific Program Director; Michael L. Gosliner, General Counsel; Marian Graham, Administrative Officer; Jeannie K. Drevenak, Staff Assistant, Permits; and Eileen Shoemaker, Staff Assistant, Publications.

The Commission Chairman, with the concurrence of the other Commissioners, appoints the nine members of the Committee of Scientific Advisors on Marine Mammals. Committee members are statutorily mandated to be knowledgeable in marine ecology and marine mammal affairs. At the end of 1988, its members were: Robert L. Brownell, Jr., Ph.D., U.S. Fish and Wildlife Service; Douglas G. Chapman, Ph.D. (Vice-Chairman), University of Washington; Daniel Goodman, Ph.D., Montana State University; Murray L. Johnson, M.D. (Chairman), University of Washington;

Jack W. Lentfer, Alaska Environmental Consulting, Homer, Alaska; George A. Llano, Ph.D., Naples, Florida; William Medway, Ph.D., D.V.M., University of Pennsylvania; Jane M. Packard, Ph.D., Texas A&M University; and Forrest G. Wood, San Diego, California. In August 1988, Joseph R. Geraci, V.M.D., Ph.D., University of Guelph, completed his term of service on the Committee, at which time William Medway, Ph.D., D.V.M., began a three-year term.

In recognition of the importance of marine mammals in the lives of many Eskimos, Indians, and Aleuts, the Commission, in 1986, asked Matthew Iya of Nome, Alaska, to serve as Special Advisor to the Marine Mammal Commission on Native Affairs. Mr. Iya continues to serve in that capacity.

### Funding

The Marine Mammal Commission came into existence during the second half of Fiscal Year 1974 and was appropriated \$412,000 for that period. Subsequent appropriations were:

FY 75:	\$750,000
FY 76:	\$900,000
FY 77:	\$1,000,000
FY 78:	\$900,000
FY 79:	\$702,000
FY 80:	\$940,000
FY 81:	\$734,000
FY 82:	\$672,000
FY 83:	\$822,000
FY 84:	\$929,000
FY 85:	\$929,000
FY 86:	\$861,000
FY 87:	\$910,000
FY 88:	\$953,000
FY 89:	\$953,000

### The Report

The Annual Report of the Marine Mammal Commission is a comprehensive review of the efforts of the Commission and its Committee of Scientific Advisors to identify and address domestic and international issues affecting marine mammals. Its purpose is to provide timely information to Congress, private citizens, public interest groups, government agencies, and the international community on events of the past year. To ensure factual accuracy, drafts of the report are circulated for review by agencies and others involved in each described activity.

One of the most significant events of 1988 was reauthorization and amendment of the Marine Mammal Protection Act. Chapter II discusses the issues considered during reauthorization hearings held by Congressional committees of both the Senate and the House of Representatives. These issues were addressed in subsequent amendments signed into law on 23 November 1988. Among other things, the amendments exempt United States and some foreign fisheries from the general permit and small take provisions of the Act until 1 October 1993. They also require owners of vessels engaged in fisheries that incidentally catch marine mammals either frequently or occasionally to register their boats with the National Marine Fisheries Service and report all interactions with marine mammals. If implemented effectively, the amendments will substantially strengthen the Marine Mammal Protection Act.

Every year, the Marine Mammal Commission devotes special attention to certain species or populations that are of particular concern. Among the thirteen species addressed in Chapter III of this Report are the West Indian manatee, the Hawaiian monk seal, the right whale, the humpback whale, the North Pacific fur seal, and the California sea otter. All have been the subject of intensive work by the Commission for a number of years.

The West Indian manatee population in the southeastern United States and the Hawaiian monk seal both are in serious jeopardy because of taking of the animals by accident or incidental to fishing, habitat degradation and destruction, and a variety of other threats. It is not alarmist to consider the possibility of extinction. For these reasons, the Commission has devoted and will continue to devote substantial effort to protecting and encouraging recovery of these species.

Like manatees and monk seals, right and humpback whales also are endangered. The activities of the Commission and others to establish recovery teams, develop recovery plans, and carry out the work described in the recovery plans also are discussed in Chapter III. In many cases, action has come about because of the Commission's persistence in forcing issues. In some cases, like the North Pacific fur seal, species occur only partly or seasonally in U.S. waters and continuing efforts to develop and implement cooperative international conservation programs are needed. Other species, like the river dolphins, Hector's dolphin, the Gulf of California harbor porpoise, and the West African manatee, are not found in U.S. waters, but are discussed here because they have become the focus of much-needed international attention. When possible and appropriate, the Commission helps support measures for the protection of such species.

As in 1987, one of the most perplexing problems encountered in 1988 was the continuing die-off of bottlenose dolphins along the Atlantic coast of the United States. By the end of the year, about 750 dead animals had been recovered and extensive examinations had been made of specimen material at laboratories throughout the United States and Canada. At year's end, various aspects of the investigation were being concluded. A summary of activities undertaken in 1988 and underway at the end of the year is provided in Chapter IV.

The Marine Mammal Protection Act mandates the Marine Mammal Commission's substantive involvement in international activities affecting marine mammals and their habitats. Most species and populations with which the Commission is concerned are wide-ranging and their conservation requires cooperative international efforts. While some issues of international concern are discussed in Chapter III, Species of Special Concern, those involving formal international agreements are reviewed in Chapter V.

Since its inception, the Marine Mammal Commission has been deeply involved in issues that could affect marine mammals in the Antarctic. It has advised the Department of State and other Federal agencies on efforts to develop and implement international agreements for the conservation of seals and other marine species and to govern possible exploration for and development of non-living resources in the Antarctic. Also, Commission representatives have participated as members of U.S. delegations to most Antarctic meetings during the past ten years.

Since the Marine Mammal Commission became operational in 1974, its representatives have participated in activities of the International Whaling Commission and its Scientific Committee. As discussed in Chapter V, activities of particular importance this past year were efforts by certain countries to conduct whaling for scientific purposes in an apparent attempt to circumvent the moratorium on commercial whaling which began in 1986.

Other international issues of particular concern discussed in Chapter V involve development of U.S. policy and research programs regarding the Arctic, negotiation of a Protocol on Specially Protected Areas and Wildlife in the Wider Caribbean Region, and activities related to the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

As noted in past Commission Reports, it is becoming increasingly clear that lost and discarded fishing gear and other persistent marine debris pose a significant threat to marine mammals and other wildlife. Since the beginning of this decade, the Marine Mammal Commission has called attention

to entanglement of marine mammals in marine debris and the general question of persistent plastics in the ocean, a major environmental issue throughout the world. As part of its effort, the Commission recommended that an international workshop on the fate and impact of marine debris be held in 1984. The Commission also provided the seed money and terms of reference for that workshop, which served to focus substantial attention on the problem, both in the United States and abroad. This past year, the National Oceanic and Atmospheric Administration continued to make real progress in implementing its marine debris program and the Coast Guard was instrumental in bringing about ratification of Annex V of the International Convention for the Prevention of Pollution from Ships and drafting domestic implementing legislation. By year's end, arrangements were in hand for the Second International Conference on Marine Debris, to be held in Hawaii on 2-7 April 1987. In Chapter VI, a broad range of domestic and international activities relating to debris and plastic pollution are addressed.

Marine mammal/fishery interactions concern fishermen, environmentalists, the scientific community, and Congress. When the Marine Mammal Protection Act was enacted in 1972, a major reason was that more than 350,000 porpoises had been killed in one year incidental to the commercial yellowfin tuna fishery. As time has passed, some marine mammal populations have grown in response to the protection provided by the Act, and different problems have emerged. In Chapter VII, actions regarding the incidental take of porpoise in the yellowfin tuna purse seine fishery and the adverse impact of the Japanese high seas gill net fisheries upon marine mammals, particularly Dall's porpoise, are both described.

Chapter VIII contains a brief historical overview of marine mammal/fishery interactions. Steps taken by the Marine Mammal Commission and others to identify and determine how to avoid or reduce the adverse effects of marine mammal/fishery interactions on both the affected fisheries and marine mammals are also reviewed. In addition, Chapter VIII contains a review of those parts of the 1988 Marine Mammal Protection Act amendments intended to produce more reliable information on the nature, extent, and effects of interactions and to identify ecologically and economically sound ways for avoiding or reducing conflicts.

Conservation of marine mammals in Alaska has been a biologically and politically difficult matter for years. Many problems may have arisen because of an unhealthy focus on bureaucratic processes rather than on the welfare of the species or populations in question. To help provide a commonly agreed basis from which groups of differing perspectives could constructively discuss Alaskan marine mammal issues,

the Commission organized and supported the preparation of species reports with research and management recommendations for ten species. The reports, the cooperative effort of many informed contributors of widely varying interests were published in 1988 and are discussed in Chapter IX. In that Chapter, a variety of other issues affecting the Native community, government agencies, and marine mammals in Alaska are discussed as well.

Since activities related to the exploration for and exploitation of offshore oil and gas resources can affect marine mammals and their habitats, the Commission has conducted a continuing review of proposed activities and has provided advice to the Minerals Management Service and other agencies on actions needed to ensure that such activities do not have significant adverse effects on marine mammals or the ecosystems of which they are a part. These efforts are described in Chapter X.

The Marine Mammal Commission is directed by statute to carry out a research program. That program is described in Chapter XI of this Report. Other research-related activities of the Commission, such as its annual survey of Federally-funded marine mammal research programs and the convening of a number of research program reviews and workshops are also discussed.

Chapters XII and XIII describe issues related to the permit process and regulations to govern the care and maintenance of marine mammals in captivity. Both are of considerable importance and have been the subject of much attention by the Commission and its Committee of Scientific Advisors.

It is the Marine Mammal Commission's hope that this Report will serve as a useful and reliable reference document for interested individuals and groups in the United States and abroad.

## CHAPTER II

### REAUTHORIZATION AND AMENDMENT OF THE MARINE MAMMAL PROTECTION ACT

The Marine Mammal Protection Act was enacted in 1972 for the purpose of protecting and encouraging the growth of marine mammal populations to the greatest extent feasible, commensurate with sound policies of resource management. The Act provides that the primary objective of marine mammal management is to maintain the health and stability of the marine ecosystem. Whenever consistent with that objective, it is the goal of the Act to obtain optimum sustainable marine mammal populations while keeping in mind the carrying capacity of the habitat.

#### Background

Since 1972, the Act has been amended several times. In 1986, section 101(a)(5) was amended to allow the take of small numbers of marine mammals from depleted stocks incidental to activities other than commercial fishing. Prior to 1988, the Act was last reauthorized in 1984 when it was also amended. Among other things, the 1984 amendments: 1) extended for an indefinite period the general permit issued to the American Tunaboat Association in 1980; 2) established quotas for the incidental take of coastal spotted and eastern spinner dolphins by U.S. tuna fishermen; 3) required that foreign nations seeking to import yellowfin tuna into the United States provide documentary evidence that they have adopted a porpoise protection program comparable to that of the United States and have achieved an incidental take rate comparable to that of the U.S. fleet; and 4) directed the Secretary of Commerce to undertake a program to monitor the indices of abundance and trends of marine mammal populations taken incidental to the yellowfin tuna fishery.

Events since reauthorization in 1984 suggested that broader amendments would be considered during the 1988 reauthorization. Most notably, the appellate court decision in Kokechik Fisherman's Association v. Secretary of Commerce, 839 F.2d 795 (D.C. Cir. 1988) invalidated a permit issued to the Federation of Japan Salmon Fisheries Cooperative Association, overturning a longstanding National Marine Fisheries Service interpretation of the Marine Mammal Protection Act permit provisions. (For further discussion of this case, see Chapter VII of this Report.) The Court's decision cast doubt on the Service's ability to issue incidental take permits for other fisheries, including several domestic fisheries whose permits were to expire at the end of 1988. In addition, delays in

implementing the 1984 amendments and a continued high mortality of porpoise incidental to foreign tuna fishing operations made it likely that the tuna/porpoise provisions of the Act would again be at issue.

These and other issues were considered by the Congress in the course of hearings on reauthorization of the Act during 1988. In response to the Kokechik decision and in anticipation of the need to amend the incidental take provisions of the Act, representatives of the U.S. fishing industry and the environmental community began meeting late in 1987 to formulate a joint legislative proposal. After lengthy negotiations, the coalition presented a proposal that included: a limited exemption to the Act's moratorium on taking, allowing taking incidental to commercial fisheries for a three-year period; limitations on the take of North Pacific fur seals and Steller sea lions; an industry-wide education program; an enhanced reporting program; a verification system with limited observer placement; a new data analysis system; and procedures for reviewing the status of affected marine mammal populations. The joint agreement formed the basis for several of the provisions of the interim exemption ultimately adopted by Congress.

The Senate Committee on Commerce, Science, and Transportation held a hearing on 13 April 1988, focusing on the incidental take of porpoise by tuna fishermen in the eastern tropical Pacific Ocean. The Committee held a second hearing on 19 May 1988, primarily to examine the joint fisheries/environmental proposal discussed above. In the House of Representatives, the Subcommittee on Fisheries and Wildlife Conservation and the Environment of the Committee on Merchant Marine and Fisheries held an initial hearing on 10 May 1988. Issues discussed included: incidental take permits and exemptions from the taking prohibition for commercial fishermen, including a discussion of the joint fishing industry/environmental community agreement; the need to reduce porpoise mortality in the tuna fishery; and provisions of the Act relating to scientific research and public display permits. A subsequent hearing was convened by the Subcommittee on 8 September 1988 to review proposed amendments designed to reduce the mortality of porpoise in the course of yellowfin tuna purse seine fishing, including a proposal to phase out fishing for tuna by setting on porpoise by the U.S. fleet. Representatives of the Commission presented testimony during and participated in all four hearings.

In the House of Representatives, a bill, H.R. 4189, was introduced on 16 March 1988 to reauthorize the Marine Mammal Protection Act at existing funding levels for a five-year period. A substitute bill was considered by the Subcommittee on Fisheries and Wildlife Conservation and the Environment on 14 September 1988 and was reported out by the Committee on

Merchant Marine and Fisheries on 23 September 1988. The Senate bill, S. 2810, was introduced on 20 September 1988, and reported out by the Committee on Commerce, Science, and Transportation on 6 October. H.R. 4189 was passed by the House of Representatives on 26 September, and the Senate passed S. 2810 on 14 October. To reconcile the two bills, the House passed an amended H.R. 4189 on 19 October, and on 21 October the Senate concurred with the House amendment. On 23 November 1988, the President signed the enrolled bill into law, reauthorizing the Marine Mammal Protection Act through Fiscal Year 1993.

A discussion of the more important substantive amendments to the Act follows.

#### Interim Exemption for Commercial Fisheries

An interim exemption from the Act's taking prohibition for commercial fishermen was enacted. During the exemption period, which runs until 1 October 1993, the general permit and small take provisions of the Act will not govern the incidental taking of marine mammals in the course of commercial fishing operations by domestic fishermen or by foreign fishermen fishing pursuant to valid permits issued under section 204 of the Magnuson Fishery Conservation and Management Act. Rather, the incidental take will be authorized and regulated in accordance with the exemption provisions of new section 114. Foreign fisheries not regulated under the Magnuson Act, such as the Japanese high seas salmon fishery at issue in the Kokechik case, are not included in the exemption. An exception is also made for the commercial yellowfin tuna purse seine fishery which will continue to operate under its present general permit.

Under the exemption provisions, commercial fishermen operating in fisheries identified by the National Marine Fisheries Service as frequently or occasionally taking marine mammals must register with the Service and obtain an exemption certificate by 21 July 1989 in order to engage lawfully in that fishery. Vessel owners, masters, and crew members will not be subject to penalties for the incidental take of marine mammals, except for the take of California sea otters or the intentional lethal take of Steller sea lions, cetaceans, or marine mammals from depleted populations, if the owner has obtained and maintains a current exemption.

In order for exemptions to remain valid, vessel owners are required to submit reports detailing any instances of incidental taking and providing such other information as may be prescribed by the National Marine Fisheries Service. In addition, owners of vessels engaged in fisheries that frequently

take marine mammals must accept the placement of natural resources observers on board their vessel or face exemption revocation. The exemptions, however, are not absolute. If the incidental taking is having an immediate and significant adverse impact on a marine mammal stock or if more than 1,350 Steller sea lions or 50 North Pacific fur seals will be killed during a calendar year, the Service, in consultation with the appropriate regional Fishery Management Councils and State agencies, must prescribe emergency regulations to prevent, to the maximum extent practicable, any further taking.

Fishermen engaged in fisheries determined to have only a remote possibility of taking marine mammals need not register with the Service or obtain an exemption certificate. As long as they report all marine mammal mortalities incidental to their operations, such fishermen will not be liable for penalties as a result of the take.

The National Marine Fisheries Service, by 22 January 1989, must publish a proposed list of all U.S. fisheries classifying them as category 1 (those with frequent incidental takes), category 2 (those with occasional incidental takes), or category 3 (those with a remote possibility of or no known incidental takes). After opportunity for public comment, the Service must publish a final list by 23 March 1989, along with information advising vessel owners how to obtain exemptions and otherwise comply with the new provisions. Other Service responsibilities include: establishment of an observer program under which 20 to 35 percent of the operations by category 1 vessels will be monitored; creation of an alternative observation program if less than 20 percent of the operations in a category 1 fishery will be observed; implementation of an information management system capable of processing and analyzing observer data and reports required from vessel owners engaged in category 1 and category 2 fisheries; and consulting with the Fish and Wildlife Service before taking actions or making determinations with respect to marine mammal species otherwise under the jurisdiction of the Department of the Interior.

As noted above, the interim exemption is intended to govern marine mammal/fishery interactions for a five year period. After that, Congress will re-examine the issue in light of the information gathered under the interim exemption and is expected to enact a permanent system under which incidental taking will be regulated. As a first step in developing the long-term regulatory regime, the Marine Mammal Commission is instructed to transmit to the Secretary of Commerce by 1 February 1990 recommended guidelines to govern the incidental taking of marine mammals in the course of commercial fishing operations after 1 October 1993.

## Status Reviews and Conservation Plans

A new section 115 sets forth procedures under which status reviews of marine mammal populations are to be conducted. The amendments authorize interested persons to petition the appropriate Service to undertake a review, specify that status determinations are to be made by rulemaking, and establish time limits for completing each step of the review. In addition, the Services are directed to prepare conservation plans as soon as possible for all depleted species or stocks unless the Service determines that such a plan will not promote the conservation of the species or stock. The National Marine Fisheries Service is specifically required to complete conservation plans for the North Pacific fur seal by 31 December 1989 and for the Steller sea lion by 31 December 1990.

## The Tuna-Porpoise Program

Changes to the program governing the take of marine mammals by the U.S. tuna fishery and the importation of yellowfin tuna taken by foreign fleets were enacted. Under regulations to be published by 1 January 1989, U.S. tuna fishermen must complete the process of backdown to remove porpoise from the net no later than 30 minutes after sundown. This restriction on sundown sets may be waived for individual certificate holders who, based on observer reports, have attained an incidental take rate for sundown sets that is no higher than the average daytime take rate for the fleet as a whole. The amendments also require the placement of an observer on every fishing trip made by U.S. vessels during 1989 and subsequent fishing seasons unless, for reasons beyond the control of the Secretary, an observer is not available. The 100 percent observer requirement may be waived after the 1991 fishing season if it is determined that a less extensive observer program will yield sufficiently reliable information. Further, the amendments prohibit the use of explosives other than Class C pest control devices in the commercial yellowfin tuna fishery. The Secretary is directed to regulate the use of Class C explosives by 1 April 1990 based on a study to determine if such devices result in physical impairment or increased mortality of marine mammals. In addition, the amendments direct the Secretary to develop and implement, by the beginning of the 1990 fishing season, a system of performance standards designed to maintain the diligence and proficiency of certificate holders. Those skippers whose incidental marine mammal mortality rate is consistently and substantially higher than the average rate for the fleet will be subject to supplemental training; continued poor performance may result in suspension or revocation of a certificate of inclusion.

Additional requirements have been placed on foreign nations seeking to import yellowfin tuna into the United States. In order for a foreign tuna/porpoise program to be found comparable to that of the United States, it must include: 1) by the beginning of the 1990 fishing season, prohibitions on encircling pure schools of marine mammals, conducting sundown sets, and other activities as are applicable to U.S. vessels; 2) monitoring by observers from the Inter-American Tropical Tuna Commission or an equivalent international program; and 3) observer coverage equal to that for U.S. vessels unless an alternative observer program with lesser coverage is determined to provide sufficiently reliable documentary evidence of the nation's incidental take rate. In addition, the average incidental take rate for a foreign fleet must be no more than twice that of the U.S. fleet during the 1989 season and no more than 1.25 times the U.S. rate during the 1990 and subsequent seasons. Limitations are also placed on the take of coastal spotted and eastern spinner dolphins. Beginning in 1989, eastern spinner dolphins may not account for more than 15 percent of the nation's total incidental take and coastal spotted dolphins may not exceed 2 percent of the nation's total take. Harvesting nations will also be required to comply with all reasonable requests from the United States to cooperate in conducting its porpoise stock assessment and monitoring program.

The amendments also place restrictions on third-party nations seeking to export yellowfin tuna to the United States. An intermediary nation must now certify and provide reasonable proof that it has acted to prohibit the importation of tuna from any country banned from directly exporting tuna to the United States. Intermediary nations have 60 days following the imposition of a U.S. import ban to implement a similar prohibition on tuna imports from the embargoed harvesting nation. Failure by the intermediary nation to adopt a parallel import ban within six months of U.S. action will prompt certification under the Pelly Amendment to the Fishermen's Protective Act and may result in restrictions on imports of all fish products from the intermediary nation.

In addition, the Secretary is directed to contract with the National Academy of Sciences for an independent review of possible alternative tuna fishing methods that do not involve the incidental take of marine mammals. This review is to be completed by 8 September 1989 and the results submitted to Congress by 5 December 1989, along with the Service's proposed plan for research, development, and implementation of the identified alternatives.

## Research, Display, and Enhancement Permits

The provisions governing scientific research and public display permits were amended, and a new permit category was created allowing the Services to authorize activities designed to enhance the survival or recovery of marine mammal populations. Also, marine mammals that were pregnant at the time of taking, nursing at the time of taking, or less than eight months old may now be imported for public display if it is determined that such importation is necessary for the protection or welfare of the animal.

Public display permits may only be issued to an applicant which offers an acceptable education or conservation program, based upon professionally recognized standards of the public display community, and which is open to the general public on a regularly scheduled basis. Before issuing a scientific research permit, the Service is required to determine that the proposed research is required to further a bona fide scientific purpose and does not unnecessarily duplicate other research. Lethal take of marine mammals for scientific research purposes may be authorized only if the applicant demonstrates that non-lethal alternatives are not feasible. Lethal take from depleted populations may be allowed only if the Service determines that the research will directly benefit the affected species or stock or fulfills a critically important research need.

Enhancement permits may be issued to authorize activities designed to contribute significantly to increasing or maintaining the distribution or size of a marine mammal population. Any such permit must be consistent with applicable conservation or recovery plans. Captive maintenance of depleted marine mammals under this authority is permitted only if the Service: 1) finds that such maintenance is likely to contribute to the survival or recovery of the species or stock; 2) determines that the expected benefit to the species or stock outweighs the likely benefit of alternatives that do not involve the removal of animals from the wild; and 3) requires that animals removed from the wild and their progeny be returned to their natural habitat as soon as feasible.

The authority of the Secretary or his designees to take actions for the benefit of marine mammals without obtaining a permit was also expanded. The Secretary may now authorize the importation of a marine mammal if necessary to render medical treatment that is not otherwise available. Once treatment has been completed, steps must be taken to return the animal to the wild if it is feasible to do so.

## Authorization of Appropriations

Appropriations of funds were authorized for the Department of Commerce, the Department of the Interior, and the Marine Mammal Commission to carry out their responsibilities under the Act during Fiscal Years 1989-1993. In addition, a separate authorization was made for the Department of Commerce to implement and administer the interim exemption program. Although authorized, Congress has yet to appropriate funding for the interim exemption program.

## Miscellaneous Amendments

As noted in Chapter IV, other amendments directed the Secretary of Commerce to conduct a study of the 1987-1988 die-off of bottlenose dolphins in the North Atlantic Ocean. The legislation expanded the definition of fish products that may be embargoed pursuant to the Pelly Amendment and authorized additional funding for the Pribilof Islands trust funds.

## Reauthorization of the Endangered Species Act

Authorization for appropriations to implement the Endangered Species Act expired on 30 September 1988. Efforts to reauthorize the Act during 1985 and in subsequent years were unsuccessful. However, the provisions of the law remained in force and funds to carry out its functions were appropriated for Fiscal Years 1986 and 1987. During 1988, Congress passed legislation to reauthorize the Endangered Species Act and, on 7 October 1988, the President signed into law H.R. 1467, reauthorizing the Act through 1992. This bill also amended the Act in several respects. Those relevant to marine mammals are discussed below.

Among other things, the amendments established new requirements for preparing and implementing recovery plans. The amendments direct the Fish and Wildlife Service and the National Marine Fisheries Service to give priority to those endangered and threatened species, regardless of taxonomic classification, that are most likely to benefit from such plans. This requirement is to be applied with particular reference to those species that are in conflict with development projects or other forms of economic activity. Recovery plans must now include: a description of site-specific management activities to be undertaken; objective, measurable criteria which, when met, would result in the delisting of the species; and estimated time and cost requirements for carrying out the measures specified in the recovery plan. In addition, the Services must provide public notice and an opportunity for comment before approving a new or revised recovery plan. The amendments

before approving a new or revised recovery plan. The amendments also require the Services to report to Congress every two years on progress being made to develop and implement recovery plans and on the status of those species for which plans have been adopted.

The Services are directed to establish a system, in cooperation with appropriate states, to monitor the status of species that are delisted for a period of at least five years following the delisting. If, as a result of the monitoring program, it becomes apparent that the species has again declined to the point where it is likely to become endangered or threatened, the Service is required to relist the species promptly, using emergency listing authority when necessary.

The amendments raised the monetary penalties that may be assessed for violations of the Endangered Species Act. Maximum civil penalties were increased from \$10,000 to \$25,000, and maximum fines for criminal violations were increased from \$20,000 to \$50,000.

Under pre-existing provisions of the Act, licenses could be issued to permit the sale of pre-Act finished scrimshaw products if they or the raw materials from which they were made were held when the Act was enacted on 28 December 1973. The amendments extended this license provision, allowing individuals holding valid licenses as of 31 March 1988 to apply for a renewal for up to five years.

## CHAPTER III

### SPECIES OF SPECIAL CONCERN

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, reviews the status of marine mammal populations and makes recommendations on necessary research and management actions as well as on designations with respect to the status of species or populations under the Marine Mammal Protection Act and the Endangered Species Act. During 1988, the Commission continued to concentrate on several species of marine mammals designated as endangered or threatened, including the West Indian manatee, the West African manatee, the Hawaiian monk seal, the California sea otter, the humpback whale, the right whale, the bowhead whale, and the Gulf of California harbor porpoise. Given the serious condition of several other marine mammal species or populations, the Commission also focused on the North Pacific fur seal, the Steller (northern) sea lion, Hector's dolphins, the five species of river dolphins, and polar bears. A review of the Commission's activities regarding these species and populations follows.

#### West Indian Manatee (*Trichechus manatus*)

West Indian manatees occur from the southeastern United States to northern Brazil. The species is endangered throughout its range. Remaining populations outside the United States are believed to be small and, in many areas, declining. Because the largest known concentration of animals, numbering at least 1,200 animals, is in Florida, the long-term survival of the species may depend on its continued existence in the southeastern United States. Survival in the United States, however, is in grave doubt. Each year, large numbers of animals die or are killed, and human use and development of waterways and adjacent lands further degrade remaining habitats.

Since 1984, known manatee mortality in the United States, primarily in Florida, has averaged 127 animals per year. During the five-year period prior to 1984, known manatee mortality averaged 90 animals per year. Most of the recent increase can be attributed to increases in deaths caused by collisions with boats and barges and perinatal deaths (*i.e.*, the death of newborn or very young animals due to undetermined or uncertain causes), both of which have nearly doubled in the past 10 years. Between 1979 and 1983, known boat/barge-related manatee mortality averaged 20 animals per year and perinatal deaths averaged 13 animals per year. Between 1984 and 1988, the number of boat kills averaged 37

per year and perinatal deaths averaged 27 per year. Manatee mortality data collected since 1977 are presented in the following table.

Manatee Mortality in the United States, 1977-1988\*

<u>Year</u>	<u>In Florida</u>	<u>Outside Florida</u>	<u>Total</u>	<u>Boat/Barge Collisions</u>	<u>Peri-natal</u>
1977	113	1	114	13	9
1978	84	0	84	21	10
1979	77	1	78	24	9
1980	63	4	67	16	13
1981	113	3	116	24	13
1982	117	6	123	21	14
1983	80	0	80	15	18
1984	128	3	131	35	25
1985	120	9	129	35	23
1986	122	3	125	33	27
1987	114	4	118	39	30
1988**	133	1	134	43	30

\* Figures include the number of manatee carcasses recovered by year and the number of animals known to have died but which were not recovered.

\*\* Data for 1988 are preliminary totals provided by the Florida Department of Natural Resources, Division of Marine Resources.

Over the past decade, human population growth and associated development in and near important manatee habitats have increased dramatically. Recent population estimates for Florida indicate a net growth rate of about 1,000 people per day. Accompanying this human population growth has been a dramatic increase in the number of registered boats in the State. Whereas about 100,000 boats were registered in Florida in the early 1960s, there are now more than 675,000, with an additional 300,000 transient boats entering annually from out-of-state. By the year 2000, the number of registered boats in Florida is expected to double. Given increasing boat traffic associated with increasing numbers of boats, the number of boat-killed manatees only can be expected to rise unless additional actions to reduce boat kills are taken. Perhaps more serious in the long-term, however, are habitat losses resulting from increased coastal development and environmental pollution that will further degrade or destroy critical manatee habitat.

## Background

In the late 1970s, a major effort was undertaken to strengthen the manatee recovery program. Among other things, the Marine Mammal Commission, in 1979 and 1980, undertook a thorough review of Federal, State, and private manatee conservation activities and, in 1980, it allocated a special Fiscal Year 1980 Congressional appropriation of \$100,000 to manatee research needs. Also in 1980, the U.S. Fish and Wildlife Service completed and adopted the West Indian Manatee Recovery Plan. As recommended by the Commission in its comments on the Recovery Plan, the Plan was further supplemented by a Comprehensive Work Plan that was adopted by the Service early in 1982. These planning activities focused attention on priority recovery needs and, through the early 1980s, they helped forge a strong, cooperative manatee recovery program involving numerous Federal, State, industry, and private agencies and organizations.

The following activities, discussed in greater detail in the Commission's previous Annual Reports, illustrate the type and range of cooperative efforts undertaken in the early 1980s. The Marine Mammal Commission: helped identify priority research and management needs; provided funds to establish and convene meetings of the Manatee Technical Advisory Council of the Florida Department of Natural Resources; provided funds for a program to train officers of the Florida Marine Patrol, the Game and Fresh Water Fish Commission, and the Puerto Rico Department of Natural Resources in State and Federal law affecting manatee protection and manatee biology; provided terms of reference and partial support to the Fish and Wildlife Service for developing a research and management plan for Crystal River manatees; provided funds to support a manatee activities coordinator in 1980; funded a study of manatee food preference and feeding areas in Hobe Sound; published a comprehensive analysis of habitat protection needs for manatees in northwest Florida; helped make arrangements with the Corps of Engineers and the Florida Department of Natural Resources for posting manatee protection signs in boat speed regulatory zones; provided direction and funding for a number of manatee-related research and management actions set forth in the Recovery and Comprehensive Work Plans; and held a number of its Annual Meetings in Florida to help focus and coordinate manatee protection and conservation efforts.

The Fish and Wildlife Service: developed and intensified efforts to radio-tag and track manatees; maintained (until 1985) a manatee salvage and necropsy program; conducted studies of factors potentially affecting the occurrence of boat/barge related manatee mortality in certain areas; continued to conduct and to evaluate techniques for aerial surveys of

manatees; initiated and maintained long-term life history and ecology studies of manatees; completed a site specific research and management plan for Crystal River manatees; convened meetings to develop and coordinate a cooperative Federal-State strategy for acquiring and protecting important manatee habitats in the Crystal River area of northwest Florida; pursued several manatee-related land acquisition efforts along the lower Suwannee, Crystal, and Homosassa Rivers; expanded efforts to review Federal dredge- and-fill permit applications for developments in manatee habitat; and generally coordinated overall manatee recovery activities.

The Corps of Engineers: assisted with the posting of manatee protection signs; provided funding for boating studies in Citrus County; provided funds to the Fish and Wildlife Service to help synthesize information on manatee distribution and mortality in Florida; and helped support telemetry and aerial survey studies conducted by the Fish and Wildlife Service along Florida's east coast.

The State of Florida, primarily through its Department of Natural Resources and Game and Freshwater Fish Commission: established, posted, and enforced more than 20 boat speed regulatory zones in areas frequented by manatees; prepared and distributed brochures and other materials to heighten public awareness and understanding of manatee conservation needs; established a stable source of funding to develop and carry forward a State manatee research and management program; assumed lead responsibility from the Fish and Wildlife Service in 1985 for operating the manatee salvage and necropsy program; initiated aerial surveys to determine manatee distribution and habitat use patterns in selected areas; helped support and carry out radio-tagging and tracking studies; pursued efforts to identify and acquire important undeveloped manatee habitat in the Crystal and Homosassa Rivers area of northwest Florida; and began working with local officials on incorporating manatee protection provisions into local growth management plans required by a new State law.

The Florida Power & Light Company: continued to prepare and distribute booklets, bumper stickers, and related public awareness materials on manatees and manatee conservation; supported a series of public education seminars on manatees; continued to fund annual winter aerial surveys to monitor manatee abundance at warm-water refuges created by its power plant outfalls; provided funds to help support radio-tracking studies of manatees and to develop a scar catalogue with which to identify and monitor movements of individual manatees; and took steps to assure that availability of warm-water discharges used by manatees in winter would not be diminished by reductions or alterations in operations at its power plants.

The Save the Manatee Club, created by Executive Order of the Governor of Florida, with assistance from the Florida Department of Natural Resources, singer Jimmy Buffett, and other concerned citizens: began preparing and distributing information on manatees and the status of manatee recovery activities; organized programs, including an adopt-a-manatee program, to help raise money for manatee conservation activities; and provided proceeds from those activities to help supplement essential manatee research and management needs.

Despite these cooperative efforts, some of the most critical issues (e.g., record numbers of boat kills and increasing loss and degradation of essential habitat) had not been resolved and the long-term survival of manatees in the United States remained tenuous. Therefore, in 1986, the Commission, with partial support from the Fish and Wildlife Service, contracted for a report to review and evaluate manatee recovery issues, activities, and priority needs. In addition, the Commission devoted its 1987 Annual Meeting primarily to discussions of West Indian manatees. In advance of that meeting and based, in part, on a draft report of the study to evaluate the manatee recovery program, the Commission wrote to the Fish and Wildlife Service on 19 November 1987 outlining its views of the critical management issues.

In its letter, the Commission recommended that the Service, in cooperation with other involved parties, take prompt action to: (1) update the West Indian Manatee Recovery Plan and Comprehensive Work Plan; (2) reconstitute and reconvene the West Indian Manatee Recovery Team; (3) complete manatee-related land acquisition projects in the Crystal River-Homosassa River area of northwest Florida; (4) strengthen the system of boat speed regulatory zones, including enforcement efforts, in essential manatee habitats; (5) control development of new boating facilities in essential manatee habitat; (6) identify and undertake priority manatee research; and (7) coordinate and expand public information and education programs.

These recommendations provided the focus for manatee-related discussions at the Commission's Annual Meeting, held on 10-12 December 1987 in Miami, Florida. Representatives of the principal State and Federal agencies and other organizations involved in the manatee recovery program participated in the meeting. There was general agreement among the participants on all of the points recommended in the Commission's letter. The results of meeting discussions and the initial steps to follow up on recommended actions as of the end of 1987 are described in the Commission's previous Annual Report.

Among the follow-up actions begun before the end of 1987, the Commission: took steps to revise and complete its contract report evaluating the manatee recovery program;

committed funds to the Florida Department of Natural Resources to help continue meetings of the Manatee Technical Advisory Council and to prepare curricula for public schools on protection of manatees and coastal ecosystems; and wrote to the Fish and Wildlife Service on 29 December 1987 recommending that the Service provide funds to expand radio-tracking studies and to continue studies of factors affecting the growth of seagrasses eaten by manatees in Hobe Sound. In addition, the Fish and Wildlife Service identified prospective new members for the Manatee Recovery Team, established a timetable for revising the Recovery Plan, and began drafting parts of the Revised Plan.

As described below, during 1988, the Commission and other involved agencies continued to take steps to redirect and strengthen cooperative manatee recovery activities.

#### West Indian Manatee Recovery Team and Recovery Plan

As indicated above, the Fish and Wildlife Service concurred with the Commission's recommendation that the Recovery Team be reconstituted and that the Recovery Plan be revised and updated. Accordingly, the Service appointed a new Recovery Team and began preparing a revised Recovery Plan. To help identify critical subjects to be addressed in the revised Plan, the Commission's contract report entitled "Protection of West Indian Manatees (Trichechus manatus) in Florida" (see J.E. Reynolds and C.J. Gluckman 1988, Appendix B) was completed and, in May of 1988, it was provided to the Service, members of the Manatee Recovery Team, and other involved and interested parties. Among other things, the report reviewed progress since 1980 in developing the cooperative Federal-State-private manatee recovery program, highlighted the need for protecting essential manatee habitat and reducing collisions between manatees and boats as the two most critical issues, and recommended future research and management priorities.

With respect to the last point, the report recommended, among other things, that efforts be undertaken to: expand radio- and satellite-tracking studies; continue and improve the salvage-necropsy program; continue seagrass studies in Hobe Sound and initiate similar studies in other areas; identify and pursue additional land acquisition projects; expand the system of boat speed regulatory zones to include additional manatee habitat and to strengthen enforcement at established zones; intensify efforts to incorporate manatee protection provisions into local growth management plans; develop criteria for determining when permit applications for boating facilities in manatee habitats should be denied, approved, or approved conditionally; expand and target information and education materials for boaters, divers, and school children; and continue

meetings of the Manatee Technical Advisory Council and the Manatee Recovery Team.

Representatives of the Service and members of the Recovery Team involved in developing the revised Recovery Plan considered the report and reflected its findings and recommendations in a preliminary Draft Recovery Plan. On 13-14 July 1988 the Recovery Team met in Gainesville, Florida, and a representative of the Commission was invited to attend. Among other matters discussed during its meeting, the Team considered actions to improve the effectiveness of posted boat speed regulatory zones and sanctuaries established to protect manatees. In this regard, the Team noted that one of the best ways to increase boater awareness of existing zones and sanctuaries, particularly for transient out-of-state boaters, would be to indicate their presence on future editions of NOAA Nautical Charts for Florida coastal waters.

To facilitate consideration of the suggestion, the Commission wrote to the National Oceanographic and Atmospheric Administration on 22 July 1988 urging that the proposal be considered. It suggested that a small symbol, such as a small manatee profile, be placed at locations where speed zones exist and that an accompanying explanation be added to the chart legend explaining the special boating regulations that apply within identified areas. The Commission noted that including such information on the charts would make an outstanding contribution toward addressing one of the highest priority needs in the manatee recovery program -- that is helping to ensure that boaters are aware of their obligations to protect manatees.

On 15 August, the National Oceanic and Atmospheric Administration responded noting that it had charted the location of all manatee warning signs which had been reported to it. It also noted that its Charting and Geodetic Service had standard procedures for identifying such areas on charts, but that because of restrictions established by the International Hydrographic Organization and the Chart Standardization Committee, its prerogatives for creating a unique symbol for manatees was limited. It noted that it would consider any new requests that it received and add them to its charts provided that the additional information did not clutter charts and deter from their navigation value. In consultation with the Fish and Wildlife Service and the State of Florida, the Commission looks forward to working with the Charting and Geodetic Service to ensure that navigation charts identify established manatee boat speed regulatory zones and sanctuaries.

On 20 October 1988, the Fish and Wildlife Service provided the Commission and other agencies, organizations, and individuals with copies of the "Technical Agency Review Draft

of the West Indian Florida Manatee (Trichechus manatus latirostris) Revised Recovery Plan." The Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, reviewed the Draft Revised Plan and, on 9 December 1988, returned comments to the Service. In its comments, the Commission noted that the Draft Revised Plan was well organized, that it did an excellent job of projecting manatee research and management priorities and responsibilities over the next five years, and that it appeared to address all of the critical issues. The Commission, commended the Service's staff and the members of the Recovery Team for preparing an accurate, thorough, and useful Plan.

With respect to recovery tasks identified in the Draft Revised Plan, the Commission noted that many Federal, State, and local agencies, private organizations and public interest groups would have important and complementary responsibilities under the Recovery Plan. Thus, extensive cooperation and coordination would be required to carry out identified tasks efficiently and effectively. However, the steps needed to ensure that recovery activities are properly organized and carried out were not set forth in the task outline. The Commission therefore recommended that a new section of tasks be added to the plan identifying the mechanisms that would be relied upon to achieve the necessary level of coordination during the course of plan implementation.

At the end of 1988, it was the Commission's understanding that comments on the Technical Agency Review Draft Plan would be incorporated into a final Draft Revised Plan, which was being provided to the principal involved agencies for final review in February. After final agency review, the Revised Plan is to be submitted to the Director of the Fish and Wildlife Service and other agency heads for final approval in the spring of 1989.

#### Support for Necessary Research and Management Tasks

During the Commission's 10-12 December 1987 Annual Meeting, it became apparent that radio-tracking was a cost-effective means of collecting habitat use pattern data needed to make sound recovery decisions. Similarly, the importance of continuing ecosystem studies begun in 1987 on grass beds at Hobe and Jupiter Sound, which are essential winter feeding areas for manatees, also was evident. Radio-tracking studies, however, were constrained by limited funding for needed equipment. Also, it was uncertain whether the Service would continue to fund studies at Hobe Sound at the level envisioned when the five-year study was begun. Therefore, as noted above, on 29 December 1987, the Commission wrote to the U.S. Fish and Wildlife Service recommending that: a) funding for radio-tracking manatees be increased by \$120,000 to \$150,000

and maintained at that level for the next five years to tag and track 20-25 manatees annually, and b) full support be provided for the second year of the five-year ecosystem study at Hobe Sound.

On 9 February 1988, the Service responded to the Commission's letter. The Service noted that it would fully fund the Hobe Sound study in Fiscal Year 1988 at the level proposed at the outset of the study. With respect to radio-tagging research, the Service agreed that the studies were very important, but indicated that, due to budgetary limitations and research needs for other endangered species, it would not be able to expand radio-tagging work unless it received additional funds. Further, it would be able only to support efforts to continue monitoring manatees tagged in 1987 and deploy three new satellite tags provided to the Service by the Florida Department of Natural Resources.

The Service subsequently submitted a proposal to the National Fish and Wildlife Foundation requesting funds to help supplement tagging and tracking research. A copy of the proposal was sent to the Commission by the Foundation and, on 17 June 1988, the Commission wrote to the Foundation expressing its strong support for the proposal. The proposal was approved and, with cooperative support from other agencies and organizations, radio-tracking studies were maintained at a level comparable to that supported in 1987, but were not expanded as recommended by the Commission.

By late summer 1988, it became apparent that the need to strengthen manatee recovery efforts was becoming urgent. Twenty-nine boat killed manatees had been recovered between January and the end of July and it was apparent that the previous year's record high of 39 boat kills would be eclipsed in 1988. Therefore, the Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, decided to abandon some of its research plans for other species and to invest most of its remaining Fiscal Year 1988 research funds in manatee-related studies.

As noted above, late in 1987 the Commission provided Fiscal Year 1988 funds to the Florida Department of Natural Resources to support the Manatee Technical Advisory Council and to develop curricula for public schools on manatee and coastal ecosystem protection. After consulting with its Committee of Scientific Advisors as well as representatives of the Fish and Wildlife Service, the Florida Department of Natural Resources, and other agencies and organizations involved in manatee recovery, the Commission allocated funds to six additional manatee-related projects in late summer 1988.

The projects, described in greater detail in Chapter XI of this report, included: (1) convening a workshop and preparing a report on possible cooperative efforts to develop a computer-based geographic information system to help study and manage manatee habitat; (2) investigating the feasibility of determining the age of manatees using bone growth layers; (3) assessing the possible use of "DNA fingerprinting" to determine genetic variability, kinship relationships, and reproductive success of manatees; (4) purchasing a portable computer suitable for field use to aid in studies of seagrasses at Hobe Sound; (5) supplementing the Hobe Sound seagrass studies to include assessment of the effects of manatee grazing on seagrasses; (6) preparing a short article on why it is important to save manatees for a popular book on what must be done to save the manatee; and (7) support for efforts by the Commission's Committee of Scientific Advisors and staff to develop a report on habitat protection needs for the population of manatees on the east coast of Florida and Georgia.

### Habitat Protection

As described in previous Annual Reports, in 1984 the Commission completed a report entitled "Habitat Protection Needs for the Subpopulation of West Indian Manatees in the Crystal River Area of Northwest Florida" (see Appendix B, Marine Mammal Commission 1984). The purpose of that report was to identify needs and make recommendations for protecting a full complement of summer and winter manatee habitat necessary to assure the long-term survival of one of Florida's discrete manatee subpopulations. Among other things, the Report recommended acquiring several areas along the Crystal, Homosassa, and Suwannee Rivers for incorporation into a regional system of Federal and State refuges, reserves, preserves, and parks.

The Commission's report was provided to the Fish and Wildlife Service and the Florida Department of Natural Resources late in 1984. In March 1985, the Fish and Wildlife Service convened a meeting of representatives from Federal and State agencies, including the Marine Mammal Commission, to consider recommendations in the report. During the meeting, participants developed a long-term, seven-point program for acquiring and protecting habitat essential for the survival and growth of Crystal River manatees. Since that meeting, a number of steps have been taken to pursue the program. The Fish and Wildlife Service has: (a) acquired shoreline areas along the lower Suwannee River (an essential summer feeding area for manatees) as part of the new Lower Suwannee National Wildlife Refuge; (b) completed planning for the acquisition of uplands and wetlands along the lower Homosassa River (an important winter travel corridor and feeding area) for incorporation into the Chassahowitzka National Wildlife Refuge; and (c) secured funds to acquire and develop an interpretative/education

center on Kings Bay (the principal warm-water refuge for area manatees) as part of the Crystal River National Wildlife Refuge.

In addition, the State of Florida has taken complementary steps through its Conservation and Recreation Lands Program administered by the State Land Acquisition Selection Committee. Among other things, the State has: (a) purchased certain undeveloped or lightly developed lands along the Crystal River (an essential winter access corridor to the warm-water refuge at the head of the river in Kings Bay); (b) taken steps to identify and purchase additional undeveloped uplands and wetlands along both sides of the Crystal River downstream of Kings Bay; (c) pursued the purchase of lands along the spring run at the head of the Homosassa River, which provides a second important warm-water refuge for manatees in winter; (d) acquired several large tracts of land along the coast between the Crystal and Homosassa Rivers that will help protect manatees traveling and feeding between the two rivers; and (e) taken steps to acquire most of the remaining undeveloped wetlands and uplands between the two rivers.

During 1988, the Commission continued to follow with great interest progress on efforts to implement these actions. On 17 June 1988, the Commission wrote to the State Land Acquisition Selection Committee, which was then in the process of ranking land acquisition projects for the 1988 recommended land acquisition priority list. In its letter, the Commission noted the importance of three Crystal River area projects to manatees. The three projects (the Crystal River, Homosassa Springs, and St. Martins River Projects) had been listed on the 1987 priority list but had not yet been acquired. The Commission also noted that these projects, in combination with other lands owned or being acquired by the Fish and Wildlife Service, would provide an outstanding nucleus of protected habitat to help meet the conservation needs of regional manatee and other wildlife populations.

The Commission expressed its hope that the Committee would be able to continue to build on its past progress in this area by retaining each of the three projects on the 1988 list and continuing to pursue their acquisition. Each of the three projects was retained on the 1988 list and, as of the end of 1988, the State had completed purchase of the Homosassa Springs Project and program funds had been expended to acquire part of the Crystal River Project.

During the manatee program review at the Commission's Annual Meeting in December 1987, the Commission reviewed progress to follow up on recommendations in its 1984 Crystal River Report and identified the need for undertaking a similar study for the manatee population on the east coast of Florida and Georgia. Shortly thereafter, the Commission undertook a

similar analysis of habitat protection needs for east coast manatees.

The product, a report entitled "Preliminary Assessment of Habitat Protection Needs for West Indian Manatees on the East Coast of Florida and Georgia," was prepared (see Appendix C, Marine Mammal Commission, 1988). The report was considered a preliminary assessment because much new information on manatee habitat use patterns was in the process of being collected and analyzed as a result of ongoing radio-tracking studies and aerial surveys by the Fish and Wildlife Service and the Florida Department of Natural Resources. Once that information becomes available, there will be a need to update and expand on analyses of habitat protection needs.

Among other findings, the Commission's report noted that: East Coast manatees constitute a more or less discrete population whose principal range extends from southern Georgia to southeast Florida; a reasonable estimate of the size of the East Coast population is between 700 and 900 animals; in 1987, 73 manatee carcasses were recovered along the East Coast suggesting that the annual mortality rate for the east coast population that year may have been 8 to 10 percent of the total population; human-related causes accounted for 32 east coast deaths in 1987, 27 of which were due to collisions with boats; and given such a high mortality rate and the species' inherently low reproductive rate, it is likely that the population is, at best, stable and may be declining in size. The report also concluded that the principal threats to East Coast manatees and their essential habitat are boat traffic, which makes vital habitats hazardous to animals, and coastal development, which can reduce grass beds preferred as feeding areas and eliminate secluded natural areas for resting, mating, calving, and nursing.

To address the most important problems, the report identified additional actions to both protect and restore or enhance manatee habitat. With respect to protecting essential habitats, the report recommended that:

- (1) the existing system of 13 boat speed regulatory zones on the East Coast be strengthened by establishing, posting, and enforcing 22 additional regulatory zones in areas where manatees and boats are most likely to encounter one another;
- (2) management plans for State Aquatic Preserves and Local Growth Management Plans: a) identify and map the location of grass beds used as feeding areas by manatees, particularly winter feeding areas near warm-water refuges, and b) prohibit new bulkheads, marinas, and other developments in or immediately

adjacent to those areas that could reduce grass bed productivity or render those areas hazardous to manatees;

- (3) as appropriate, the Fish and Wildlife Service and the State of Florida consider cooperative efforts to acquire and protect additional undeveloped shorelines adjacent to particularly important manatee habitat along a 30-mile stretch of the upper St. Johns River north and south of Blue Spring and along the Tomoka River; and
- (4) cooperative arrangements be undertaken among the Fish and Wildlife Service, the Florida Department of Natural Resources, and industries to assess and, to the extent practicable, avoid adverse effects of foreseeable interruptions in the availability of heated power plant effluent upon which manatees have come to depend for refuge from cold weather.

In addition to the above actions, the Commission's report also recommended actions to restore and enhance manatee habitats. With respect to restoration, it recommended that the Fish and Wildlife Service initiate consultations with the National Aeronautics and Space Administration to explore the possibility of reconnecting a manatee travel corridor at the Kennedy Space Center that was blocked by construction of a solid fill causeway built to carry the space shuttle to its launch pad. The travel corridor would provide access between the principal north-south travel route for manatees along the Indian River and the northern Banana River, which is one of the most important spring and summer habitats on the East Coast. With respect to enhancement, the report recommended that a pilot study be undertaken to examine the potential feasibility of creating new protected manatee habitats in coastal waters presently too shallow to be used by manatees.

On 22 December 1988, the Commission transmitted its report to the Fish and Wildlife Service. In its letter, the Commission noted that the East Coast manatee population was clearly at risk and that unless actions, such as those identified in its report, are taken immediately to better protect manatees and manatee habitats, the last opportunity to secure the long-term existence of a viable, self-sustaining East Coast population in the wild may be lost. The Commission therefore requested that it be advised of the Service's views on the recommendations made in the report and of the steps it would take to implement them. In this regard, the Commission invited a Service representative to address the matter at the Commission's next Annual Meeting scheduled for February 1989.

Because many different Federal and State agencies have responsibilities for implementing actions identified in its report, the Commission also transmitted copies of the report to various other Federal and State agencies, including the Corps of Engineers, the Florida Department of Natural Resources, the Florida Game and Fresh Water Fish Commission, the Florida Department of Environmental Regulation, and the Florida Department of Community Affairs. In addition, at the end of 1988, the Commission was in the process of distributing its report to the many other agencies, organizations, and groups in the Federal, State, private, and industry sectors that are involved in the manatee recovery program in order to further develop a cooperative approach to implementing the needed actions as quickly as possible.

### Manatees in Puerto Rico

As noted in previous Annual Reports, the Fish and Wildlife Service, in consultation with the Commission and other agencies and organizations, developed a Recovery Plan for the manatee population in Puerto Rico. Since its adoption in 1987, little has been done to implement identified research and management activities. To help start needed work in Puerto Rico, the Commission contracted with the Puerto Rico Conservation Foundation to conduct preliminary studies in support of long-term conservation measures for West Indian manatees in Puerto Rico. This is described in greater detail in Chapter XI.

### Conclusion

Over the past several years, Federal, State, and private agencies working together have established a framework to bring about recovery of the manatee population in the southeast United States. Despite this effort, however, issues critical to the recovery of the species have not been resolved and the plight of manatees in Florida continues to worsen. This does not appear to be the result of misdirected or ill-conceived recovery actions. Rather, it appears that recovery activities initiated to date have not been of a scale sufficient to keep pace with ever-increasing boat traffic and development affecting manatees and essential manatee habitat. During 1987 and 1988, significant steps were taken by the Fish and Wildlife Service, the Florida Department of Natural Resources, and the Commission to identify those areas where manatee recovery activities must be strengthened. In 1989, the Commission will continue to assist cooperative efforts to implement a significantly strengthened manatee recovery program.

### West African Manatee (*Trichechus senegalensis*)

The West African manatee is found in the rivers, lagoons, and coastal regions of West Africa from the Senegal River southeast to the Cuanza River in Angola. The species ranges 2,000 km up the Niger River into Mali, and a landlocked population has been reported in tributaries of Lake Chad. The species' abundance is believed to have declined significantly from previous levels, and several local populations are reported to have been completely extirpated.

The West African manatee is listed as threatened under the U.S. Endangered Species Act. It also is listed on Appendix II of the Convention on International Trade in Endangered Species of Fauna and Flora and as Class A of the African Convention for the Conservation of Nature and Natural Resources. West African manatees are protected by domestic statutes in every country where they are found.

Several factors have contributed to the reduction in the number of West African manatees. These include subsistence hunting, incidental take by fisheries, mortality resulting from entrapment in dams, and loss of habitat due to development of wetlands, cutting of mangrove forests, dam construction, and drought. Much of the decline is apparently due to continued subsistence hunting. Although the species is officially protected, enforcement is minimal, and killing and consumption of manatees is openly practiced in many areas. Like other Sirenians, this species probably has a low reproductive rate, which makes it particularly vulnerable to over-exploitation.

West African manatees live in areas where there is adequate food, access to fresh water, and calm waters. Construction of dams can pose a particularly serious threat to the availability of these habitat requirements. For example, damming of rivers can limit access to fresh water for manatees downstream of dam sites. Above dams, manatees may be unable to reach food during the periodic lowering of reservoir water levels. In addition, construction of dams and barrages blocks reproductive exchange between groups of manatees, creating isolated population units such as has occurred on the Volta and Niger Rivers. A number of other dams have been proposed for major West African rivers by international development agencies and local governments. These structures may pose similar threats to other local populations of manatees.

A decrease in available food also threatens the continued existence of West African manatee populations. Mangrove is thought to be an important food item for manatees in estuarine areas of West Africa and, in some places, it may be the only food source. Throughout coastal West Africa, mangrove is

being increasingly harvested for fire wood and building material, and mangrove forests are being replaced by agricultural projects, such as saltwater rice production. In addition, drought has contributed to the reduction of mangroves from Senegal to Nigeria. Manatees reportedly have disappeared from some areas where fresh water outflow has greatly decreased, and mangroves have died or were cut.

Manatees are generally herbivores and do not compete for naturally occurring food resources. However, in Sierra Leone, fishermen report that manatees sometimes eat fish from their nets. In the Casamance, Senegal, and Sierra Leone, manatees are said to damage fishing nets. Rice farmers in Sierra Leone and Niger state that manatees consume rice. Fishermen and farmers are hired to capture and kill manatees as a service to the local community.

Pollution poses another growing threat to manatees in West Africa. Extensive use of pesticides and herbicides poses an unknown but potential threat to manatees and their habitats. The numerous oil fields located in estuaries of Nigeria also are cause for concern because of possible oil spills or other problems resulting from contamination.

Efforts to protect and conserve the West African manatee have been hindered by the lack of information on the status and ecology of the species. Recognizing this need, the New York Zoological Society, through its Wildlife Conservation International Division, has initiated a research and conservation project in cooperation with the Government of Cote d'Ivoire. Studies have focused on the distribution, status, food habits, movements, reproductive biology, and habitat utilization of the species. Information also is being gathered on exploitation and human-related mortality. Another major aim of the project is to train West African biologists in manatee conservation and research practices.

Responsibility for protecting manatees lies primarily with the countries in which the species is found. However, steps can be taken to assist in these efforts. Among the identified needs are: continued support for basic research on the biology of the species; surveys of manatee status and distribution to identify critical habitat and areas of special concern; information on manatee conservation for use in national training and education programs; greater international cooperation on protecting and managing coastal and wetlands habitats where West African manatees occur; impact studies and manatee status surveys at existing dams; and mechanisms for monitoring the effects of internationally sponsored development projects on manatee populations.

To help foster cooperative international efforts to protect this threatened species, the Commission anticipates providing partial support for certain field activities in 1989.

#### The California Sea Otter Population (*Enhydra lutris*)

Commercial hunting of sea otters for fur began in the mid-1700s and continued intermittently until 1911 when the species was protected by the North Pacific Fur Seal Treaty, signed by the United States, Great Britain, Russia, and Japan. Prior to commercial exploitation, sea otters inhabited the coastal waters of the North Pacific Ocean from central Baja California, north along the coasts of California, Oregon, Washington, British Columbia, and southern Alaska, west around the Aleutian, Pribilof, Commander, and Kuril Islands, and south along the Kamchatka Peninsula and the islands of northern Japan. By 1911, sea otters were extinct throughout most of their historic range.

Small groups of sea otters survived in remote areas in the Soviet Union, Alaska, and central California. The remnant population in California occupied a few miles of the rocky Point Sur coast and may have numbered fewer than 50 animals in 1911. Under the protection of the Fur Seal Treaty and subsequent State of California protection measures, the population grew slowly and, by the mid-1970s, occupied nearshore areas along about 160 miles of the central California coast. The population at that time was estimated to number fewer than 1,800 animals. At the same time, the risk of oil spills in and near the California sea otter range was increasing as a result of increased tanker traffic, due primarily to transport of oil from the recently completed Alaska pipeline.

Because of its small size and limited distribution, and the increasing risk of oil spills and other catastrophic events, the California sea otter population was designated as threatened under the Endangered Species Act in January 1977. The most effective way to insure that the population would not be threatened by oil spills would be to establish one or more sea otter colonies outside the existing sea otter range in California. However, such an action could adversely affect commercial and recreational fisheries for abalone, clams, and other invertebrates eaten by sea otters. It also could reduce populations of sea urchins and other species that consume kelp, and thus benefit the kelp industry and both recreational and commercial fisheries for finfish that inhabit kelp beds.

The Marine Mammal Commission recognized the need to consider and to minimize possible adverse effects on commercial and recreational fisheries, as well as to protect the California sea otter population. Accordingly, in December 1980, it

recommended that the Fish and Wildlife Service adopt and implement a management strategy recognizing the ultimate need for "zonal" management of sea otters and the need to establish one or more sea otter colonies at a site or sites not likely to be affected by an oil spill in or near the population's current range. The Fish and Wildlife Service concurred with the Commission's recommendation and incorporated the zonal management concept into the Southern Sea Otter Recovery Plan adopted in February 1982.

Past Commission efforts to help with development and implementation of an effective Southern Sea Otter Recovery Plan are described in previous Annual Reports. Brief summaries of some of these efforts and descriptions of actions taken in 1988 are provided below.

#### Incidental Take

When the California sea otter population was listed as threatened in January 1977, it was assumed that the population was increasing and would continue to increase at about five percent per year for the foreseeable future. However, as noted in previous Commission reports, subsequent studies indicated that substantial numbers of sea otters were being caught and killed incidentally in coastal gill and trammel net fisheries and that this incidental take may have been sufficient to stop and reverse the population increase. Thousands of sea birds and non-target fish species, as well as sea otters and other marine mammals, also were being caught and killed in gill and trammel net fisheries along the central California coast.

The State of California recognized the problems being caused by this indiscriminate by-catch and, beginning in 1982, enacted a series of regulations prohibiting the use of gill and trammel nets in areas where birds, sea otters, and other marine mammals were likely to be entangled. These prohibitions have reduced the incidental take of sea otters and, although it is too soon to be certain, the results of sea otter surveys as shown in the table on the following page suggest that the population is beginning to increase.

#### Sea Otter Amendment to the Endangered Species Act and the Translocation Decision Process

To promote protection and recovery of the California sea otter population while minimizing adverse effects on commercial and recreational fisheries, the Commission, as noted earlier, recommended in December 1980 that the Fish and Wildlife Service adopt and implement a management strategy recognizing the ultimate need for "zonal" management of sea otters and the need to establish one or more sea otter colonies at a site or

Sea Otter Population Counts  
by the Fish and Wildlife Service and  
the California Department of Fish and Game 1982-1987

	<u>Independent Otters</u>	<u>Pups</u>	<u>Total</u>
1982 Spring	1124	222	1346
Fall	1194	144	1338
1983 Spring	1131	120	1251
Fall	1062	164	1226
1984 Spring	1181	123	1304
1985 Spring	1124	236	1360 *
Fall	1066	155	1221 *
1986 Spring	1345	225	1570 *
Fall	1088	113	1201 *
1987 Spring	1430	220	1650 *
Fall	1263	104	1367 *
1988 Spring**	1505	219	1724 *

\* Surveys conducted since implementation of State bans on use of entanglement nets beginning in January 1985.

\*\* A fall count was not done in 1988.

sites not likely to be affected by an oil spill in or near the population's current range. The Service concurred with the Commission's recommendation and, as described in previous Commission Reports, initiated efforts in 1981 to identify and evaluate possible translocation sites, develop a translocation plan, and assess the possible environmental and other consequences of the proposed action.

Questions concerning the legal authority for, and other aspects of, the Fish and Wildlife Service's translocation proposal were raised and considered during Congressional hearings on reauthorization of the Endangered Species Act held in the spring of 1985. At the end of 1985, Congress enacted legislation authorizing continued appropriations to the Fish and Wildlife Service and other agencies responsible for implementing the Act. As part of this legislation, Congress required that the Fish and Wildlife Service move forward with its decision-making on the proposed sea otter translocation.

Complying with the Congressional directive, the Fish and Wildlife Service prepared and, on 31 July 1986, issued a Draft Environmental Impact Statement. This document identified translocation of sea otters to San Nicolas Island in the California Channel Islands as the preferred action. On 15 August 1986, the Service published proposed experimental population regulations in the Federal Register.

In the fall of 1986, Congress passed and the President signed Public Law 99-625. This law, which extended the Wetlands Loan Act, included provisions authorizing and encouraging the development and implementation of a plan to establish at least one sea otter colony outside the present sea otter range in California. It required, among other things, that the translocation plan specify a translocation zone that would meet the habitat needs of the translocated animals and provide a buffer against possible adverse activities that may occur outside that zone. It also required that the area surrounding the translocation zone be designated a management zone from which sea otters are to be excluded by non-lethal means. This would protect fishery resources by prohibiting expansion of the sea otter population south of Point Concepcion.

The Fish and Wildlife Service's proposal to translocate sea otters to San Nicolas Island was designed to fulfill research as well as management objectives and therefore required a scientific research permit as provided for under the Marine Mammal Protection Act. It also constituted a major Federal action under the Coastal Zone Management Act and required a determination of consistency with the California Coastal Management Plan. In addition, to satisfy conditions related to the Endangered Species Act, it required the concurrence of the California Fish and Game Commission and consultations within the Fish and Wildlife Service pursuant to section 7 of the Act.

Steps taken by the Commission and others to make the required determinations and satisfy the conditions of applicable statutes and regulations are described in the Commission's previous Annual Report. A final rule and record of decision regarding the translocation was issued by the Fish and Wildlife Service on 11 August 1987. Efforts to capture and translocate sea otters were initiated on 24 August 1987.

On 28 August 1987, a group representing several fishing interests filed suit in California State Court seeking a temporary restraining order to stop the translocation from proceeding. The plaintiffs alleged that several State laws had been violated in issuing the State permit to the Fish and Wildlife Service. The California Superior Court denied the request for a temporary restraining order, concluding that the action against the Fish and Wildlife Service should have

been brought in Federal court. On 11 September, plaintiffs filed an amended complaint in the Federal District Court adding allegations of violations of the National Environmental Policy Act and Public Law 99-625. The Court denied the plaintiff's motion for a preliminary injunction on 29 September, ruling that the plaintiff was unlikely to succeed on the merits of its claims. Both the Federal and State defendants filed dispositive motions on 28 December 1987. California moved to have the claims against it dismissed on the basis of the Eleventh Amendment, which gives states immunity from suits in Federal court. Federal defendants filed a motion for summary judgment, seeking to have the case decided on the merits.

A hearing on the matter was held on 7 March 1988. On 4 April 1988, the Court issued an order granting summary judgment for the Federal defendants and an order dismissing the suit against the State. In upholding the legality of the sea otter translocation, the Court found that the translocation plan, the final rule implementing the plan, and the actions undertaken by the Fish and Wildlife Service to translocate sea otters were in compliance with the requirements of Public Law 99-625. The Court also ruled that the Final Environmental Impact Statement was in compliance with the National Environmental Policy Act and that it adequately evaluated the extent of marine resources around San Nicolas Island, the potential impact of translocated sea otters on those resources, measures designed to mitigate the impacts of translocated sea otters, and public comments on the Draft Environmental Impact Statement. The claims against the State of California were dismissed because the Eleventh Amendment bars the Court from granting the relief sought by plaintiffs against the State defendants.

#### Summary of 1987 and 1988 Translocation Activities

Capture of sea otters for translocation to San Nicolas Island was initiated on 24 August 1987 by teams of biologists from the Fish and Wildlife Service and the California Department of Fish and Game. By mid-July 1988, a total of 124 sea otters had been caught along the central California coast. Seventy-four of these otters were judged to be healthy and of the right age for translocation and were transported by van to the Monterey Bay Aquarium, tagged, screened for possible health abnormalities, and prepared for shipment to San Nicolas Island. Four otters died while at the Aquarium and a fifth was returned to its original capture site and released. The remaining 69 sea otters (16 males and 53 females) were flown to San Nicolas Island in 13 groups of 1-24 animals.

By late July 1988, approximately 20 of the 69 otters taken to San Nicolas Island were routinely being seen in the vicinity of the island. Of the remaining otters taken to the

island, by late July, 14 had been sighted back in the existing California sea otter range, one was captured in the "no-otter" Management Zone and returned to the existing range along the central coast, five (3 males and 2 females) were known to be dead, three were suspected to have been caught and killed in fishing gear, and the remaining 26 were unaccounted for.

Containment: From September 1987 through July 1988, there were 37 reports and 15 verified sightings of sea otters within the designated Management Zone. As noted above, a female and her newborn pup were captured and returned to the site where she was originally captured. The remaining otters sighted in the Management Zone left the area before they could be captured. Given the number of translocated otters that subsequently were resighted back in the existing sea otter range, it is possible that many or most of the sea otters sighted in the Management Zone ultimately returned to the existing range.

Monthly aerial surveys carried out by the Fish and Wildlife Service have found no sea otters resident in areas around any of the offshore islands, other than San Nicolas Island, or along the mainland south of Point Concepcion. The only location of repeated sea otter sightings has been near Point Concepcion, the northern boundary of the Management Zone. A group of two to four otters has been routinely seen in this area since at least 1982 and these individuals may frequently move into and out of the Management Zone.

Modification of the Translocation Plan: The Translocation Plan adopted by the Fish and Wildlife Service in August 1987 authorized the Service to translocate up to 70 otters a year, but totaling no more 250 in a five-year period, and required, among other things, that: up to 20 of the otters translocated each year were to be adults; captures could be conducted only from August through mid-October when weather conditions generally are good; a minimum of 20 otters must be translocated at a time; and, once at San Nicolas Island, the otters must be transferred to a stationary floating pen and held for up to five days before release.

Experience gathered from August 1987 through July 1988 indicated that some of these provisions were hindering, rather than helping, the translocation effort. Therefore, by Federal Register notice of 19 August 1988, the Fish and Wildlife Service proposed revising the regulations implementing the Translocation Plan to: provide more flexibility in selecting the ages of otters for translocation; eliminate the requirement to capture otters only within the August to mid-October timeframe; provide flexibility to either transport captured otters immediately or hold them on the mainland before transport to San Nicolas Island; and eliminate the requirement to

translocate a minimum of 20 otters at a time and to hold the otters at San Nicolas before release.

Continuation of Translocation Efforts: The revision of the Southern Sea Otter Translocation Plan was finalized on 27 September 1988. Between 1 September and 31 December 1988, an additional 61 sea otters were captured along the central California coast between Point Buchon and Santa Cruz. Of these, 32 were transported to the Monterey Bay Aquarium. One animal died at the Aquarium, probably due to stress, and the remaining 31 were flown to San Nicolas Island and released immediately.

The Fish and Wildlife Service is continuing the translocation program and is expected to prepare and issue progress reports quarterly, as it did in 1988.

#### Update of the Southern Sea Otter Recovery Plan

As noted earlier, the Southern Sea Otter Recovery Plan was adopted by the Fish and Wildlife Service in 1982. Some of the research and management actions recommended by the Plan have been fully implemented, while others have been partially implemented or not implemented at all. There is a need, therefore, to review and update the Plan.

The Fish and Wildlife Service recognizes the need to review and to update or revise the Plan as necessary. As a first step in this regard, the Service, by letter of 27 May 1988, advised the Commission that it was considering re-establishing the Southern Sea Otter Recovery Team to assist in evaluating and updating the Plan. It asked the Commission to suggest possible candidates to serve on the Recovery Team.

The Commission considered the Service's request and, by letter of 17 June 1988, advised the Service that it agreed it would be desirable to review efforts to implement the Southern Sea Otter Recovery Plan and to determine what should be done to update and improve implementation of the Plan. The Commission questioned, however, whether re-establishment of the Recovery Team was the best way to accomplish this. The Commission noted that care must be taken not to compromise either the understandings that led to Public Law 99-625 or the agreements and programs subsequently developed to implement the Southern Sea Otter Translocation Plan. The Commission suggested that it might be more effective to conduct an in-house review of the Plan, in consultation with the Commission and the California Department of Fish and Game, update the Plan accordingly, and then convene a series of meetings with representatives of other Federal agencies, State agencies, and private and public interest groups to agree on who should be taking the identified steps to implement the revised Plan.

The Commission noted that, if this approach were adopted, it should be possible to complete the update by the end of the year, to organize and hold planning and coordination meetings in January and February 1989, and to complete and adopt a Comprehensive Implementation Plan by April or May of 1989.

At the end of 1988, the Service had not responded to the Commission's suggestions. The Commission intends to conduct a comprehensive review of issues related to the conservation and protection of the southern sea otter early in 1989.

#### Hawaiian Monk Seal (*Monachus schauinslandi*)

The Hawaiian monk seal occurs only in the Hawaiian Islands. Animals are sighted only rarely around the main Hawaiian islands and are found almost exclusively along the 1,100 mile chain of small, remote islands, atolls, and reefs northwest of the main Islands. Beaches in the northwest Hawaiian Islands are used for pupping, nursing, and resting. Shallow waters surrounding these beaches, including the lagoons, reef flats, and seaward slopes atop the submerged volcanic cones which form the chain, are essential feeding and mating areas.

Harassment and over-exploitation by sealers during the 19th century brought the species close to extinction. The first systematic counts of animals were made in the 1950s, at which time the population was thought to be increasing. In subsequent years, however, the numbers apparently declined. Counts of animals in 1983 were roughly half the number counted in 1958. More recently, there are encouraging signs that the population size is increasing. Counts between 1983 and 1987 suggest that the number of births and the total number of animals counted on island beaches are greater than levels observed in 1983. The population currently is estimated to number about 1,500 animals. The species is listed as endangered under the Endangered Species Act.

The National Marine Fisheries Service is responsible for protecting Hawaiian monk seals and their habitat under the Marine Mammal Protection Act and the Endangered Species Act. Because most of the species' terrestrial habitat is within the Hawaiian Islands National Wildlife Refuge, the Fish and Wildlife Service also has important responsibilities for protecting the species and its habitat. As discussed in previous Annual Reports, critical issues relating to the recovery of Hawaiian monk seals include: disturbance of seals on pupping and haul-out beaches; interactions between monk seals and commercial fisheries; entanglement in lost and discarded fishing gear and other marine debris; designation of critical habitat under the Endangered Species Act; management of the Hawaiian Islands National Wildlife Refuge; and identi-

fication of, and continued support, for priority research and management tasks.

Congressional concern for survival of the species has been expressed, in part, through special appropriations for monk seal-related activities. In Fiscal Year 1981, Congress provided the Commission \$100,000 to develop and initiate an expanded research and management program for monk seals. The Commission's efforts to develop and begin implementing a directed research and management program are discussed in its previous Annual Reports. Each year since 1981, Congress has appropriated funding to the National Marine Fisheries Service explicitly for the purpose of carrying that program forward. Recent appropriations to the Service for critically needed monk seal research include \$350,000 in Fiscal Year 1985 and \$325,000 for each of Fiscal Years 1986, 1987, and 1988.

In 1983, the National Marine Fisheries Service, in consultation with the Marine Mammal Commission and other interested parties, adopted a Recovery Plan for Hawaiian monk seals. In the years following adoption of the plan, progress on developing and implementing recovery actions, the accumulation of new information, and recognition of new research and management issues precipitated a need to thoroughly review priorities for the monk seal recovery program. As a result, the Commission wrote to the Service in December 1986 recommending, among other things, that the Hawaiian Monk Seal Recovery Team, which had not met since 1984, be reconstituted and reconvened to update the monk seal Recovery Plan. During 1987, the Service invited individuals, including a representative of the Marine Mammal Commission, to serve on the Recovery Team. Due to funding limitations, the Team was unable to meet in 1987.

As an interim measure, the Commission convened a Hawaiian monk seal program review during the course of its 10-12 December 1987 Annual Meeting. Representatives of the Service, as well as the Commission and its Committee of Scientific Advisors, participated in the review. There was general agreement among the participants regarding a number of priority needs including: testing and selection of population monitoring procedures; determining the significance of disease problems related to recovery; identifying monk seal habitat use patterns and food preferences; continuing the Kure Atoll Head Start Project to help rebuild the atoll's seal population; continuing the removal and rehabilitation of emaciated pups from French Frigate Shoals to increase their chances of survival; continuing to remove marine debris from beaches and nearshore waters where it might entangle and kill monk seals; continuing consultations with the Coast Guard on ways to reduce disturbance of seals on Kure Atoll; consulting further with the Fish and Wildlife Service to ensure continued operation of

the field station on Tern Island; and extending critical habitat boundaries out to the 20-fathom isobath around certain islands and reefs in the northwest Hawaiian Islands.

As discussed below, there was progress during 1988 on most of these issues.

#### Program Funding

As indicated above, Congress has provided funding at a level of about \$325,000 for the Hawaiian monk seal research program in recent years. This has paid for field and laboratory work which has yielded a great amount of critically needed information. Although work in Fiscal Year 1988 also was funded at \$325,000, it was noted during the Commission's December 1987 Hawaiian monk seal program review that the monk seal program was being required to pay a larger share of its data management costs than it had in the past. Thus, funding for critical field activities had been reduced or eliminated, including pup tagging, tag resighting, and other population monitoring work at certain breeding locations.

In view of the reductions the Commission wrote to the Service on 6 May 1988 requesting that special consideration be given to continuing to support the monk seal program without cuts and that the Service advise the Commission as to what steps were being taken or planned to ensure that critical research would be carried forward. By the end of 1988, the Service had not responded to the Commission's letter and it was not clear whether or how much funding the Service planned to provide for monk seal work in Fiscal Year 1989.

#### Kure Atoll Head Start Project

The Head Start Project is a pup capture and release program at Kure Atoll that involves removing newly weaned female pups from the beaches of Kure, placing them in an enclosed pen on the Kure shoreline to protect them from natural predators, raising them through their first summer of life in the protective enclosure, and then releasing them back into the wild at Kure. The effort was begun by the National Marine Fisheries Service in 1981 in response to an alarming decline in the Atoll's seal population, very high pup mortality through the 1970s at Kure, and declining numbers of breeding females. To further supplement the female component of the seal population at Kure, emaciated and prematurely weaned female pups from French Frigate Shoals that appeared unlikely to survive on their own in the wild also were taken beginning in 1984. These pups were taken to Honolulu where they were rehabilitated and subsequently released back at Kure. By the end of 1987, 16 pups had been taken and released through the Head

Start Project and eight pups had been taken and released through the French Frigate Shoals rehabilitation effort.

The importance and success of this long-term effort is becoming apparent. Survival rates of released animals have been very high (23 of 24 animals released at Kure were known to be alive at the end of 1987) and, in the past two years, six female monk seals released through the Head Start Project bore pups on Kure Atoll, two in 1987 and four in 1988. The total number of pups born on Kure in 1988 was only eight, indicating that Head Start females are becoming the principal component of the population's reproductively active females. Because of the program's success, it appears that the declining trend in births and seal numbers at Kure may be reversing, and that a self-sustaining seal population at Kure Atoll may yet be achieved. The program also is providing vital information on seal reproduction and survival, which will improve understanding of monk seal population dynamics and help determine future priority recovery needs.

#### Critical Habitat Designation

In April 1986, the National Marine Fisheries Service designated certain areas as critical habitat for Hawaiian monk seals under provisions of the Endangered Species Act. The area designated included beaches, lagoons, and coastal waters out to a depth of 10 fathoms around most of the northwest Hawaiian Islands. Critical habitat designation strengthens protection for endangered species by advising other Federal agencies of the importance of particular habitats to listed species and helps ensure that planning for contemplated Federal actions recognizes and avoids adverse effects on habitats critical to a listed species' survival and recovery.

As discussed in previous Annual Reports, both the Marine Mammal Commission and the Hawaiian Monk Seal Recovery Team had recommended that waters out to 20 fathoms around the Northwest Hawaiian Islands and Maro Reef be designated as critical habitat. The recommendations were based on information suggesting that seals regularly dive to and feed at depths of 20 fathoms and deeper and that such areas constitute essential feeding habitat. The Commission therefore wrote to the Service on 26 September 1986 recommending that the matter be re-opened for public comment to obtain additional information on special management considerations that apparently had not been considered by the Service during the designation process.

On 15 July 1987, the Service published a Federal Register notice requesting additional information on special management considerations out to the 20-fathom isobath around the critical habitat boundary designated previously. As described in its previous Annual Report, the Commission responded by letter of

14 August 1987 identifying a number of special management needs in the area between 10 and 20 fathoms related to commercial fishing activities, vessel traffic, marine debris, and enforcement. The Commission also repeated its previous recommendations that areas out to the 20-fathom isobath, including waters shallower than that depth around Maro Reef, be designated as critical habitat for monk seals.

Based on the additional information, the Service concluded that designating critical habitat out to the 20-fathom isobath around the existing critical habitat boundary and around Maro Reef was warranted. On 9 January 1988, the Service published its findings in a Federal Register notice and proposed that critical habitat be extended accordingly. The Service's analysis and proposed action were consistent with advice provided previously by the Commission, the Hawaiian Monk Seal Recovery Team, and the majority of those providing comments. On 26 May 1988, the Service published a Federal Register notice advising that it was extending critical habitat for Hawaiian monk seals as it had proposed earlier in the year and, on 27 June 1988, the new boundary became effective.

#### Research and Management Activities at the Hawaiian Islands National Wildlife Refuge

As noted above, the Fish and Wildlife Service has important responsibilities for Hawaiian monk seals because of the dependence of seals on beaches in the Hawaiian Island National Wildlife Refuge. As part of its Refuge management program, the Service maintains and operates a field station on Tern Island at French Frigate Shoals. Personnel and facilities on Tern Island provide critical support for monk seal research and management activities throughout the Refuge. As noted in previous Annual Reports, funding constraints led the Service to consider removing personnel from Tern Island, at least seasonally. Because of the importance of the field station for work on monk seals, as well as other endangered species, the Commission wrote to the Service in 1986 urging that personnel be kept on the island year-round.

The need to remove personnel from the Island was averted in 1987 when Congress provided a special \$200,000 appropriation for operating the Tern Island field station. Appropriated funds were used to upgrade facilities at the island and permitted Service personnel to remain there year-round. Congress again appropriated funds for the Tern Island field station in Fiscal Year 1988. Among other things, continued support for the field station in 1988 enabled Refuge staff to continue working closely with the National Marine Fisheries Service on efforts to: locate and remove emaciated, prematurely weaned monk seal pups from French Frigate Shoals for rehabilitation; remove and destroy marine debris that potentially

could entangle and thereby injure or kill seals; conduct year-round censuses of seals on French Frigate Shoals; and provide logistical support for various monk seal research and management activities. Refuge personnel also participate on the Hawaiian Monk Seal Recovery Team and assist National Marine Fisheries Service staff in preparing biological opinions required by section 7 of the Endangered Species Act for Federal activities potentially affecting monk seals.

Although long-term plans for the field station remain uncertain, certain long-range planning needs are being addressed. For example, the Service recently began a cooperative study with the Corps of Engineers to develop a plan to restore the decaying seawall that stabilizes the north shore of Tern Island and protects the Island's landing strip. The seawall is in bad repair and poses a hazard to monk seals, as well as endangered and threatened sea turtles, which can become trapped behind eroded bulkheads. For Fiscal Year 1989, Congress again provided funds to the Fish and Wildlife Service for the Tern Island field station, assuring that it will remain in operation at least through September 1989.

#### Reconvening the Recovery Team and Updating the Recovery Plan

As noted above, the Commission recommended in 1986 that the National Marine Fisheries Service reconstitute and reconvene the Hawaiian Seal Recovery Team to update the Recovery Plan. Letters inviting members to participate on the Team were sent out in 1987; however, the Service was unable to provide funds for the Team to meet that year. The Team did not meet in 1988, and the Commission was unaware of any steps taken during 1988 to update the Recovery Plan adopted in March of 1983.

At the end of 1988, despite encouraging signs that recovery of the species may have begun, the Commission remained concerned about the lack of progress toward updating the Hawaiian Monk Seal Recovery Plan. Among other things, it was not clear whether the results of recent work and shifting priorities had been fully evaluated with respect to future program needs. In addition, funding for critical research and management activities had remained constant for several years despite increasing costs. Thus, it was not clear that all essential recovery work was being identified and adequately supported to ensure continued population growth. Therefore, at the end of 1988, the Commission planned during its Annual Meeting, scheduled for February 1989, to review the status of the Hawaiian monk seal recovery program. Based on that review and other information, the Commission will continue to work with the National Marine Fisheries Service, the Fish and Wildlife Service, and other involved agencies and organizations to ensure that all necessary and possible actions are undertaken to promote recovery of the Hawaiian monk seal population.

## North Pacific Fur Seal (*Callorhinus ursinus*)

North Pacific fur seals occur seasonally in waters throughout the rim of the North Pacific Ocean. Most pupping and breeding occurs on Robben Island in the Okhotsk Sea, the Kurile Islands in the western North Pacific, the Commander Islands in the western Bering Sea, and the Pribilof Islands in the eastern Bering Sea. New pupping and breeding colonies became established on San Miguel Island off southern California in the late 1960s and early 1970s and, more recently, on Bogoslof Island in the Aleutian chain.

Commercial exploitation of North Pacific fur seals began in the 1700s when the species' pupping and breeding sites were first discovered. The Pribilof Islands' population, which historically has represented about three-fourths of the total number of North Pacific fur seals, is estimated at that time to have numbered between 2 and 2.5 million animals. Except for brief periods in the early 1800s, between 1912 and 1916, and in 1942, commercial harvests were conducted annually until 1985.

Between the late 1800s and 1911, sealing was conducted both on land and at sea. During this period, the fur seal population declined in size, and by the end of the first decade of the 1900s, the number of fur seals on the Pribilof Islands is estimated to have been about 300,000 animals. In response, nations involved in commercial fur seal harvests signed the Fur Seal Treaty of 1911. The Treaty imposed a ban on pelagic sealing and directly regulated the land-based harvest, which was limited to male seals. Under the new management system, the fur seal population recovered to levels approaching its pre-exploitation stock size by the 1940s. The Treaty expired, however, in 1941 after Japan withdrew from the Agreement.

From 1941 to 1957, fur seal harvests on the Pribilof Islands were governed by a provisional agreement between the United States and Canada. During that period, the size of the Pribilof Islands' fur seal population remained relatively stable at an estimated 2.2 million animals. In 1957, the Governments of Canada, Japan, the Soviet Union, and the United States concluded an Interim Convention on the Conservation of North Pacific Fur Seals. The purpose of the Convention was to bring the North Pacific fur seal herd to the level that would provide the greatest harvest year after year, with due regard for the productivity of other living marine resources. The Interim Convention was extended by a series of Protocols adopted in 1963, 1969, 1976, and 1981.

Under these management arrangements, an experimental harvest of female, as well as male, seals was undertaken on

the Pribilof Islands from 1956 to 1962 to reduce the population size. The experiment was based on a theoretical assessment suggesting that the size of the population was too large to produce the maximum yield of skins. Between 1963 and 1968, an effort was made to stabilize the population by harvesting females believed to be in excess of the number needed to maintain a stable population. As a result of these efforts, the Pribilof Islands' fur seal population was reduced to a level of about 1.3 million by the early to mid-1970s. After 1968, commercial harvests were again limited to juvenile male seals that were believed unnecessary for maintaining the herd's reproductive potential. Between 1968 and 1984, commercial harvests on the Pribilof Islands declined steadily from 58,908 to 22,416 seals.

From the late 1970s through early 1980s, the decline in the size of the Pribilof Islands' fur seal population continued. The cause or causes of the population decline since the mid-1970s has not been determined although entanglement in lost and discarded fishing gear is considered to be a contributing, if not a major, cause of the decline. By 1983, the population on the Pribilof Islands had declined to an estimated 871,000 animals.

In October 1984, a Protocol to extend the Interim Convention to 1988 was signed by representatives of all four contracting governments. However, due in part to concerns precipitated by the declining size of the fur seal population, the United States did not ratify the Protocol, and the Convention therefore expired. As a result, management authority for fur seals in the United States became subject to domestic laws, including the Marine Mammal Protection Act, which, among other things, preclude commercial harvesting unless the Act's moratorium on taking is waived. (Although the Marine Mammal Protection Act was enacted into law in 1972, it explicitly provided that its provisions would not supercede those of any existing international agreements for managing marine mammals, such as the Interim Convention on fur seals, to which the United States was a party.) Since 1984, the population decline has continued although recent analyses of pup production suggest that the decline may have slowed and is perhaps coming to an end. The most recent estimate of the size of the Pribilof Islands' fur seal population is 800,000 animals.

#### The 1988 Subsistence Harvest

Alaska Natives who live on the Pribilof Islands have relied on meat and other by-products from the commercial harvest of North Pacific fur seals for subsistence purposes since the 1700s. Since the last commercial harvest in 1984, subsistence harvests of sub-adult male fur seals by Native

residents on the islands have continued under authority of the Marine Mammal Protection Act and the Fur Seal Act.

As described in previous Annual Reports, the subsistence harvest of fur seals is governed by regulations issued by the National Marine Fisheries Service on 9 July 1986. Among other things, the regulations provide for an annual subsistence harvest of juvenile male seals from the end of June to the second week of August when an influx of sub-adult female seals begins to break down the rookery structure. The regulations require that the Service estimate the minimum and maximum number of seals needed for subsistence purposes on both St. George and St. Paul Islands before the start of each year's harvest. If and when the lower limit of the harvest estimate is reached, the harvest must be suspended pending a determination by the Service that additional seals are required to meet subsistence needs.

The regulations also provide for extending the harvest to as late as 30 September if the Service determines, among other things, that the number of seals taken prior to 8 August does not meet the subsistence needs of the Pribilof Natives. However, because of the demonstrated risk of accidentally taking female seals during the harvest extension, the National Marine Fisheries Service, in its 1 August 1988 notice of harvest levels, stated its intention to modify the regulations to eliminate the extension option for 1989 and subsequent years.

In 1987, 1,710 seals were killed during the subsistence harvest on St. Paul Island and 92 seals were taken on St. George Island. For 1988, the Service projected that between 1,800 to 2,200 fur seals would be needed for subsistence purposes on St. Paul Island and 600 to 725 seals on St. George Island. During the 1988 subsistence harvest, Alaska Natives on St. Paul Island took 1,145 fur seals, and residents on St. George Island took 113 fur seals. No females were taken on either island.

#### Designation of North Pacific Fur Seals as Depleted

The Marine Mammal Protection Act provides that when the Secretary of Commerce, in consultation with the Marine Mammal Commission and its Committee of Scientific Advisors on Marine Mammals, determines that a species or population stock is below its optimum sustainable population level, the species or population stock shall be designated as depleted. Once designated as such, the species may be taken only for limited purposes, including for Alaska Native subsistence and handicrafts, limited taking incidental to commercial fishing operations (see Chapter II), small incidental takes by certain authorized activities other than commercial fishing, scientific research, and enhancement of the species' survival or recovery.

The term "optimum sustainable population" has been defined as a range of population levels between the largest supportable within the ecosystem (i.e., carrying capacity) and the population level that results in the greatest net annual increment in population numbers or biomass due to population reproduction or growth (i.e., maximum net productivity). The maximum net productivity level for fur seals has not been estimated, but, based on precedents established for other species, would be 60 percent or more of carrying capacity. As indicated above, the estimated size of the Pribilof Islands' fur seal population in 1983 (871,000 animals) was about 40 percent of the estimated size in the 1940s and early 1950s (2.2 million animals).

As discussed in previous Annual Reports, the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, recommended in 1984 and again in 1985 and 1986 that the National Marine Fisheries Service formally designate the Pribilof Islands' population of North Pacific fur seals as depleted under the Marine Mammal Protection Act. On 30 December 1986, the Service published and requested comments on a proposed rule to do so. The comment period, initially scheduled to end early in February 1987, was extended to the end of March to accommodate rural Alaskans.

The Commission provided comments to the Service on 6 March 1987, concurring with the proposed action. Among other things, the Commission noted that while the population had declined to less than 50 percent of its level in the 1940s and early 1950s, there is no evidence suggesting that the North Pacific ecosystem cannot still support a fur seal population as high as was observed during that earlier period. In this regard, it noted that the average body sizes of both male and female fur seals had increased and the length of time fur seals spend at sea feeding had decreased, suggesting that the population was not being limited by decreased food supplies.

On 4 August 1987, the Service requested comments from the Commission and others on a draft final rule designating the Pribilof Islands' fur seal population as depleted. During consideration of the draft rule, the Service's Northwest and Alaska Fisheries Center questioned the Service's determination that the fur seal's carrying capacity had not changed significantly since the peak population size in the early 1950s. In response to the Center's questions, the Service suspended action on the proposed rulemaking and reopened the comment period on the proposed rule on 31 December 1987. In doing so, it requested new information on possible changes in the carrying capacity of the Bering Sea ecosystem. The comment period closed 29 February 1988.

The Service considered new information and further comments bearing on the matter and concluded that available information did not support the hypothesis that the carrying capacity for fur seals had declined to levels below that which existed in the 1940s and early 1950s and that the Pribilof Islands' fur seal population was below its optimum sustainable population level. Accordingly, on 18 May 1988, the Service published its findings and conclusions in the Federal Register and, effective 17 June 1988, the Pribilof Islands' population of North Pacific fur seals was formally added to the list of species and population stocks designated as depleted under the Marine Mammal Protection Act.

### Research Activities

As noted above, the cause or causes of the fur seal population decline on the Pribilof Islands is uncertain, but may be related to entanglement of seals in lost and discarded fishing gear. To provide a basis for evaluating possible methods of assessing the magnitude of fur seal mortality caused by entanglement in such marine debris, the National Marine Fisheries Service convened a workshop on 28-29 January 1988 at the Northwest and Alaska Fisheries Center in Seattle, Washington. Participants in the Workshop, which included representatives of the Marine Mammal Commission, reviewed proposed research on the role of entanglement in the fur seal population decline and considered whether research could and should be carried out to determine if entanglement in trawl webbing significantly adds to at-sea mortality.

Preliminary results of the Workshop suggested that the highest priority research needs included continued monitoring of population trends by annual counts of pups and by tagging fur seal pups to estimate survival rates for juvenile seals to ages three and four. In addition, high priority was assigned to research to: estimate the percent of juvenile male seals entangled; estimate the survival of juvenile male seals found entangled in small net fragments on Pribilof Islands' beaches; and determine if differences exist between haul-out patterns of entangled and non-entangled juvenile males. A final report on the findings and conclusions of the Workshop had not been made available by the end of 1988.

By letter of 22 February 1988, the Service asked the Commission for comments on a request by the Service's Northwest and Alaska Fisheries Center to modify an existing permit for research on North Pacific fur seals. In previous comments on the permit provided on 18 June 1987, the Commission recommended that authorization by the Service to take fur seals in conjunction with certain research activities during 1988-1992 be deferred pending receipt and evaluation of a comprehensive fur seal conservation plan. The permit modification request

did not provide such a plan, nor did it adequately describe what would be done or why. Consequently, it was not possible to assess the usefulness of the data likely to be obtained or whether the possible impacts on the affected animals and populations were justified. The Commission advised the Service of its concerns by letter of 22 March 1988 and noted that the request should not have been forwarded to the Commission for review without that information.

By letters of 5 May, 13 May, and 8 June 1988 the Service provided the Commission with additional information on the activities to be conducted under the requested permit modification, including the rationale for such research. Two proposed studies appeared to reflect research needs on age-specific survival and reproductive rates identified as high priority during the Service's 28-29 January 1988 Workshop. These included studies to: a) tag a sample of females, sub-adult males, and/or pups on St. Paul, St. George, Bogoslof, and San Miguel Islands so that a portion of the respective seal populations could be identified in future years to assess survival and (for females) fecundity rates; and b) estimate survival rates of entangled and non-entangled juvenile male seals on St. Paul Island and perhaps other islands. The remaining projects included studies to: develop, test, and use radio tags and other types of instrumentation to obtain more reliable data on feeding strategies of adult females and post-weaned pups; collect blood samples from seals to assess certain unspecified variables and indicators of the condition of seals already being handled for instrumentation or other purposes; and conduct lavage and enema studies to collect information on the diet of North Pacific fur seals.

On 23 June 1988, the Commission, in consultation with its Committee of Scientific Advisors, recommended approval of the requested permit modification subject to certain specified conditions. Among other things, the Commission recommended conditioning work in 1989 and beyond upon submission and review of a report detailing past research results and a clear justification that continued sampling will yield meaningful results that will not unnecessarily jeopardize the affected animals or populations. In this regard, the Commission noted that there are uncertainties as to whether the proposed studies will yield the quality of information needed for decision-making and whether the risk of stressing, killing, or injuring individual animals is therefore justified. Thus the Commission repeated the belief stated in its letters to the Service on 27 April 1987 and 18 June 1987 that the North Pacific Fur Seal Research Program must be developed and evaluated within the context of a comprehensive fur seal conservation plan.

## International Cooperation

North Pacific fur seals, including seals which breed and haul out on the Pribilof Islands, occur not only in U.S. waters, but also seasonally in international waters and waters under the jurisdiction of other countries. Thus, conservation of the species and the ecosystem of which it is a part requires multi-national cooperation. In light of the expiration of the Interim Convention in 1984 and the difficulty of securing cooperation in the absence of an international agreement, the National Marine Fisheries Service and the Department of State invited representatives of the former parties to the Interim Convention to an informal meeting in Washington D.C., on 22-23 September 1987 to explore the possibility of a new agreement.

The Commission supported the proposed meeting and, by letter of 22 May 1987, provided comments on steps that should be taken to prepare for the meeting. In particular, the Commission referenced its previous recommendations that a fur seal conservation plan, similar to a recovery plan for endangered species, be developed. The value of such a plan for promoting and guiding international cooperation was noted in the Commission's letter of 29 November 1985. In its earlier letter, the Commission first recommended to the Service that it develop a North Pacific fur seal conservation plan to provide a basis for identifying and carrying out the full range of priority research and management actions needed to promote recovery of the fur seal population. To help develop the plan, the Commission provided the Service with a preliminary plan outline on 6 December 1985.

The need for a conservation plan was raised in several subsequent letters from the Commission to the Service; however, a draft plan was not prepared. Therefore, in its 22 May 1987 letter, the Commission again noted that such a plan would provide a structured, rational context within which to discuss cooperative international efforts on fur seal conservation issues, and it recommended that one be drafted and distributed to all appropriate governmental and non-governmental groups for review and development into a U.S. position paper before the multi-lateral meeting. A draft conservation plan was not developed in advance of the meeting; however, an outline for such a plan based on the outline provided to the Service by the Commission in December 1985 was distributed and used for discussion purposes during the multi-lateral meeting.

As discussed in the previous Annual Report, representatives of the Governments of Canada, Japan, the Soviet Union, and the United States participated in the informal 22-23 September 1987 meeting. The meeting provided a useful opportunity to exchange views. At the end of the meeting, the head of the

U.S. delegation noted that, although there were differing views as to the type of agreement needed, the need for multi-national efforts to protect and conserve North Pacific fur seals and their habitat was generally recognized. He therefore noted that, based on the discussions, he would recommend to the Government of the United States that it proceed with efforts to initiate formal talks to negotiate a new international agreement on fur seal research and conservation.

On 4 April 1988, the National Marine Fisheries Service provided the Commission with a proposed draft of a new international agreement on North Pacific fur seals as a first step toward pursuing formal international negotiations. Among other things, the proposed text for the agreement called upon parties to: prohibit commercial exploitation of fur seal populations that are below maximum net productivity levels; reduce and eventually eliminate incidental take of fur seals during commercial fishing operations; prohibit pelagic sealing; collect and share data on certain aspects of fur seal biology and management; and coordinate fur seal research and management.

By letter of 26 May 1988, the Commission, in consultation with its Committee of Scientific Advisors, provided the Service with comments and recommendations on the proposed text. In its letter, the Commission noted that neither the draft agreement nor other available information made it clear how the National Marine Fisheries Service expected the United States to meet the objectives and obligations set forth in the proposed text and that it therefore was not possible to determine whether the proposed agreement would be a desirable and effective means of protecting and conserving fur seals and their habitat, as required by the Marine Mammal Protection Act. In this regard, the Commission noted that, to provide a basis for identifying and undertaking domestic and international actions necessary to protect and conserve fur seals and their habitats, it had recommended that the Service develop a fur seal conservation plan.

The Commission further noted that the relative advantages and disadvantages of any proposed agreement should be evaluated within the context of a conservation plan, and recommended that the Service suspend efforts to draft and negotiate a new fur seal agreement until: (1) a comprehensive fur seal conservation plan has been completed and, (2) in consultation with the Commission and others, it has assessed the relative merits of a new agreement within the context of that plan. In the Service's 16 May 1988 Federal Register notice designating fur seals as depleted (see above), the Service announced that it was in the process of preparing a conservation plan for fur seals. Given the amount of thought

that already had gone into developing a plan, the Commission concluded, and so commented in its 26 May letter, that it should be possible for the Service to develop and circulate a draft plan with two months. By letter of 5 July 1988, the Service advised the Commission that, in accordance with its recommendation, the Service was suspending its efforts to pursue a new international agreement. At the end of 1988, the Commission had not received a draft fur seal conservation plan for review from the Service.

#### Steller Sea Lion (*Eumetopias jubatus*)

Steller or northern sea lions inhabit coastal areas around the rim of the North Pacific Ocean from northern Hokkaido, Japan, through the Kuril Islands and Okhotsk Sea, the Aleutian Islands and central Bering Sea, the southern coast of Alaska and the coasts of British Columbia, Washington, and Oregon, south to the California Channel Islands. Numbers are greatest and the largest pupping colonies occur in the Gulf of Alaska and the Aleutian Islands.

Available information indicates that Steller sea lion populations have been declining since the late 1970s in the Kuril, Commander, Aleutian and Pribilof Islands, in Bristol Bay and the central and western Gulf of Alaska and in California. The cause or causes of the decline have not been determined and, on 9-10 December 1986, the National Marine Fisheries Service's National Marine Mammal Laboratory convened a workshop to review available information and identify research necessary to determine the cause and to better document the nature and extent of the decline.

The workshop report, published in March 1987, indicates that the number of adult and juvenile Steller sea lions on haul-out sites in the central Gulf of Alaska has declined from about 140,000 in 1956-1960 to about 68,000 in 1985 -- a decline of about 52 percent. The decline has been greatest in the eastern Aleutian Islands where estimated numbers in 1985 were 79 percent less than in 1956-1960. The workshop concluded that the decline was continuing and likely was due to reduction in juvenile and adult female survival rates. The workshop also noted that declines in North Pacific fur seals, harbor seals, and fish-eating birds apparently have occurred in recent years as well in the Gulf of Alaska and the Bering Sea.

#### Proposed Designation as Depleted

By Federal Register notice of 6 May 1988, the National Marine Fisheries Service published an advance notice of, and requested comments on, a proposed rule to designate the Steller

sea lion population in Alaska as depleted under the Marine Mammal Protection Act. The Commission, in consultation with its Committee of Scientific Advisors, reviewed and, by letter of 8 July 1988 to the Service, provided comments on the proposed rulemaking and the Steller Sea Lion Status Review prepared and distributed by the Service in conjunction with the Federal Register notice. In its letter, the Commission stated its view that available information provided sufficient grounds for designating Steller sea lions, in at least some areas, as depleted under the Marine Mammal Protection Act and possibly as threatened under the Endangered Species Act. The Commission also noted that, while available information is insufficient to document the cause of the decline, information provided in the Status Review suggests that incidental take in commercial fisheries in Alaskan waters has at least contributed to the decline.

With regard to the potential impact of incidental take, the Commission noted that the Status Review indicated that an estimated 305 Steller sea lions were shot in the spring of 1978 by fishermen participating in the Copper River Delta salmon gill net fishery. While recognizing that this fishery may not be representative of all fisheries in Alaska, the Commission suggested that the Service extrapolate this and other incidental take and fishery data to obtain an "order of magnitude" estimate of the numbers of sea lions possibly being taken incidentally by various fisheries in Alaskan waters.

In addition, the Commission suggested that past survey data and ongoing and planned baseline and monitoring programs be carefully evaluated to determine: (1) what proportion of the apparent population decline may be attributable to variation in survey techniques or the time of year when surveys were conducted; (2) the magnitude of population increases or decreases that could be detected over different time intervals (e.g., one, three, five, and ten years) given the nature and extent of ongoing and planned monitoring programs; and (3) what additional baseline research and monitoring programs would be required to document the cause or causes of the decline and to judge the effectiveness of measures that may be taken to stop and reverse the decline. Finally, the Commission recommended that the Service immediately designate Steller sea lions in Alaska as depleted under the Marine Mammal Protection Act and develop and begin implementing a Conservation Plan for the species.

#### Amendments to the Marine Mammal Protection Act

Among other things, the 1988 amendments to the Marine Mammal Protection Act, described in Chapter II of this Report, provide that no more than 1,350 Steller sea lions may be killed incidentally in fisheries in U.S. waters in any calendar

year, and direct that the National Marine Fisheries Service prepare a Conservation Plan for Steller sea lions by 31 December 1990. To effectively implement the statutorily mandated quota, the National Marine Fisheries Service will have to develop a system for obtaining and analyzing incidental catch data necessary to determine when the quota has been reached, and a mechanism to stop or regulate the involved fisheries in time to insure that the quota is not exceeded. It also may be necessary to allocate the quota among different fisheries since some fisheries may take disproportionately large numbers of Steller sea lions or occur later in the year than others. Consequently, by letter of 6 December 1988, the Commission suggested that the National Marine Fisheries Service work with the North Pacific Fishery Management Council, the State of Alaska, affected fishermen, and other interested parties to develop guidelines for quota allocations and a reporting/monitoring program to provide the incidental take data necessary to determine when quotas are reached.

The Commission also pointed out in its letter that the background information necessary to develop a Conservation Plan for Steller sea lions was available in the report of the Steller Sea Lion Workshop convened by the National Marine Mammal Laboratory in December 1986 and in the Steller sea lion species account published in the Commission's 1988 "Selected Marine Mammals of Alaska, Species Accounts with Research and Management Recommendations." The Commission therefore concluded that it should be possible to complete the Steller sea lion Conservation Plan by mid-1989, well before the 31 December 1990 deadline mandated by the statute.

By the end of 1988, the Service had taken no further action to designate the Steller sea lion as depleted under the Marine Mammal Protection Act and had not advised the Commission of steps it was taking to develop and begin implementing a Conservation Plan as recommended by the Commission.

#### Proposed Increase in the Optimum Yield Range of the Groundfish Fishery of the Bering Sea and Aleutian Islands

On 28 April 1988, the National Marine Fisheries Service issued a "Draft Supplemental Environmental Impact Statement and Regulatory Impact Review/Initial Regulatory Flexibility Analysis for a Proposal to Increase the Optimum Yield Range in the Fishery Management Plan for the Groundfish Fishery of the Bering Sea and Aleutian Islands." The document provided an assessment of the possible effects of increasing the upper limit of the allowable catch of groundfish in the Bering Sea and the Aleutian Islands area from a maximum of 2.0 million metric tons to approximately 2.6 million tons. The Statement noted that the proposed increase in allowable catch could

have secondary, "trophic" effects on Steller sea lions and other marine mammals that eat groundfish. It concluded that an increase in catch of groundfish species other than pollock would not affect marine mammal populations and that, since the proposal was not expected to result in a substantial increase in pollock catch, the impact on Steller sea lions and other marine mammals would not differ substantially from the status quo.

In its 21 July 1988 comments on the Draft Statement, the Commission noted that the conclusions concerning the possible impacts of the proposed action on sea lions and other marine mammals were based largely on unverified assumptions concerning the feeding habits of marine mammals. It pointed out that past and ongoing exploitation of pollock and other groundfish may have caused or contributed to the present decline of Steller sea lions and other species in the North Pacific. The Commission recommended that the optimum yield level not be increased unless and until there is adequate information to reasonably conclude that the groundfish fishery is not causing or contributing to the decline of sea lions and other marine mammals in the Bering Sea and Aleutian Islands area or, alternatively, an effective system, including placement of observers on both foreign and domestic catcher and processing vessels, is in place to: (a) verify assumptions concerning the impact of the fishery on marine mammal food supplies; and (b) insure that all direct and indirect effects of groundfish fishing on marine mammals will be detected in time for corrective action to be taken.

#### Humpback Whale (*Megaptera novaeangliae*)

Humpback whales, which are found in most of the world's oceans, have been severely reduced in number as a result of commercial whaling. Commercial exploitation of the species has been banned by the International Whaling Commission since 1966. In 1970, the species was designated as endangered under the U.S. Endangered Species Preservation Act, which was replaced by the Endangered Species Act of 1973. However, as noted in Chapter V of this Report, a small number of humpback whales are still taken in St. Vincent and the Grenadines. In this and other areas, the species' recovery is threatened by human activities such as commercial vessel traffic, recreational boating, offshore oil and gas development, commercial fisheries, and coastal development.

#### Efforts To Develop a Recovery Plan

The Commission believes that recovery plans, as required under the Endangered Species Act, are essential to identify and to encourage responsible agencies to take actions necessary

to protect and promote recovery of endangered and threatened species. As discussed in previous Annual Reports, the Commission recommended in 1984 and again in 1986 that the National Marine Fisheries Service prepare recovery plans for humpback whales and other endangered cetacean species that occur in U.S. waters. On 15 July 1987, the Service invited scientists and resource managers with broad knowledge of humpback whales and associated management problems to serve as members of the Humpback Whale Recovery Team. A representative of the Marine Mammal Commission was named to the Recovery Team. During its Annual Meeting on 10-12 December 1987, the Marine Mammal Commission was advised by the Service that a draft Plan was nearing completion; that it would address populations of humpback whales off both the east and west coasts of the United States; and that it would be provided to the Recovery Team early in 1988 for review and comment.

As noted in previous Annual Reports, in 1985 the Commission contracted for a study to compile and evaluate information related to conservation and protection of humpback whales in Hawaii. The report from the study was completed in 1988. It noted, among other things, that the increasing level of human activities in Hawaiian waters could have both short-term and long-term effects on humpback whales. It identified steps that should be taken to better document, monitor, and prevent or mitigate the possible adverse effects of increasing human activities. On 13 April 1988, the Commission made copies of the report available to the National Marine Fisheries Service for distribution to members of the Recovery Team. In its accompanying letter, the Commission noted that the report should be useful in preparing the Humpback Whale Recovery Plan.

During 1988, the National Marine Fisheries Service prepared and circulated a draft Recovery Plan to members of the Recovery Team for their comments. At the end of 1988, it was not clear when a draft Plan would be made available for agency and public review. It was expected that the Service would advise the Commission of its schedule for completing and implementing recovery plans for humpback whales, right whales, and other endangered species during the Commission's Annual Meeting scheduled for February 1989.

#### Interactions between Humpback Whales and Vessel Traffic

A matter of general concern regarding humpback whales and certain other endangered whales in U.S. waters (e.g., right and gray whales) is disturbance by whale-watching boats and other vessels. The problem has been a matter of particular concern in Hawaiian waters and in waters off southeast Alaska, New England, and California.

Hawaii -- The importance of Hawaii's coastal waters to humpback whales for calving, nursing, and breeding is well documented. In order to protect whales from deliberate and inadvertent harassment, in 1979, the National Marine Fisheries Service published a "Notice of Interpretation of Harassment of Humpback Whales in Hawaiian Waters." This notice provided guidelines for approaching whales and advised boat and aircraft operators of proper conduct when in the vicinity of humpback whales.

In recent years, there has been a substantial increase in boat and aircraft traffic in Hawaiian waters and a corresponding increase in the number of reported incidents of aircraft and vessel operators violating the guidelines outlined in the Service's Notice of Interpretation. However, because guidelines do not have the legal force of regulations, the Service has had difficulty prosecuting violators. To overcome this problem, in 1986, the Service proposed formal regulations to replace the 1979 Notice of Interpretation. The proposed regulations would apply within 200 nautical miles of the Hawaiian Islands and would prohibit, except under permit: (a) operating an aircraft at altitudes lower than 1,000 feet above a humpback whale; (b) approaching by boat or other means closer than 100 yards from a whale; (c) causing a vessel or other object to approach closer than 100 yards of a whale; or (4) disrupting the normal behavior or activity of a whale by any other act or omission.

As discussed in previous Reports, the Commission, in consultation with its Committee of Scientific Advisors, reviewed and, by letter of 23 December 1986, provided comments on the proposed regulations. In its letter, the Commission pointed out, among other things, that the proposed regulations would eliminate the special protection that had been afforded cow/calf pairs in the 1979 Notice of Interpretation. The Commission recommended that traditional calving/breeding areas be identified and designated as areas where vessel approaches closer than 300 yards are prohibited.

On 23 November 1987, the National Marine Fisheries Service issued an interim rule aimed at reducing disturbance of humpback whales by vessel and aircraft operations. The interim rule took effect on 23 December 1987. It prohibits aircraft from approaching closer than 1,000 feet and vessels or swimmers from approaching closer than 100 yards of humpback whales. As recommended by the Marine Mammal Commission, additional protection is provided in certain cow/calf areas by prohibiting vessels and swimmers from approaching closer than 300 yards. Because the latter restriction was not included in the regulations as proposed in November 1986, the Service provided an additional 60-day comment period on this provision. The comment period expired 22 January 1988.

It was expected that the Service would incorporate the provision providing additional protection in cow/calf areas into the interim regulations and adopt them as final regulations. However, the Service subsequently decided not to proceed with adoption of final regulations until it had considered the findings of the November 1988 whale watching workshop, described below. At the end of 1988, no further action had been taken by the Service, and interim regulations were still in effect.

Alaska -- Glacier Bay and surrounding waters in southeast Alaska provide summer habitat for a portion of the North Pacific population of humpback whales. In the late 1970s, it became apparent that fewer whales were using the Bay than had done so previously. It was believed that increased vessel traffic in the area could have been a contributing cause and, in 1979, the National Park Service initiated steps to limit vessel traffic during the period when whales are present.

As discussed in previous Annual Reports, the Commission assisted in efforts to assess the situation and identify appropriate research and management actions by, among other things, convening research reviews and planning meetings in October 1979 and December 1981. Both meetings were organized and held in consultation with the National Park Service and the National Marine Fisheries Service. In addition, the National Park Service initiated consultations with the National Marine Fisheries Service pursuant to section 7 of the Endangered Species Act to ensure that permitted vessel access into the Bay would not adversely jeopardize the humpback whale or its critical habitat.

Based on the results of the meetings and consultations, the National Park Service initiated a multi-year research program in 1980 to assess factors possibly affecting the distribution of humpback whales in Glacier Bay and surrounding waters. It also promulgated temporary regulations which, among other things, limited to 1976 levels the number of large commercial tour ships and smaller recreational vessels that could enter the Bay (i.e., the level of use during the year before the marked decline in whale numbers was observed in the Bay). The temporary regulations also established a mechanism for designating temporary "whale waters" in which certain vessel operating restrictions were to apply. In subsequent years, these regulations were modified and reissued annually until 1985, when the National Park Service published permanent regulations for the protection of humpback whales in the Glacier Bay National Park and Preserve. These regulations established a permit system for vessel entries, prohibit the harvest of certain humpback whale prey species in the Bay, and provide for designating "whale waters."

Since the early 1980s, the National Park Service has gradually allowed more vessels to enter the Bay during the summer whale season. Its decisions in this regard were based on results of relevant research, periodic consultations with the National Marine Fisheries Service, and other relevant information. During this period, use of the Bay by humpback whales has increased and, between June and September 1987, 33 individual humpback whales were observed in Glacier Bay. This is the largest recorded number since systematic surveys of the area began in the early 1970s.

On 4 September 1987, the Service announced plans to further increase allowable vessel entries by an additional seven percent in 1988. This increase, combined with a 13 percent increase in the preceding year, made the authorized entry level 20 percent greater than the 1976 level. Following a 30-day comment period, the proposed increase in permitted vessel entries for 1988 was adopted.

On 5 October 1988, the National Park Service provided the Commission and others a description of the humpback whale research and monitoring information from 1988. At the same time, it provided and requested comments on proposed vessel regulations for 1989. In its discussion, the Park Service noted that the 13 percent increase in vessel traffic in 1987 and the subsequent 7 percent increase in 1988 made a combined increase of 20 percent, as recommended in the National Marine Fisheries Service's 1983 Biological Opinion. The Opinion also recommended that the National Park Service monitor a minimum of two years of vessel use before considering additional increases in vessel entries and that additional traffic be allowed only if the number of individual whales entering the Bay remained equal to or greater than the 1982 level.

Monitoring of whale use of Glacier Bay in 1988 showed a total count of 39 whales for the period of 2 June to 14 September, the highest number ever recorded during the past four years of whale censusing. A total of 55 individual whales, including seven calves, were identified in the combined areas of Glacier Bay and Icy Strait, four lower than the 1987 count of 59 whales in the combined areas.

In its discussion, the National Park Service noted that past studies and its annual whale monitoring program raise a distinct possibility that the number of vessels and how they are operated could adversely affect whales in Glacier Bay. Based on the intent of the Biological Opinion and a review of recent whale activity in Glacier Bay, the National Park Service proposed no change in permitted vessel entries for the 1989 season.

## Workshop on Whale Watching

As noted above, efforts to assess and prevent or mitigate the effects of whale watching and other vessel activities on humpback and other cetaceans have generally been approached from a local or regional perspective. As similar problems have developed in different geographic areas, the National Marine Fisheries Service has begun to consider the possible advantages of promulgating regulations that would be generally applicable and provide a more consistent approach to regulating whale watching and other activities in different areas.

In 1988, the National Marine Fisheries Service contracted with the Center for Environmental Education (now the Center for Marine Conservation) to organize and convene the Whale Watching Workshop, held 14-16 November 1988 in Monterey, California. The Workshop participants, which included a representative of the Marine Mammal Commission, generally agreed that: (1) whale watching provides useful opportunities for educating the public, for developing an ecologically sound conservation ethic, and for obtaining basic information on the distribution, abundance, and behavior of whales; (2) whale watching can disturb and alter the behavior of whales which, in turn, may affect vital processes, such as feeding and reproduction, and cause decreases in the survival or productivity of whales; and (3) a licensing or permit system should be developed to help insure that operators of whale watching vessels are aware of applicable regulations and operate accordingly.

The Workshop report, expected to be completed and submitted to the National Marine Fisheries Service early in 1989, will be used by the Service, in consultation with the Commission and others, to develop a long-term strategy for assessing and, as necessary, regulating whale watching in U.S. waters.

## Other Efforts To Protect Humpback Whales

The North Atlantic population of humpback whales breeds and calves during the winter months in the area of Silver, Navidad, and Mouchoir Banks in the Caribbean. Of these whales, about 85 percent winter in the vicinity of Silver Bank, which is located primarily in waters of the Dominican Republic, about 80 miles north of the island.

As discussed in the previous Annual Report, in 1985, the Center for Environmental Education initiated a public education program in the Dominican Republic to promote efforts to protect the region's humpback whales. In addition, the Center provided support to the Center for Marine Biological Research at the Autonomous University of Santo Domingo for a biological inventory of marine resources in the Dominican Republic. A report

on the inventory was completed in October 1986 and, on 14 October 1986, the President of the Dominican Republic designated Silver Bank as a humpback whale sanctuary. The Presidential decree creating the sanctuary prohibits all hunting, capturing, or injuring of any marine mammal within the sanctuary boundaries. Also banned is the dumping of "contaminated, explosive or electrical materials" and the dredging, drilling, or alteration of the sea bottom. The Silver Bank sanctuary should contribute significantly to the protection and recovery of the northwest Atlantic humpback whale population and could serve as a model for creating sanctuaries elsewhere.

As noted in Chapter V of this Report, the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region is intended to protect marine resources and habitat in Caribbean areas vulnerable to pollution. Article 10 of the Convention calls on Contracting Parties to "take all appropriate measures to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened, or endangered species...." In response to this charge, the Parties to the Convention have initiated steps to develop a Protocol on Specially Protected Areas and Wildlife in the Wider Caribbean Region (see Chapter V).

In support of this initiative, the Commission wrote to the Department of State on 28 September 1988 to call attention, among other things, to the fact that Silver and Navidad Banks, which lie south of the Turks and Caicos Islands and north of the Dominican Republic, are the principal calving and breeding grounds for the North Atlantic humpback whale population. With its letter, the Commission provided a copy of a report prepared by the Center for Environmental Education describing the objectives of the Silver Bank sanctuary. The Commission noted that the report provides a good example of the types of things that can and should be done to develop and implement management plans for marine areas requiring special protection.

As discussed in Chapter V, negotiation of the protocol was initiated at a meeting of experts held on St. Croix, U.S. Virgin Islands, on 24-26 October 1988. A report of that meeting is expected to be available by the end of January 1989.

#### Northern Right Whale (*Eubalaena glacialis*)

The northern right whale is the world's most endangered large whale. Remnant populations are found in the western North Atlantic and North Pacific Oceans. Available whaling records dating back to the 16th century indicate that, during the 80-year period between 1530 and 1610, Basque whalers in the Newfoundland and Labrador areas of eastern Canada took between 25,000 and 40,000 whales (about 300 to 500 animals

per year), most of which are believed to have been right whales. Subsequent commercial whaling, which continued into the early 20th century, reduced both the Atlantic and Pacific populations to exceedingly low numbers. The current population in the North Pacific Ocean may number a few tens of animals and be too small to recover. The population off the east coast of the United States and Canada is presently estimated to number about 300 animals. Few, if any, animals remain in the eastern North Atlantic Ocean.

Northern right whales have been protected from commercial whaling since the 1930s; however, there is no evidence of substantial population increases. Right whales spend much of their time in coastal waters and thus are exposed to environmental pollution and human activities that may adversely affect both the whales and their habitat.

As noted in previous Annual Reports, the Marine Mammal Commission has taken a number of steps to improve prospects for the recovery of right whale populations. Among other things, the Commission: provided partial funding for a June 1983 workshop convened in response to a request by the International Whaling Commission to assess the extent to which protection from commercial whaling had resulted in recovery of right whales (see Appendix C, Brownell *et al.* 1986); supported a study to help develop a right whale sighting network in the southeastern United States (see Appendix B, Winn 1984); funded two workshops in 1985 to describe actions needed to protect and encourage recovery of the northwest Atlantic Ocean right whale population (see Appendix B, Kraus 1986); supported aerial surveys of right whales in the Great South Channel off Massachusetts (see Appendix B, Winn *et al.* 1985); and helped support a 1986 workshop to assess new information and the need to protect right whale calving areas off the southeastern U.S. coast during winter (see Appendix C, The Georgia Conservancy 1986).

Congress also has recognized the need to protect right whales in the northwest Atlantic Ocean. In 1986, Congress appropriated \$500,000 to the National Marine Fisheries Service to develop a five-year right whale research program involving a consortium of non-governmental organizations concerned about recovery of the northwest Atlantic population. To continue that program, Congress appropriated an additional \$250,000 to the Service in both Fiscal Years 1987 and 1988. Due to the Deficit Reduction and Balanced Budget Act of 1985 and other factors, actual funds allocated by the Service to right whale research have been somewhat lower than the appropriated amounts. As discussed in previous Annual Reports, those funds have been used to support research needed to gather and analyze basic information on distribution, abundance,

and ecology so as to provide a better basis for developing and evaluating potential recovery actions.

A great deal of vital information on right whales can be developed through long-term observation of known individuals identifiable through scars, marks, callosity patterns, and other unique features. Among other things, observing known animals over time and space can help identify and detect changes in habitat use patterns, movements, survival rates, and reproductive rates. For the past several years, scientists have been using photographs to identify individual animals. To increase the amount of information that can be developed through photo-identification, there is a need to continue to compile and distribute a catalogue of photographs to aid researchers in identifying individual whales. The National Marine Fisheries Service has been unable to fully support preparation of such a catalogue and, in 1988, the Commission provided partial support to the New England Aquarium to copy and print photographs provided by cooperating scientists, as described in previous Reports (see also Chapter XI).

In addition to actions noted above, the Commission has recommended on several occasions that the National Marine Fisheries Service constitute a recovery team and prepare a recovery plan for right whales, as required by the Endangered Species Act. In response to these recommendations, in July 1987, the Service extended invitations to selected scientists and resource managers, including a representative of the Marine Mammal Commission, to serve on the Recovery Team. In September 1987, the Service provided Team members with terms of reference governing its activities. Among other things, the Recovery Team is responsible for providing advice and assistance to the Service on: developing and implementing the recovery plan; reviewing the status of the species and recovery efforts; and considering technical and scientific matters such as research permits and section 7 consultations under the Endangered Species Act. During the Commission's Annual Meeting on 10-12 December 1987, representatives of the Service advised the Commission that its staff was developing a draft recovery plan, which would be provided to the Recovery Team for review shortly, and that the first Team meeting would be early in 1988.

By early May, the Service had not yet provided the Recovery Team with a draft plan and, on 6 May, the Commission wrote to the Service urging that the draft be completed and forwarded to the Team as soon as possible. In late May, members of the Team were sent copies of a draft recovery plan that included sections addressing right whale populations in both the North Pacific and western North Atlantic Oceans. After reviewing and submitting comments on the draft plan to the Recovery Team leader, Team members met in Boston, Massachusetts, on 30

November-2 December 1988. The meeting was devoted entirely to a discussion of the draft plan and the critical issues to be addressed.

The draft plan developed by the Service did not include all parts essential for a recovery plan, and there was general agreement among Team members that substantial additions and revisions would be needed. Therefore, the Team developed a schedule whereby Team members would prepare a recommended revised draft plan for submission to the Service early in 1989. At the end of 1988, the Recovery Team was in the process of developing its recommended revised draft recovery plan. The Recovery Team scheduled a second meeting for early March 1989 to review a revised draft, which it expects to provide to the Service shortly thereafter.

#### Bowhead Whale (Balaena mysticetus)

Bowhead whales are circumpolar in distribution and make up at least five or six separate populations. Over-exploitation by commercial whalers between 1600 and 1900 reduced all populations to extremely low levels, and one population, the Spitsbergen population north of Scandinavia, may be extinct. The largest surviving population is in the western Arctic, where animals migrate seasonally between the Bering Sea and the Chukchi and Beaufort Seas. The population is important to Alaska Natives who continue to hunt bowhead whales for subsistence and cultural purposes.

#### Consideration by the International Whaling Commission

The International Whaling Commission (IWC) reviews information on the status of the Bering-Chukchi-Beaufort Seas stock of bowhead whales and establishes quotas for aboriginal subsistence whaling. During its 1987 Annual Meeting, the IWC adopted an aboriginal subsistence whaling quota for 1988 of 35 strikes for this stock. As noted in Chapter V, the IWC considered new information on bowhead whales and subsistence needs during its 1988 Annual Meeting in Auckland, New Zealand, to develop a recommendation on future quotas. Based on this new information and analyses presented during the IWC's Scientific Committee meeting, a revised estimate of the size of the Bering-Chukchi-Beaufort Seas stock of bowhead whales was accepted. The new estimate is 7,800 whales with a 95 percent confidence interval of between 5,600 and 10,600 animals.

Also during the 1988 IWC meeting, a report prepared for the U.S. Department of the Interior on Alaska Eskimo subsistence needs was considered. The report, entitled "Quantification of Subsistence and Cultural Need for Bowhead Whales by Alaska Eskimos," concluded that current annual subsistence and cultural

needs of Alaska Eskimos would be met by landing 41 bowhead whales. Based on information reviewed during the meeting, the IWC adopted a three-year quota for the Bering-Chukchi-Beaufort Seas stock of bowhead whales covering the 1989, 1990, and 1991 whaling seasons. The quota provides for an annual limit of 44 strikes or 41 landings, whichever is reached first, and also provides that up to three strikes not used in 1988, 1989, or 1990 may be added to the strike limit for the following year.

### Eskimo Whaling

In 1981, the National Oceanic and Atmospheric Administration and the Alaska Eskimo Whaling Commission signed a cooperative agreement setting forth shared responsibilities for regulating, monitoring, and enforcing the Alaska Eskimo bowhead whale hunt. Under terms of the agreement, quotas are negotiated annually between the two parties. The Alaska Eskimo Whaling Commission allocates the negotiated quota among Alaska whaling villages and monitors the hunt for compliance with the regulations. The quotas negotiated under the agreement have been consistent with those established by the IWC. The table below shows the quotas set by the IWC and the results of the Eskimo hunts since 1977.

Quotas and Numbers Taken of Bowhead Whales, 1977-1989

Year	IWC Quotas*		Takes by Alaska Eskimos		
	Landings	Strikes	Actually Landed	Struck But Lost	Total Struck
1977	[No Quota]		26	82	108
1978	14	20	12	6	18
1979	18	27	12	15	27
1980	18	26	16	18	34
1981	45**	65**	17	11	28
1982			8	11	19
1983			9	9	18
1984			12	13	25
1985		43***	11	6	17
1986		26+	19	9	28
1987		32++	22	9	31
1988		35	23	6	29
1989	41+++	44+++	--	--	--

- \* In establishing quotas for both landings and strikes, the IWC stipulated that whaling should cease whenever the number of whales landed or the number of strikes reached the specified number, whichever came first.
- \*\* In 1980, a block quota was set for the years 1981 to 1983, with a stipulation that in any one year, the number landed should not exceed 17 and the number of strikes should not exceed 27.
- \*\*\* In 1983, a block quota was set on strikes alone for 1984 and 1985, with a further stipulation that the number of strikes in any one year not exceed 27.
- + In 1985, a quota of 26 strikes per year was set for the years 1985-1987, with the stipulation that strikes not used in any one year could be used the following year as long as no more than 32 strikes were made in any single year.
- ++ In 1987, the IWC modified its 1987 quota to allow 32 strikes.
- +++ The adopted quota provides that up to three strikes not used in 1988 may be used in 1989.

To help reduce the number of whales struck but lost and to make the killing more humane, the Alaska Eskimo Whaling Commission, with support from the National Oceanic and Atmospheric Administration, has contracted for a study to develop a more reliable and powerful type of explosive device for use in the bowhead whale hunt. During 1988, the prototype for the new projectile, called a penthrite bomb, was tested successfully under experimental conditions on a dead whale. Subsequently, a limited number of the new projectiles were made available to Alaska Eskimo whaling captains in certain villages for use during the 1988 spring and fall hunts. Nine whales were taken with the new projectile in 1988. Further tests will be required to determine how much the device will contribute to reducing the struck but lost rate.

#### Agreement between the Oil and Gas Industry and Alaska Natives

Seismic surveys and other activities associated with offshore oil and gas exploration and development may affect the movement and behavior of bowhead whales during the fall migration, thereby forcing Alaska Eskimo whalers to travel greater distances during the fall hunt. This in turn may increase the risk that those engaged in the hunt may be injured or killed or be unable to bring dead whales back to their villages. Therefore, in 1986, the Alaska Eskimo Whaling Commission and certain companies engaged in oil and gas activities on Alaska's North Slope entered into a cooperative agreement for the fall 1986 hunt whereby industry participants agreed to: (1) attempt to tow caught whales to a suitable butchering site to prevent meat from spoiling (if an industry vessel was available near the kill site); cache emergency supplies (e.g., gasoline, food, etc.) at selected sites for use by subsistence hunters; (3) provide emergency assistance to hunters during adverse weather conditions; and (4) assist in transporting whale meat and muktuk to prevent spoilage and maximize utilization of the catch.

The Agreement was approved by the National Oceanic and Atmospheric Administration in 1986. In 1987, the Agreement was modified to include additional industry participants and renewed for the fall 1987 hunt. In 1988, the Agreement was modified once again and renewed for the 1988 fall hunt. Among other things, the modifications adopted in 1988 clarified actions that industry planes and vessels would take to avoid interfering with ongoing whaling activity.

#### Research Planning and Coordination

In December 1977, the IWC lifted its total ban on subsistence taking of bowhead whales that had been adopted the preceding June. This action was taken, in part, on a pledge by the U.S. Commissioner to the IWC that the United

States would undertake a comprehensive research program on the species. The National Marine Fisheries Service is responsible for planning and implementing this program. Relevant research also has been conducted or supported within the context of this program by the Alaska Eskimo Whaling Commission, the North Slope Borough, the Minerals Management Service, the State of Alaska, and the oil and gas industry. As discussed in its Annual Reports for 1977, 1978, and 1979, the Marine Mammal Commission played a major role in developing the research plan and initiating efforts to coordinate related bowhead whale research projects.

During 1988, a representative of the Commission was invited to observe bowhead whale research being carried out in Barrow, Alaska, by the North Slope Borough during the spring migration of bowhead whales. The invitation was accepted and, on 9-11 May 1988, a member of the Commission's Committee of Scientific Advisors visited the site of the research activities and observed visual counts and acoustic tracking of bowhead whales from the shorefast ice. He also was advised of the status of efforts to test the new projectile being developed to kill whales more quickly and humanely and to calculate estimates of the number of bowhead whales.

Research on bowhead whales continues to involve various Federal agencies, Native organizations, and industry groups, and it is not clear, however, that everything necessary and possible is being done to identify research priorities and coordinate research activities. During 1989, the Commission will review matters related to bowhead whale research and undertake efforts as may be indicated to strengthen cooperative bowhead whale research efforts.

#### Hector's Dolphin (*Cephalorhynchus hectori*)

Hector's dolphin, one of four species of the genus Cephalorhynchus, is among the smallest cetaceans. The species is found only in coastal waters of New Zealand and is most abundant along the east and west coasts of South Island. Surveys carried out during 1984-1985 indicate a total population on the order of 3,000 to 4,000 animals.

Hector's dolphins are taken incidentally in commercial and recreational gill net fisheries. This problem appears to be related to the species' seasonal movement into inshore waters to calve during periods of intense fishing. Recent studies suggest that the problem is particularly severe in the Banks Peninsula area off the east coast of New Zealand's South Island. Over the past four years, 223 dolphins have been reported killed in gill nets in the area. At the time

of the 1984-1985 survey, the total number of Hector's dolphins in the Banks Peninsula area was estimated at 740 animals.

The species' preference for nearshore habitat also makes it vulnerable to pollutants such as heavy metals and pesticide residues. Although the biological effects of the pollutants are poorly known, the level of contaminants found in dolphin tissues examined to date gives cause for concern.

Long-term studies of the species indicate that females become sexually mature at seven to nine years of age and produce, at most, one calf every two years. Considering the species' inherently low reproductive rate, it seems possible that the impact from gill net entanglement, in addition to natural mortality, will cause this small population to decline in size.

The New Zealand Department of Conservation is aware of the urgent nature of the problem and, in 1988, prepared a discussion paper that addressed possible ways to increase protection of Hector's dolphins. Based on analyses in the document, the Department initiated steps at the end of 1988 to designate waters around the Banks Peninsula as a Marine Mammal Sanctuary under provisions of the New Zealand Marine Mammal Protection Act of 1978. Among the specific measures to be taken to address the incidental take of Hector's dolphins in gill nets were the following: a ban on gill netting in the Sanctuary from November through February; a ban on use of gill nets longer than 30 meters during the period March through October; and a requirement that fishermen using gill nets deploy no more than one net per boat, remain with the nets while they are deployed, and refrain from leaving nets to soak overnight. At the end of 1988, it was the Commission's understanding that these provisions would become effective early in 1989.

During 1989, the Marine Mammal Commission will continue to cooperate, as requested, in efforts to help determine steps that might be taken to ensure the protection of the Hector's dolphin population.

#### Gulf of California Harbor Porpoise (*Phocoena sinus*)

The Gulf of California harbor porpoise is one of the smallest and perhaps the rarest of all cetaceans. Until recently, there have been few confirmed sightings of live animals and most of what is known of the species has been obtained from examination of carcasses washed up on beaches or taken incidentally in gill net fisheries in the upper Gulf of California, Mexico. Confirmed sighting and stranding data

suggest that the species' range is limited to the northern third of the Gulf.

Researchers from the University of California, Santa Cruz, conducted boat surveys in the northern Gulf of California in the spring of 1986, 1987, and 1988. During these surveys, a total of 99 Gulf of California harbor porpoise were seen -- 30 in 1986, 46 in 1987, and 23 in 1988. These surveys covered much of the known range of the species and, based upon the 1986 sighting data, the National Marine Fisheries Service estimated that the minimum population could number as few as 50 to 100 individuals.

The major threat to the species appears to be incidental take in the gill net fishery for totoaba (Totoaba macdonaldi). This fishery operated in the Gulf of California from the late 1940s to 1975 when it was closed by the Mexican Government to protect the fish. In the spring of 1985, the Mexican Government conducted experimental fishing operations to assess the status of the totoaba stock in the upper Gulf. During this experimental fishery, at least 13 harbor porpoise were caught and killed. Illegal and limited experimental fishing continued in the spring of 1986 and 1987, and at least a few porpoise were taken. The fishery remains closed, but the closure is difficult to enforce and some illegal fishing and incidental take of harbor porpoise continue to occur.

Habitat degradation and destruction also may be affecting the Gulf of California harbor porpoise. Dams and water projects on the Colorado River in the southwestern United States have reduced the outflow of the river into the Gulf of California. This may have reduced nutrient input and biological productivity in the Gulf, including reduction of species upon which harbor porpoise depend for food. Also, exploratory drilling for oil and gas has begun in the northern Gulf, raising the possibility of future development, disturbance, oil spills, and other types of environmental contamination.

In addition, run-off from farms and roads in the northern Gulf of California drainage system may be introducing significant quantities of pesticides and other chlorinated hydrocarbon contaminants. Commission-funded analysis of blubber samples from 8 of the 13 porpoise recovered from gill nets in 1985, however, revealed generally lower levels of these contaminants than have been found in cetaceans in many other areas. This suggests that at least chlorinated hydrocarbons presently may not pose a significant threat to the species.

Because of its limited distribution, small numbers, and vulnerability to gill net fisheries and other human activities, the National Marine Fisheries Service, in January 1985,

designated the Gulf of California harbor porpoise as endangered under the Endangered Species Act. In 1988, researchers from the Center for the Study of Deserts and Oceans and the Universidad Nacional Autonoma de Mexico began a cooperative program, funded by the Center for Environmental Education (now the Center for Marine Conservation), to interview fishermen in the northern Gulf of California. The objectives are to obtain better information on incidental porpoise mortality and to advise fishermen and others of the rare and endangered status of the species. If successful, this effort should provide more reliable information on when, where, how, and how many Gulf of California harbor porpoise are being caught and killed in gill net fisheries. It also may suggest ways to avoid or reduce the incidental take.

#### River Dolphins (Superfamily Platanistoidea)

The Platanistoidea superfamily of toothed whales is composed of five species commonly known as river dolphins. It includes the only cetaceans whose natural habitat is limited to fresh-water environments. The species and their distribution are: Platanista gangetica, known as the Ganges or blind river dolphin, found in India, Bangladesh, and Nepal; P. minor, the Indus river dolphin, found in the Indus River system of Pakistan; Inia geoffrensis, the boto or Amazon river dolphin, found in the Amazon and Orinoco River basins in South America; Lipotes vexillifer, the baiji or Chinese river dolphin, presently found along the middle and lower Yangtze River in the Peoples Republic of China; and Pontoporia blainvillei, the franciscana or the La Plata river dolphin, found in the South Atlantic coastal waters off Argentina, Uruguay, and Brazil. Pontoporia is the only member of the group that inhabits salt water.

Although little is known about the population status and ecology of river dolphins, there is reason to believe that all five species may be threatened to varying degrees with extinction due to subsistence hunting, incidental take by fisheries, and/or human-caused destruction and degradation of habitat. Construction of dams and other development in and near important river dolphin habitat pose potentially serious threats to the continued survival of several of the species. The baiji, Ganges river dolphin, and Indus river dolphin are listed on Appendix I of the Convention on International Trade in Endangered Species of Fauna and Flora, and the boto and franciscana are listed on Appendix II.

On 23 December 1986, the Commission wrote to the National Marine Fisheries Service recommending, among other things, that steps be taken to list the five species of river dolphins as threatened or endangered under the U.S. Endangered Species

Act. By Federal Register notice of 17 February 1987, the Service announced that it had reviewed a petition to designate the baiji as endangered and had determined that, based on available information, the proposed listing may be warranted. On 17 April 1987, the Service announced its intention to review the status of the other four river dolphins to determine whether any of these species should be listed as endangered or threatened.

On 18 May 1988, the National Marine Fisheries Service published a Federal Register notice indicating that, based upon the best available information, it had determined that the Chinese river dolphin is endangered and should be so listed on the U.S. List of Endangered and Threatened Species. On 31 August 1988, the Service published a List of Candidate Vertebrate and Invertebrate Marine Species for listing under the Endangered Species Act. The list included the Amazon, Ganges, Indus, and La Plata river dolphins.

By the end of 1988, the Chinese river dolphin had not yet been listed as endangered, and no action had been initiated to formally list the other four river dolphin species as either endangered or threatened under the Endangered Species Act. The Commission understands, however, that the final steps necessary to list the Chinese river dolphin will be completed early in 1989 and that consideration then will be given to appropriately listing the other four species.

#### Identification of Needed Research and Management Actions

As noted in previous Annual Reports, the Commission provided funds in 1986 to help convene an international Workshop on the Biology and Conservation of the Platanistoid Dolphins. The Workshop was held 26 October-6 November 1986, in Wuhan, China. The report of the Workshop was completed early in 1987 and is expected to be published, along with contributed papers, in 1989 by the Species Survival Commission of the International Union for the Conservation of Nature and Natural Resources.

One of the Workshop's recommendations was to initiate research to obtain better information on numbers, movement patterns, reproductive biology, feeding habits, and social organization of the baiji. In response to the recommendation, in 1987, the Marine Mammal Commission contributed funds to send a U.S. scientist to China to assist in developing a long-range conservation plan for the baiji. The report from this site visit was submitted to the Commission in February 1988. Among other things, the report notes that: damming, dredging, sand bank removal, and fisheries in the Changjiang (Yangtze) River were jeopardizing the species and its habitat; groups of animals should be recovered from the main body of

the river and placed in semi-captive breeding reserves to protect them and to ensure the continuation of a viable gene pool; proposed sites for reserves at Shishou and Tongling should be evaluated and facility construction should be begun immediately if the sites are suitable; and further studies should be conducted to better determine the status, habitat requirements, critical habitats, and basic biology of the species.

The contractor was invited to return to China to assist scientists from the Institute of Hydrobiology, Wuhan, China, in developing and implementing a program to better determine the biology and ecology of, and threats to, the species. As described in Chapter XI, the Commission provided funds to help cover travel and related expenses for this endeavor. Additional funding was provided by the World Wildlife Fund, Gland, Switzerland.

The contractor and several associates plan to travel to Wuhan in spring 1989 to initiate the cooperative studies. The report of the initial cooperative effort and other relevant information will be reviewed by the Commission, in consultation with its Committee of Scientific Advisors, to determine what more the United States might do to encourage protection and recovery of the baiji and other endangered river dolphins.

#### Polar Bear (*Ursus maritimus*)

Polar bears have a circumpolar distribution around the rim of the Arctic Ocean and adjacent ice-covered seas. Pregnant polar bears spend from late November through late March or early April in dens which they excavate in snow banks on shore, on shorefast ice, on pack ice, or on drifting sea ice. They generally give birth to cubs in late December or early January and leave the dens with their cubs between late February and early April, depending on latitude.

Available information suggests that there may be two relatively discrete polar bear populations along the northern Alaska coast. One ranges approximately from Icy Cape in Alaska into the western Canadian Arctic, and one ranges from west of Icy Cape into the eastern Soviet Arctic. The principal threats to these and other polar bear populations are hunting and oil and gas development.

#### International Agreement on Conservation of Polar Bears

Throughout the 1940s, most hunting of polar bears was done by Natives with dog teams. By the 1960s, other hunting methods had evolved, and more bears were being killed. Also, interest in assessing and developing Arctic oil and gas

resources was increasing. Such hunting and other human activities threatened the viability of polar bear populations throughout their range and, in November 1973, the Governments of the United States, Canada, Denmark (for Greenland), Norway, and the Soviet Union concluded an Agreement on the Conservation of Polar Bears. This Agreement, which entered into force in 1976, prohibits the hunting, killing, and capturing of polar bears except for certain specified purposes; prohibits the use of aircraft and large motorized vessels for hunting polar bears; and requires each Contracting Party to protect the ecosystems of which polar bears are a part, particularly polar bear denning and feeding sites. The Agreement also requires that the Contracting Parties conduct and coordinate research programs, consult each other on the management of shared polar bear populations, and exchange information on research and management programs, research results and data on bears taken.

#### Native Agreement on Polar Bears in the Southern Beaufort Sea

As noted above, available information indicates that the population of polar bears which occupies the southern Beaufort Sea from about Icy Cape in Alaska to the Baillie Islands in the Northwest Territories of Canada is a discrete population shared by the United States and Canada. Effective conservation of this population will require coordinated regulation of subsistence hunting and other activities that might affect the population. Recognizing this, representatives of the Native user groups in Canada and the United States -- the North Slope Borough Fish and Game Management Committee in the United States and the Inuvialuit Game Council in Canada -- concluded an agreement in January 1988 to cooperatively regulate the hunting of polar bears in the southern Beaufort Sea from the Baillie Islands in Canada west to Icy Cape. Among other things, this Agreement provides protection for females with cubs and all bears in dens or constructing dens. It also provides that catch quotas be established annually, based upon the best available scientific evidence, that the quota be allocated equitably between Alaska and Canadian Natives, and that data on the number, locations, age and sex of bears killed be collected and shared.

#### Regulations Governing the Marking, Tagging, and Reporting of Polar Bears and Other Marine Mammals Taken by Alaskan Natives

The Marine Mammal Protection Act provides that coastal-dwelling Alaska Natives can take polar bears and other marine mammals for subsistence purposes or for purposes of creating and selling authentic Native articles of handicrafts and clothing if such taking is done in a non-wasteful manner. Reliable information on the number, species, age, sex, and other characteristics of the animals taken, among other things, is

required to accurately assess and monitor the possible effects of the subsistence take on the affected populations. Such information can be obtained most effectively by requiring hunters to report the location, number, and sex of animals taken and to provide teeth and other body parts for age determination and other analyses. Likewise, the trade and sale of hides and other parts of any animals taken or traded illegally can be reduced by requiring that hides, tusks, etc. be marked or tagged so that they can be recognized as having been taken legally.

The Marine Mammal Protection Act was amended in 1981 to authorize the Secretaries of Commerce and the Interior to prescribe regulations requiring the marking, tagging and reporting of marine mammals taken by Alaska Natives for subsistence and handicraft purposes. As described in Chapter IX of this Report, the Fish and Wildlife Service, in consultation with the Commission, initiated action in 1985 to promulgate regulations governing the marking, tagging, and reporting of marine mammals taken by Alaska Natives. A final rule was published in the Federal Register in June 1988 and took effect on 26 October 1988.

If implemented effectively, the marking and tagging regulations, combined with ongoing research programs and the cooperative Native management agreement described in the previous section, should ensure that Native subsistence hunting at least in the Beaufort Sea is consistent with the International Agreement on the Conservation of Polar Bears. The cooperative management agreement does not apply to the area west of Icy Cape and thus does not contribute to ensuring that Native subsistence hunting in the Chukchi Sea also is consistent with the Agreement.

#### Oil and Gas Exploration and Development

Ongoing and proposed oil and gas development in the Arctic National Wildlife Refuge and in marine areas off the north coast of Alaska and Canada could affect polar bears in several ways. Geophysical seismic exploration, aircraft and ship traffic, road and pipeline construction, drilling and transport operations, etc. could cause females coming ashore to den in the fall to avoid traditional denning areas and/or cause mothers to abandon their cubs or leave dens before their cubs are able to withstand the severe winter environment. Such activities also could attract bears and increase the probability of bears being shot and killed because of real or perceived threats to human safety as has happened elsewhere. In addition, oil spills could have both direct and indirect effects on polar bears -- i.e., bears could be affected directly by contact with or ingestion of oil, or be affected indirectly

through oil-effects on ringed seals and other components of the Arctic food web of which they are a part.

The Minerals Management Service, as noted in Chapter X of this Report, is responsible for assessing and avoiding or mitigating possible adverse impacts of offshore oil and gas development on polar bears and their habitat. To date, the Service has relied primarily on the Fish and Wildlife Service to obtain the population and other information necessary to assess and determine how to avoid or mitigate the possible direct and indirect effects of offshore oil and gas exploration and development on polar bears. The available information and ongoing Fish and Wildlife Service research programs may be insufficient for these purposes and, by letter of 29 September 1988, the Commission advised the Minerals Management Service that additional studies are needed to determine what proportion of the Alaska polar bear populations could be affected by offshore oil and gas exploration and development, and to identify and evaluate the likely effectiveness of ways whereby interactions between oil field workers and polar bears might be avoided or minimized. In addition, early in 1989 the Commission will sponsor a workshop in cooperation with the Fish and Wildlife Service and the Alaska Department of Fish and Game to determine what, if any, additional measures may be necessary to better assess and to avoid or mitigate the possible effects of oil and gas exploration and development on polar bears.

The report of the workshop, to be held in Anchorage, Alaska, 24-25 January 1989, will be used by the Commission, in consultation with its Committee of Scientific Advisors, to identify and recommend actions that should be taken by the Minerals Management Service or other agencies to adequately protect polar bears and their habitat in Alaska and adjacent areas.

In 1989, the Marine Mammal Commission will undertake a full review of polar bear activities to determine, among other things, U.S. compliance with the international polar bear agreement.

## CHAPTER IV

### DIE-OFF OF BOTTLENOSE DOLPHINS (TURSIOPS TRUNCATUS)

The bottlenose dolphin is the most common cetacean species in coastal waters off the mid and south Atlantic coastal states. Prior to 1987, an average of about 12 dead bottlenose dolphins a year washed up on beaches from New Jersey to Cape Hatteras. In June 1987, large numbers of animals began to die and wash up on New Jersey beaches. This unprecedented mortality continued throughout 1987 and into 1988, and moved southward with the seasonal migration of the species.

During an eleven-month period beginning in June 1987, more than 740 bottlenose dolphins washed up on beaches along the Atlantic coast from New Jersey to Florida. In early February 1988, an aerial sighting of nine dolphin carcasses on Horn and Petit Bois Islands in the Mississippi Sound raised fear that whatever was causing the mortality might have spread into the Gulf of Mexico. However, there have been no subsequent reports of possible unusual mortality of bottlenose dolphins in the Gulf of Mexico, suggesting that the problem has not spread to that region. Information concerning the die-off and activities undertaken by the Marine Mammal Commission and other agencies in response to the event are described below.

#### Background

As noted in its previous Annual Report, the Marine Mammal Commission learned of the die-off in July 1987 when unusually high numbers of bottlenose dolphins began washing up on beaches in Virginia. The Commission immediately consulted the National Marine Fisheries Service and a number of persons expert in bottlenose dolphin biology and disease. The Commission asked Joseph R. Geraci, V.M.D., Ph.D., at that time a member of its Committee of Scientific Advisors on Marine Mammals and an expert in marine mammal husbandry and disease, to organize and lead an investigation to try to determine the cause or causes of the die-off.

The Commission also made arrangements with other Federal agencies to help in the investigation. The Department of Agriculture's Animal and Plant Health Inspection Service was asked and agreed to conduct bacterial and viral isolation studies and other analyses to determine whether pathogenic organisms, environmental contaminants, or biological toxins were causing or possibly contributing to the die-off. The Smithsonian Institution agreed to continue collecting basic morphological data from the stranded animals, and the U.S.

Navy provided facilities at the Little Creek Amphibious Base for detailed postmortem examinations of dolphins recovered in the Virginia Beach area as well as other substantial logistic support. In consultation with the National Marine Fisheries Service, the Commission arranged for the Service's laboratory in Charleston, South Carolina, to perform toxicological analyses. In addition, the Commission sought the assistance of the Environmental Protection Agency in obtaining information on offshore dump sites, possible illegal dumping, phytoplankton blooms, water movement patterns, and other environmental factors that might provide a clue to the cause of the die-off.

The multi-disciplinary response team, with funding and administrative support provided by the National Marine Fisheries Service and the Marine Mammal Commission, began its investigations in Virginia Beach, Virginia, early in August 1987. From 9 August through 2 September, 83 bottlenose dolphin carcasses were recovered from beaches in the area. Gross necropsies were performed on most of the animals, and tissue samples from the freshest animals were collected and sent for testing and analyses to: the National Veterinary Services Laboratory; the Diagnostic Virology Laboratory, Eastern Virginia Medical School; the National Cancer Institute, National Institutes of Health; Virginia Beach General Hospital; and the Charleston, South Carolina, laboratory of the National Marine Fisheries Service. Nearshore and offshore aerial surveys were carried out by National Marine Fisheries Service personnel and contract investigators to locate stranded animals, identify trends in the mortality pattern, and determine the impact of the event on both coastal and offshore dolphin stocks. Aerial observers also attempted to verify reports of dead dolphins floating offshore.

Because tissues from dead animals were not suitable for doing the full range of analyses necessary to investigate the die-off, live animals were needed to obtain blood and other samples for examination. Therefore, the Commission made arrangements with Sea World, Inc., Orlando, Florida, and provided funds for a team of people experienced in the capture of bottlenose dolphins to assist in capturing live dolphins in the Virginia Beach area. The U.S. Navy transported a net and other equipment from Orlando to Norfolk and provided a boat and crew to assist in the capture operation. Also as a part of this effort, the Commission paid for two small boat charters. Four live dolphins were caught, examined, and subsequently released on 16 August 1987. The sample size was inadequate and an additional 19 animals were captured in the Virginia Beach area from 6-9 October 1987. Blood samples from these animals were analyzed for cell types and characteristics, and serum constituents including electrolytes, metabolites, enzymes, proteins, thyroid and adrenocortical hormones, and viral antibodies.

Preliminary results of the continuing investigations were reviewed during the Commission's Annual Meeting in Miami, Florida, on 10-12 December 1987, and were discussed in the previous Annual Report. It was apparent that further studies were required to determine whether one or more viruses, environmental pollutants, or natural environmental fluctuations were the primary cause or a factor contributing to the die-off. It also was apparent that further studies were necessary to identify the distribution and patterns of mortality and its impact on nearshore and offshore stocks of bottlenose dolphins and other marine species.

Following its Annual Meeting, the Commission consulted with the National Marine Fisheries Service and others to determine what might be done to expedite the investigation. On 16 March 1988, the Commission wrote to the National Marine Fisheries Service noting that, although it had not been anticipated at the end of 1987, the dolphin die-off had continued and that the cause or causes of mortality were still unknown. Therefore, the Commission recommended: (1) that the Service appoint a senior scientist to administer the program; (2) that all four elements of the program (medicine, environmental correlates, natural history, and population dynamics) be reviewed by involved scientists and independent experts with respect to plans for continuation of the investigation and development of contingency plans, should the die-off resume in the summer; (3) that the programs in medicine and environmental correlates be separated from the other elements and reviewed immediately; (4) that, as soon as possible, the Service take necessary steps to secure adequate funding; (5) that other responsible federal agencies be advised of the need to provide support for the investigation; (6) that these agencies be invited to participate in the reviews proposed by the Commission; (7) that a second full review be scheduled for sometime in early summer to finalize plans to address a die-off, should one occur again in 1988; and (8) that the Service continue to maintain an active presence in areas where animals are dying to ensure that dead animals are collected and appropriate specimen material taken and preserved for analysis. In its letter, the Commission endorsed the Service's plan to appoint Dr. Geraci as special advisor on the die-off investigation and recommended that he be provided with sufficient funds to retain the help necessary to carry out this work.

The Service wrote to the Commission on 8 April, responding directly to the recommendations contained in the Commission's 16 March letter. In its letter, the Service stated that it had assigned lead responsibility for the die-off investigation to a senior staff scientist; that a program review would be convened with involved and independent scientists; that attention would be focused on contingency planning, should a

similar die-off occur in the future; that other Federal agencies would be invited to participate in the program review; and that the review would be an opportunity for the Service to query what support might be forthcoming.

In its response, the Service also noted that the Commission had recommended that the program review be conducted in two parts, with the medical and environmental aspects being examined immediately. The Service stated that it had consulted with Dr. Geraci and had concluded that it would be premature to review any aspects of the program at that time and, accordingly, it intended to convene a program review in the early summer of 1988. With regard to the Commission's recommendation on securing needed funding, the Service noted that it was putting together a proposal to ensure an effective response in the event of another die-off episode. This proposal included support for Dr. Geraci to continue leading the emergency response team.

During 1988, the Commission continued to encourage and support efforts to determine the cause or causes of the die-off. As noted above, primary viral and bacterial isolation studies were undertaken at the Department of Agriculture's National Veterinary Services Laboratory and at the Virginia Beach General Hospital. In February 1988, the Commission provided funds to the Ontario Veterinary College to complete the histopathological studies of bacteria and fungi begun by the Department of Agriculture. The Commission also provided funds to the New England Aquarium to continue collecting and archiving tissues which it had started in 1987, and to the Eastern Virginia Medical School to continue virological analyses. Additional funding for these and other aspects of the investigation was provided by several other Federal, state, and private organizations.

In June 1988, the Commission initiated discussions with the National Oceanic and Atmospheric Administration and the National Aeronautics and Space Administration to assess the potential for using satellite imagery to detect the presence of dumped toxic/volatile hydrocarbon and other compounds in the marine environment. However, none of the satellites operated by the two agencies had the required capability.

The National Oceanic and Atmospheric Administration was also requested to provide data on meteorological and oceanic current and temperature patterns in the mid-Atlantic region during the die-off. Water temperatures reported in newspapers during the die-off suggested that surface water temperatures had been unusually high during the summer of 1987. Such conditions might have promoted a bloom of established microorganisms, favored the rise of new forms, or transformed relatively harmless species into pathogenic variants. The

presence of a "red tide" bloom in North Carolina between late October 1987 and early March 1988 raised concern about the possible involvement of brevetoxin, a fat-soluble biotoxin produced by the dinoflagellate, Ptychodiscus brevis, in the die-off. To determine whether red tide biotoxins may have caused or contributed to the unusual bottlenose dolphin mortality, the Commission provided funds to an investigator at the University of Miami to analyze samples collected from three species of fish commonly preyed on by bottlenose dolphins. The contract report, which was received in June 1988, indicated that, of the species tested (Spanish mackerel, silver trout, and menhaden), biotoxins were found in menhaden and only in the viscera of the animals. These results indicated little potential for intoxication in humans, and only those animals that consume menhaden whole are at potential risk.

As noted in the Commission's previous Annual Report, a wide variety of pathogenic bacteria were isolated from animals that stranded. Also evidence of papova viruses and herpes-like particles were found in tissue samples from several of the stranded dolphins and, in samples from some animals, high levels of organochlorides were detected. None of the isolated bacteria, viruses, or environmental contaminants have been found consistently in animals that died, suggesting that while they may have contributed to or caused the deaths of some animals, they were not the primary cause of the die-off.

At the end of the year, toxicological and other analyses undertaken to determine the cause of the die-off were being concluded. A final report on this aspect of the investigation is expected to be completed and submitted to the Marine Mammal Commission and the National Marine Fisheries Service at the end of January 1989.

#### Population Status

Data from population studies done in the late 1970s and early 1980s suggested that there could be two more or less discrete stocks of bottlenose dolphins along the U.S. east coast -- a nearshore stock that moves north to the New Jersey/New York Bight area in the spring and south to the Georgia/Florida area in the fall, and an offshore stock that occurs primarily along the 100-fathom depth contour between Georges Bank in the north and Cape Hatteras in the south. Data from the die-off investigation were insufficient to judge when, where, and how many animals might have been affected. Therefore, as noted above, the National Marine Fisheries Service began a series of coastal and offshore aerial surveys in the fall of 1987 to better determine the distribution, number, sizes, composition, and movements of dolphin pods along the mid-Atlantic coast and to determine and monitor the number of

dead animals floating at sea and washed up on beaches in selected index areas.

Preliminary results suggest that only the nearshore population was affected and that the impact was substantial. Perhaps 50 percent or more of the population died, and at least some of the survivors were severely debilitated and therefore unlikely to breed. On 11 November 1988, the Center for Environmental Education (now the Center for Marine Conservation) petitioned the National Marine Fisheries Service to begin informal rulemaking to list the mid-Atlantic coastal stock of bottlenose dolphins as depleted under the Marine Mammal Protection Act. As noted, information compiled by the National Marine Fisheries Service suggests that this proposal has merit. Consequently, early in 1989, the Service is expected to take steps to list the nearshore population of bottlenose dolphins along the U.S. Atlantic coast as depleted under the Marine Mammal Protection Act.

#### Follow-on Activities

The cause or biological significance of the 1987-1988 die-off had not been determined by mid-1988 when reauthorization of the Marine Mammal Protection Act was being considered (see Chapter II of this Report). Therefore, in the amendments to the Act, signed into law on 23 November 1988, Congress directed that the National Marine Fisheries Service conduct a study to examine: (1) the cause or causes of the epidemic; (2) the effect of the epidemic on coastal and offshore populations of Atlantic bottlenose dolphin; (3) the extent to which pollution may have contributed to the epidemic; (4) whether other species and populations of marine mammals were affected by those factors which contributed to the epidemic; and (5) any other matters pertaining to the causes and effects of the epidemic.

The amendments require that the Service submit a plan for conducting the study to the Senate Committee on Commerce, Science, and Transportation and the House Committee on Merchant Marine and Fisheries by 1 January 1989. However, the final report of the die-off investigation is not expected to be completed and submitted to the Service and the Commission until the end of January 1989. Therefore, by letter of 6 December 1988, the Commission suggested that the Service advise the concerned Congressional Committees of this fact when submitting its required study plan. The Commission also pointed out that, while the forthcoming report was expected to identify the likely cause of the die-off, it would not provide an assessment of the impact of the die-off on the affected population or populations or indicate the follow-up studies necessary to determine how soon the populations may recover. The Commission therefore suggested that the Service include

in its research plan a study to evaluate the impact of the die-off on the affected populations and the recovery of these populations over time.

In 1989, the Commission will continue to work with the National Marine Fisheries Service and other organizations to complete the investigations of the 1987-1988 die-off and to develop a contingency plan for responding to other similar events that may occur in the future.

## CHAPTER V

### INTERNATIONAL ASPECTS OF MARINE MAMMAL PROTECTION AND CONSERVATION

Section 108 of the Marine Mammal Protection Act directs that the Departments of Commerce, the Interior, and State, in consultation with the Marine Mammal Commission, seek to further the protection and conservation of marine mammals under existing international agreements and take such initiatives as may be necessary to negotiate additional agreements required to achieve the purposes of the Act. In addition, section 202 of the Marine Mammal Protection Act directs that the Marine Mammal Commission recommend to the Secretary of State and other Federal officials appropriate policies regarding existing international arrangements for the protection and conservation of marine mammals.

The Commission's activities in 1988 with respect to conservation and protection of marine mammals in the Southern Ocean, the International Whaling Commission, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, and the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region are discussed below. This Chapter also discusses the Commission's efforts in 1988 to assist other agencies in developing research and policy regarding the Arctic.

#### Conservation and Protection of Marine Mammals in the Southern Ocean

At least thirteen species of seals and whales inhabit or can be found seasonally in the Southern Ocean, the seas surrounding Antarctica. Two of the seal species, the Antarctic fur seal and the southern elephant seal, were nearly extirpated by unregulated hunting in the late 18th and early 19th centuries. In addition, Southern Ocean populations of large whales, including populations of humpback, blue, fin, sei, and sperm whales, were severely depleted by poorly regulated commercial whaling that began in the Antarctic in the early 1900s.

In 1972, the Antarctic Treaty Consultative Parties concluded the Convention for the Conservation of Antarctic Seals to regulate commercial sealing, should it resume in the Antarctic. In 1982, the International Whaling Commission agreed to a moratorium on commercial whaling, which took effect in 1986 (see the following section of this Chapter). Thus, commercial sealing and commercial whaling presently do

not pose threats to Southern Ocean populations of seals and whales. However, both commercial sealing and commercial whaling could be resumed in the future. In addition, developing fisheries, particularly the fishery for Antarctic krill (Euphausia superba), and growing interest in possible mineral exploration and development pose threats to seals, whales, and other components of the Southern Ocean ecosystem.

Antarctic krill is a keystone of the Southern Ocean food web. It is one of the dominant herbivores and the principal component in the diets of numerous species including: fin, blue, humpback, and minke whales; crabeater and Antarctic fur seals; Adelie, chinstrap, macaroni, and rockhopper penguins; several other species of birds; and several species of fish and squid. Some of these species are eaten in turn by sperm whales, killer whales, leopard seals, and other higher-order predators.

Because of the possible direct and indirect effects of fisheries, mineral development, and related activities on marine mammals, the Marine Mammal Commission has, since 1974, undertaken a continuing review of matters that might affect marine mammals, krill, or other components of the Southern Ocean ecosystem upon which marine mammals may depend. It has made recommendations to the National Science Foundation, the Department of State, the National Oceanic and Atmospheric Administration, and the National Marine Fisheries Service on the need for basic and directed research and monitoring programs and for international agreements to effectively regulate sealing, whaling, fisheries, exploration and development of non-living resources, and related activities in the Southern Ocean. In addition, since 1978, Marine Mammal Commission representatives have served as scientific advisors on most U.S. delegations to regular Antarctic Treaty Consultative Meetings, special consultative meetings held to negotiate the marine living resources and minerals regimes, and the annual meetings of the Commission and the Scientific Committee established under the Convention on the Conservation of Antarctic Marine Living Resources.

Background information and a description of Southern Ocean-related activities undertaken in 1988 are provided below.

#### Activities Related to Antarctic Seals

As noted above, commercial sealing in the late 18th and early 19th centuries led to the near extinction of the Antarctic fur seal and the southern elephant seal. The crabeater, leopard, Weddell, and Ross seals, which occur primarily in ice-covered areas of the Southern Ocean, were not subject to commercial sealing until 1964. In that year, a private

Norwegian expedition conducted exploratory sealing in the western Atlantic sector of the Southern Ocean to determine whether crabeater seals could be profitably exploited. At about the same time, Canadian scientists recommended that the Canadian and Norwegian long-distance sealing fleets be diverted to the Antarctic to reduce exploitation of depleted harp seal stocks in the western North Atlantic.

Recognizing the need to provide a mechanism for regulating commercial sealing, should it resume, the Antarctic Treaty Consultative Parties, in 1972, concluded the Convention for the Conservation of Antarctic Seals. The Convention entered into force in March 1978 and, to date, has been ratified by 13 countries -- Argentina, Australia, Belgium, Chile, France, the Federal Republic of Germany, Japan, Norway, Poland, the Republic of South Africa, the Union of Soviet Socialist Republics, the United Kingdom, and the United States. The Convention prohibits commercial exploitation of fur seals, elephant seals, and Ross seals. Permissible catch levels, sealing areas, and sealing seasons for crabeater, leopard, and Weddell seals are specified in an Annex. The Convention provides for the establishment of a regulatory body and a scientific advisory committee, when and if commercial sealing is resumed, and requires that each Party annually provide information to the other Parties and to the Scientific Committee on Antarctic Research (SCAR) on seals taken for scientific or commercial purposes. It also requires that the Contracting Parties and the Scientific Committee on Antarctic Research be notified at least thirty days in advance of the initiation of proposed sealing expeditions and that the Parties meet at least every five years to review the operation of the Convention.

Since the Convention was concluded in 1972, several hundred seals have been killed each year for research purposes and food for sled dogs. As noted in the Commission's previous Report, the Soviet Union sent two sealing vessels to the Antarctic during the 1986-1987 austral summer and, in a diplomatic note dated 4 November 1987, advised the United States and other Convention Parties that the two sealing vessels had conducted experimental sealing in the Balleny Island area from 9 December 1986 to 2 February 1987 and that, during this period, they had taken 4,014 crabeater seals, 649 leopard seals, 107 Weddell seals, 30 Ross seals, and 2 elephant seals.

The experimental sealing conducted by the Soviet Union raised questions about whether a commercial sealing industry was being developed in the Antarctic, and whether a regulatory body and scientific advisory committee should be constituted to govern the industry, as provided by the Convention. These and other related questions were addressed at a meeting of

the Convention's Contracting Parties held in London, England, 12-16 September 1988. The meeting was attended by representatives of all Contracting Parties as well as representatives of Brazil, Canada, New Zealand, Peru, and Sweden, who participated as observers by invitation of the Contracting Parties. Representatives of the Commission established under the Convention on the Conservation of Antarctic Marine Living Resources, the Scientific Committee on Antarctic Research (SCAR), and the International Union for the Conservation of Nature and Natural Resources also attended the meeting by invitation. A representative of the Marine Mammal Commission attended the meeting and worked with representatives of the Department of State, the National Marine Fisheries Service, the National Science Foundation, and public interest groups to develop and pursue agreement on U.S. positions regarding key issues considered by the meeting.

A report provided to the meeting by the SCAR Group of Specialists on Seals indicated that an average of 483 seals had been killed or captured in the Antarctic each year from 1964 through 1985 and that this level of take could not be considered to have had a significant adverse effect on any seal population. The report further noted that many of these seals had been taken for dog food and that the number of seals taken from 1974-1975 through 1984-1985 was less than half the number taken from 1964-1965 through 1973-1974 due largely to the decline in use of dog teams for transport in the Antarctic.

The Soviet delegation reported on the experimental sealing conducted during the 1986-1987 austral summer and, based upon the results of this expedition, indicated it was unlikely that commercial sealing would begin in the Antarctic within the next five to ten years, if at all. In this context, other delegations also indicated that their countries were unlikely to engage in commercial sealing in the Antarctic in the foreseeable future.

Recognizing that additional research is necessary to improve understanding of the biology and ecology of Antarctic seal populations, and that some local populations could be affected by such research, the meeting called upon the Contracting Parties to insure that the number of seals permitted to be killed or captured for scientific research purposes is limited to the minimum number necessary to meet the objectives of the research, and to take all feasible steps to encourage cooperative planning, minimize duplication, and share the results of research that is conducted.

Meeting participants noted that Weddell seals concentrate along recurring tide cracks in shore-fast ice to pup and breed and that the Convention prohibited the taking of Weddell

seals one year old or older during the breeding season to protect these breeding colonies. Participants further noted that Weddell seal pups also are highly vulnerable to exploitation during the breeding season and agreed to recommend to their governments that commercial exploitation of Weddell seal pups, as well as seals one year old or older, be prohibited during the breeding season. Thus, all taking of Weddell seals would be prohibited during the breeding season.

During the meeting, it was noted that many thousands of harbor seals (Phoca vitulina) had died recently in the North Sea due apparently to canine distemper or a related virus. Accidental introduction of such an infectious disease into the Antarctic could have catastrophic effects on Antarctic seal populations and other wildlife. The meeting agreed that steps should be taken to: (a) avoid as far as possible the introduction into the Antarctic of any potential virus carrier; (b) minimize contact between dogs and seals in the Convention Area; (c) quarantine sick dogs and carry out postmortem examination of all dogs and those seals which are believed to have died from unusual causes; and (d) cremate or remove all dead domestic animals from the Antarctic in sealed containers.

#### Activities Related to Other Living Resources

Experimental harvesting of Antarctic krill was begun by the Soviet Union and Japan in the early 1960s. Commercial harvesting of finfish was begun by the Soviet Union in the late 1960s. As noted in previous Commission Reports, concern that the developing fisheries, particularly the krill fishery, could adversely affect not only the target species, but also dependent and associated species and the ecosystems of which they are a part, led the Scientific Committee on Antarctic Research to plan and coordinate an international research program entitled "Biological Investigations of Marine Antarctic Systems and Stocks" (BIOMASS). At the same time, recognition of the need for a legal framework to regulate fisheries led the Antarctic Treaty Consultative Parties to negotiate and adopt the Convention on the Conservation of Antarctic Marine Living Resources.

The Convention, which was concluded in May 1980 and came into force in April 1982, established the Commission and the Scientific Committee for the Conservation of Antarctic Marine Living Resources. The first meetings of the Commission and Scientific Committee were held in 1982. The Marine Mammal Commission's involvement in negotiation of the Convention and the first six meetings of the Commission and Scientific Committee established by the Convention are described in previous Annual Reports.

The 1988 Meetings of the Commission and Scientific Committee: The 1988 meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources were held in Hobart, Australia, on 24 October-4 November 1988. To help prepare for these meetings and to review the results of studies carried out in 1987-1988 as part of the National Marine Fisheries Service's Antarctic Marine Living Resource Research Program (see below), the National Marine Fisheries Service, in consultation with the Marine Mammal Commission, the Department of State, and the National Science Foundation, convened an ad hoc group of U.S. Antarctic scientists and representatives of interested industry and environmental groups in Washington, D.C., on 21 June 1988. At that meeting, information and views were exchanged on scientific and technical issues on the agenda for the 1988 meeting of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources and on ongoing efforts by the National Marine Fisheries Service and the National Science Foundation to implement applicable domestic legislation, the Antarctic Marine Living Resources Convention Act of 1984. Marine Mammal Commission representatives participated in this meeting and in subsequent interagency meetings to develop agreed positions on issues scheduled for consideration during the 24 October-4 November 1988 meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources. A Commission representative also participated as a member of the U.S. delegation to the 1988 meetings of the Commission and Scientific Committee.

During their 1988 meetings, the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources considered a broad range of issues, including finfish conservation, krill research and monitoring, establishment of a system of observation and inspection, assessment and avoidance of incidental mortality, ecosystem monitoring, and development of a long-term conservation strategy.<sup>1</sup>

Finfish Conservation Measures: Vessels from seven countries (Chile, the German Democratic Republic, France, Japan, South Korea, Poland, and the Soviet Union) fished in the Convention Area during the 1987-1988 fishing season. The total fish catch was 86,987 metric tons, down slightly from the catch of 98,029 metric tons in 1986-1987. Much of the

---

<sup>1</sup> Reports of the meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources can be obtained from: The Executive Secretary, Commission for the Conservation of Antarctic Marine Living Resources, 25 Old Wharf, Hobart, Tasmania, 7000, Australia.

catch (37,943 metric tons) was of Champsoccephalus gunnari, which has been heavily exploited in the area around South Georgia Island and for which a total allowable catch of 35,000 metric tons was set during the 1987 meeting of the Commission.

Fishing countries reported a combined catch of 34,573 metric tons of C. gunnari in the South Georgia area during the 1987-1988 fishing season. Analysis of catch, effort, and related data done by the Scientific Committee in 1988 indicated that the allowable catch of C. gunnari in the South Georgia area should be reduced to 10,194 metric tons for the 1988-1989 fishing season. This fishing season had begun on 1 October 1988, and catch reported prior to and during the 24 October-4 November 1988 meeting of the Commission indicated that the allowable catch level recommended by the Scientific Committee already had been exceeded. The Commission therefore adopted a conservation measure prohibiting directed fishing for C. gunnari until after the 1989 meeting of the Commission and Scientific Committee (6-17 November 1989) when a catch limit for the 1989-1990 fishing season will be considered. To avoid by-catch of C. gunnari in other fisheries, the Commission also prohibited fishing for four other finfish species in the South Georgia area, except for research purposes, prior to 20 November 1989. Based upon advice from the Scientific Committee, the Commission also established a total allowable catch of 13,000 metric tons of Patagonotothen brevicauda guntheri in the South Georgia area for the 1988-1989 fishing season.

Krill Research and Monitoring: The total catch of Antarctic krill in the Convention Area in 1987-1988 was 370,663 metric tons, down slightly from the 1986-1987 catch of 376,527 tons. It is unlikely that this level of catch has had any adverse effects on either krill stocks or krill predators, except possibly in local areas such as around South Georgia Island where much of the krill fishing has been focused.

The importance of determining and obtaining data necessary to predict and detect the possible effects of krill fishing on krill stocks and the ecosystems of which they are a part has been widely recognized. During the 1988 meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources, it was agreed that a permanent Working Group on Krill should be established to assist in making the required determinations. It also was agreed that this Working Group would meet at the Southwest Fisheries Center in La Jolla, California, early in June 1989 to begin its work and that prior to the Working Group meeting, a workshop would be held at the Southwest Fisheries Center. The purposes of the workshop are to consider and make recommendations to the Scientific Committee regarding the potential utility of catch per unit effort analyses to detect and quantify

changes in krill biomass and the types of catch, effort, and related data that would be required to make the necessary determinations.

Observation and Inspection: Article XIV of the Convention on the Conservation of Antarctic Marine Living Resources calls for establishment of an observation and inspection system to insure compliance with provisions of the Convention. During the 1987 meeting of the Commission, a standing committee was constituted to help develop and oversee implementation of the system. This Committee met during the 1988 meeting of the Commission and formulated a system of observation and inspection provisions which subsequently were adopted by the Commission. Among other things, the system provides that: each member of the Commission may designate persons to carry out observation and inspection activities on board vessels engaged in scientific research or harvesting of marine living resources in the Convention Area; each Contracting Party shall provide to the Commission by 1 May each year a list of all of its flag vessels intending to harvest marine living resources in the Convention Area during the year beginning 1 July; designated observers and inspectors shall be entitled to board vessels engaged in research or harvesting of marine living resources in the Convention Area to carry out their functions; detailed reports on observation and inspection activities shall be prepared and provided to the designating member, which shall in turn report to the Commission; and, if there is evidence of violations of the provisions of the Convention or measures adopted by the Commission, the flag state shall take steps to prosecute and, if necessary, impose sanctions.

Before the system can be implemented, a number of technical and administrative details must be worked out. These include such things as the development of an agreed check list for use by observers and inspectors and an agreed format for reporting the results of observations and inspections. These matters will be addressed at the 1989 meeting of the Commission and, if agreement can be reached, the observation and inspection system could be implemented as early as the 1989-1990 fishing season.

Assessment and Avoidance of Incidental Mortality: Seals, whales, birds, and other marine organisms may be caught incidentally during fishing operations, may be caught and killed in lost and discarded fishing gear, or may die as a result of ingesting plastic bags and other debris discarded in the Convention Area (see Chapter VI of this Report for more detailed discussions of these problems). The Commission for the Conservation of Antarctic Marine Living Resources has recognized this and has adopted a number of measures to try to insure that accidental and incidental mortality of marine living

resources does not become a serious problem in the Convention Area.

In response to a decision at the fifth meeting of the Commission, the Commission's Executive Secretary completed and, in 1988, distributed to Members: (a) an information brochure to be given to fishermen, researchers, and others working in the Convention Area to make them aware of the sources, fates, and effects of potentially hazardous marine debris, and (b) a placard to be displayed aboard ships operating in the Convention Area describing "do's" and "don'ts" with respect to handling, storing, and discarding refuse. At the 1988 meeting, members of the Commission reported the loss of fishing gear and sightings of debris consisting of fishing buoys, gas bottles, plastic containers, net fragments, and packaging material in the Convention Area. In addition, they reported sighting five fur seals entangled in derelict fishing gear and two male fur seals that had died after becoming entangled in trammel nets being used for fish research near South Georgia Island. Members also noted that Annex V of the MARPOL Convention would enter into force on 31 December 1988 and agreed that those members who have not done so would consider and take such steps as may be appropriate to accept or ratify the Annex.

The Commission noted that Members are required to report losses of fishing gear and observations of animals entangled in such gear and to survey and report observations of potentially hazardous debris washed up on beaches in the vicinity of their research stations in the Convention Area. However, these obligations do not take into account possible problems caused by birds and other organisms ingesting plastics and may not provide for the acquisition of adequate data to detect and evaluate the effectiveness of steps taken to mitigate problems. Accordingly, the Commission requested that the Chairman of the Scientific Committee consult the Scientific Committee on Antarctic Research's Subcommittee on Bird Biology and the Scientific Committee's Group of Specialists on Seals to determine what additional steps might be taken to assess, avoid, or mitigate problems. It was agreed that Members would continue to report and to take all feasible steps to prevent incidental mortality and the discard of potentially hazardous debris in the Convention Area. It was also agreed that this subject should be kept under continuing review.

Ecosystem Monitoring: In 1984, the Scientific Committee for the Conservation for Antarctic Marine Living Resources established a working group to formulate and coordinate implementation of a multi-national research program to obtain information necessary to predict and detect the effects of fishery development on key components of the Antarctic marine ecosystem. Since then, the Working Group has developed and

members have begun implementing a long-range program plan with three major components: (1) monitoring of representative krill predators (e.g., crabeater seals, Antarctic fur seals, and Adelie, chinstrap, and macaroni penguins) at a network of sites throughout the Antarctic; (2) comprehensive studies of krill, krill predators, and related environmental variables in three "integrated study areas" (Prydz Bay, the Bransfield Strait, and the area around South Georgia Island); and (3) basic studies of the demography and dynamics of crabeater seals in one or more pack ice areas. The Working Group also has taken steps to develop standard methods for collecting and formats for reporting various types of predator, prey, and environmental data.

During the 1987 meeting of the Scientific Committee, it was noted that the utility of the network of land-based study sites being established as part of the Ecosystem Monitoring Program could be compromised by other activities being conducted in or near the study sites. The Committee therefore requested that the Commission establish procedures for registering and protecting land-based study sites. This request was considered at the 1988 meeting of the Commission, and Members generally agreed that such a mechanism was desirable. Members could not agree on a mechanism, however, primarily due to uncertainties as to how to consult other components of the Antarctic Treaty system to insure that measures taken by the Commission to protect land-based study sites do not adversely affect, and are not adversely affected by, actions taken by the Antarctic Treaty Consultative Parties and the Contracting Parties to the Convention for the Conservation of Antarctic Seals and the Convention on the Regulation of Antarctic Mineral Resource Activities (see below).

It was agreed that the Commission would give further consideration to ways of protecting land-based ecosystem monitoring sites at its next meeting. It also was agreed that the Working Group on Ecosystem Monitoring would meet in 1989 to review and identify steps that can be taken to improve the design and implementation of the Ecosystem Monitoring Program.

Development of a Conservation Strategy: There is no established precedent to the ecosystem-oriented conservation standard set forth in Article II of the Convention on Conservation of Antarctic Marine Living Resources. Therefore, at its meeting in 1986, the Commission established under the Convention formed a Working Group to assist in considering and identifying steps that could be taken to facilitate implementation of the ecosystem-oriented management approach mandated by Article II. As noted in the Marine Mammal Commission's previous Annual Report, this Working Group met in 1987 and agreed to focus its efforts initially on development

of performance criteria for assessing the effectiveness of different management strategies with respect to obtaining the Convention objectives. The Group met again during the 1988 meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources. At this meeting, the Working Group concluded that it would be desirable to develop operational definitions for depletion and for target recovery levels for depleted populations. It also noted that conservation approaches have to consider both short- and long-time scales and that the practical utility of some approaches would depend on the ability of the Ecosystem Monitoring Program, described earlier, to detect, quantify, and differentiate between natural and harvest-caused changes in the species and populations being harvested, and in dependent and associated species and populations. The Working Group requested that the Scientific Committee provide advice on the ability of the Ecosystem Monitoring Program to detect and differentiate between naturally caused and harvest-caused changes in selected predator and prey species, and suggested that development of the program continue on an experimental basis until it is known whether a practically feasible monitoring program for predators, prey, and environmental parameters can be implemented at a reasonable cost.

The Commission agreed that there was a continuing need to identify and evaluate possible alternative approaches for achieving the objectives of Convention Article II and directed that the Working Group communicate during the inter-sessional period to help develop an agreed program of work.

#### The U.S. Antarctic Marine Living Resources Research Program

The Antarctic Marine Living Resources Convention Act of 1984 establishes the domestic authority necessary for the United States to implement the Convention on the Conservation of Antarctic Marine Living Resources. Among other things, the Act directs that the National Science Foundation continue support of basic marine research in the Antarctic and that the Secretary of Commerce, in consultation with the Secretary of State, the Director of the National Science Foundation, and appropriate officials of other Federal agencies, such as the Marine Mammal Commission, prepare, implement, and annually update a plan for directed research necessary to effectively implement the Convention. In response to this directive, the National Marine Fisheries Service has prepared and begun to implement a plan for directed marine living resource research in the Southern Ocean. The plan was developed in consultation with the National Science Foundation, the Marine Mammal Commission, other Federal agencies, knowledgeable scientists in the United States and abroad, representatives of the U.S.

fishing industry, and representatives of interested U.S. environmental groups.<sup>2</sup>

Ship support is a costly and essential element of marine research programs. To make the best possible use of available funding, the Service arranged in 1987, as it had in 1986-1987, to carry out a series of research cruises in the Southern Ocean on a cost-sharing basis aboard a Polish research vessel, the Profesor Siedlecki. Two research cruises were conducted -- the first, from 11 December 1987 to 16 January 1988, was dedicated to fish stock assessment studies in the area around South Georgia Island; the second, from 18 January to 14 February 1988, was dedicated to krill assessment studies in the Bransfield Strait and in the area around Elephant Island.

In addition, as noted in the Marine Mammal Commission's previous Annual Report, the National Marine Fisheries Service and the National Science Foundation cooperatively supported land-based studies of seals and birds at Seal Island in the South Shetland Islands and at Palmer Station on Anvers Island. Papers summarizing the results of these studies were provided to the Scientific Committee for the Conservation of Antarctic Marine Living Resources to facilitate identification of needed conservation measures and other issues considered during its 1988 meeting.

In 1988, responsibility for the National Marine Fisheries Service's Antarctic Marine Living Resources Research Program was transferred from the Service's Laboratory in Narragansett, Rhode Island, to its Southwest Fisheries Center in La Jolla, California. At the request of the Center's Director, representatives of the Marine Mammal Commission, the National Science Foundation, and the Service's Northeast and Northwest and Alaska Fisheries Centers met with staff members of the Southwest Fisheries Center on 26 May 1988 to discuss research needs and priorities and steps that have been and should be taken to meet the Service's responsibilities under the Antarctic Marine Living Resources Convention Act of 1984. Research needs and priorities were discussed further at the previously mentioned meeting of the ad hoc Scientific Working Group on the Antarctic convened by the Service on 21 June 1988 to assist in preparing for the 24 October-4 November 1988 meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources.

---

<sup>2</sup> Details of the National Marine Fisheries Service's Antarctic Marine Living Resources Research Program can be obtained from the Director, Southwest Fisheries Center, 8604 La Jolla Shores Drive, P.O. Box 271, La Jolla, CA 92038.

Taking into account the views expressed by its own scientists and representatives of the Commission, the National Science Foundation and the U.S. academic community, the National Marine Fisheries Service announced, on 13 October 1988, that it was sending the National Oceanic and Atmospheric Administration ship Surveyor to the Antarctic to conduct two research cruises during the 1988-1989 austral summer. The Service also announced that a program review and planning meeting would be held early in April 1989 to assist in the development of a multi-year plan for subsequent field operations in the Southern Ocean.

The Marine Mammal Commission believes that both basic and directed research are essential to effective operation of the Antarctic Treaty system. Therefore, in 1989, the Commission will continue to work with the Department of State, the National Oceanic and Atmospheric Administration, the National Marine Fisheries Service, the National Science Foundation, and private organizations to facilitate development of both basic and directed marine research programs in the Antarctic.

#### Activities Related to Non-living Resources

As noted in previous Marine Mammal Commission Annual Reports, there is growing interest in potential non-living resources in Antarctica, particularly offshore oil and gas. Disturbance, noise, oil spills, and other environmental pollutants possibly resulting from exploration, development, and transport of oil, gas, or other non-living resources could have direct and indirect effects on whales, seals, krill, and other components of the Antarctic marine ecosystem. The Antarctic Treaty Consultative Parties have recognized this possibility and, at the XIth Antarctic Treaty Consultative Meeting (Buenos Aires, Argentina, 23 June-7 July 1981), agreed that an international agreement should be elaborated to provide means for: (1) assessing the possible impact of mineral resource activities on the Antarctic environment in order to provide for informed decision-making; (2) determining the acceptability of possible mineral resource activities; and (3) governing those activities determined to be acceptable. Negotiation of the agreement was begun in June 1982 and, following ten subsequent negotiating sessions, on 2 June 1988, the Convention on the Regulation of Antarctic Mineral Resource Activities was concluded and adopted by the Antarctic Treaty Consultative Parties. The Convention was open for signature on 25 November 1988 and, by 31 December 1988, had been signed by ten Antarctic Treaty Consultative Parties, including the United States. The Convention will enter into force 30 days following the deposit of instruments of ratification, acceptance, approval, or accession by 16 of the 22 Consultative Parties.

Among other things, the Convention provides that no Antarctic mineral resource activities shall take place unless available information is adequate to conclude that the activities would not have significant adverse effects on wildlife, the Antarctic environment, or the special scientific, historic, aesthetic, or wilderness values of the Antarctic. The Convention provides for the establishment of a commission to overview its implementation, regulatory committees to govern mineral resource activities judged to be acceptable, and a scientific, technical, and environmental advisory committee to provide advice to the commission and regulatory committees.

The Marine Mammal Commission believes that the Minerals Resources Convention provides a mechanism which will help insure that, should mineral exploration and development occur in the Antarctic, they do not have significant adverse effects on whales, seals, or other components of the Antarctic marine ecosystem. In 1989, the Commission will work with the Department of State and other Federal agencies to determine steps that should be taken by the United States to give effect to the Convention.

#### Scientific Committee on Antarctic Research (SCAR)

The Scientific Committee on Antarctic Research (SCAR) was established in 1958 to foster international cooperation on scientific research programs in the Antarctic. It is one of the scientific committees under the International Council of Scientific Unions, a body to which the National Academy of Sciences is the U.S. adhering organization. The Academy's Polar Research Board functions as the U.S. National Committee for SCAR.

SCAR serves as an unofficial scientific advisory body to the Antarctic Treaty Consultative Parties, who have increasingly called upon it for scientific and technical advice concerning conservation and other issues. As described in previous Annual Reports, for example, the Antarctic Treaty Consultative Parties have, since 1983, requested that SCAR provide advice on: procedures to evaluate the possible environmental impacts of scientific research programs and related logistic support activities in the Antarctic; standards and technology for waste disposal; the adequacy of the existing system of Antarctic protected areas and the possible need for an additional category of protected area; and measures that possibly could be taken to improve the comparability and accessibility of environmental and other data being collected by national Antarctic programs.

SCAR and many of its subsidiary bodies met in Australia in September 1988. A Marine Mammal Commission representative participated in the meetings, at which a number of conser-

vation-related issues were considered, including: approval of SCAR's response to the previously mentioned requests from the Antarctic Treaty Consultative Parties for advice on waste disposal and possible means for improving the comparability and accessibility of scientific data on Antarctica; establishment of an ad hoc Committee on the Coordination of Antarctic Data; preparation of a statement elaborating SCAR principles regarding protection of the Antarctic environment; establishment of a Group of Specialists on Antarctic Environmental Affairs and Conservation; plans to produce a SCAR manual on preparation of management plans for protected areas; SCAR's approval of proposals for (a) four new Sites of Special Scientific Interest (Battleship Promontory, Victoria Land; Ablation Point, Alexander Land; Avian Island, Marguerite Bay; and Mount Flora, Trinity Peninsula), (b) a Specially Protected Area at Lion's Rump, King George Island, and (c) reclassifying Specially Protected Area No. 11, Cape Shirreff, as a Site of Special Scientific Interest to facilitate monitoring studies in support of the Convention on the Conservation of Antarctic Marine Living Resources; the preparation of a paper describing the role of Antarctic science in global change programs (e.g., the International Geosphere-Biosphere Program); preparation of a statement of concerns regarding the introduction of non-indigenous biota into the Antarctic; the review of reports on seal takes and information bearing on the Convention for the Conservation of Antarctic Seals; establishment of an ad hoc Committee on Ethics for Animal Research in the Antarctic under the Working Group on Biology; and consideration of proposals for a Conference on Antarctic Science to be held in 1991.

A member of the Marine Mammal Commission staff served on the ad hoc Group on Data Management of the Working Group on Biology, the group that prepared SCAR's response to the request of the Antarctic Treaty Consultative Parties for advice on data management as described above and in previous Annual Reports. SCAR approved the ad hoc Group's report and recommended that it be transmitted through SCAR National Committees to Governments with the caveat that the response applies only within the context of Recommendation XIII-5 (Man's Impact on the Antarctic Environment) and does not examine the question of scientific data and information exchange in relation to global scientific programs. Consequently, SCAR established an ad hoc Committee on the Coordination of Antarctic Data to determine the requirements within SCAR for a coordinated approach to data management.

Elements of the Antarctic protected area system were considered by SCAR's Working Group on Biology at the Hobart meetings. The Working Group discussed the proposal for a new multiple-use protected area which had been developed by SCAR in response to a request from the Antarctic Treaty Consultative Parties and which subsequently had been referred by the

Treaty Parties to Governments for development of draft management plans that could be examined to further evaluate the potential utility of the multiple-use concept. The Working Group was particularly concerned that SCAR National Committees use their best efforts to ensure the preparation of draft management plans for a number of areas that could be provided, for illustrative purposes, to the Antarctic Treaty Consultative Parties in advance of their XVth meeting to be held in the late summer or fall of 1989.

The area around the U.S. Palmer Station on Anvers Island was identified by SCAR and the Antarctic Treaty Consultative Parties as one of the areas where multiple-use conflicts were beginning to occur and which therefore could be used to evaluate the potential value of the proposed new category of Antarctic Protected Area. To help evaluate this potential, the Marine Mammal Commission, as described in Chapter XI, funded a workshop to describe the scientific value of the Palmer area, to identify sites in the area requiring special protection, and to identify other possible management needs. The workshop was held on 3-4 November 1988 in Santa Barbara, California. The workshop report will be provided to the National Science Foundation and the Department of State to serve as the basis for developing a management plan which will ensure the conservation of marine mammals and their habitat in, and the unique scientific value of, the area around Palmer Station. A proposed management plan is expected to be completed in time to be distributed at the May 1989 Preparatory Meeting for the XVth Antarctic Treaty Consultative Meeting.

The SCAR Working Group on Biology also sponsored a Symposium on the Conservation of Antarctic Ecosystems, which was held 28 August-3 September in Hobart, Australia. A member of the Commission staff presented a keynote paper on "New Directions for Biology in the Study and Conservation of Antarctic Ecosystems" at the Symposium. The paper, available from the Commission, describes the use of monitoring concepts -- *i.e.*, the collection of long time-series of data for specific purposes -- in basic and applied research programs for the purpose of understanding and determining the effects of human activities on the environment in and outside the Antarctic.

The Marine Mammal Commission believes that SCAR plays a critical role in planning and coordinating research programs in the Antarctic and is essential to the effective operation of the Antarctic Treaty system. Through the Polar Research Board, the Commission will continue to provide whatever assistance possible to facilitate SCAR's work.

## New International Interest in Antarctica

As noted in previous Commission Reports, there is growing international interest in Antarctica. Since the Treaty entered into force in 1961, 26 additional nations have acceded to it, bringing the total number of Parties to 38. Ten of the acceding states have achieved Consultative Status by establishing and maintaining research programs in the Antarctic, making a total of 22 Parties eligible to participate in making decisions under the Antarctic Treaty.<sup>3</sup>

The growing international interest in Antarctica reflects, in part, recognition of the unique scientific values of Antarctica and the influence of Antarctica on global climate and weather patterns. It also reflects efforts by a number of countries to identify and exploit undeveloped fishery resources in areas not under national jurisdiction, and speculation about potential non-living mineral resources, particularly possible offshore oil and gas resources. In addition, there is a growing interest in tourism and an increasing tourist industry.

Speculation about possible non-living resources appears to have been a major factor in stimulating an initiative started by Malaysia in 1983 to involve the United Nations in Antarctic matters. In 1988, the "Question of Antarctica" was raised again, and two resolutions were adopted by vote during the forty-third session of the United Nations General Assembly in November. The first resolution expressed regret that the Antarctic Treaty Consultative Parties had proceeded with negotiations and, on 2 June 1988, had adopted the Convention on Regulation of Antarctic Mineral Resources Activities. It calls upon the Consultative Parties to invite the United Nations Secretary General or his representative to all meetings of the Treaty Parties and requests that the Secretary-General provide a report on these meetings to the forty-fourth session of the General Assembly. The second resolution repeats an earlier appeal to the Antarctic Treaty Parties to exclude the apartheid regime of South Africa from participating in meetings of the Consultative Parties.

The Marine Mammal Commission believes that the Antarctic Treaty and the related agreements that form the Antarctic Treaty system provide the necessary basis for protecting and

---

<sup>3</sup> At the end of 1988, the Antarctic Treaty Consultative Parties were: Argentina, Australia, Belgium, Brazil, Chile, Peoples Republic of China, France, German Democratic Republic, Federal Republic of Germany, India, Italy, Japan, New Zealand, Norway, Poland, South Africa, Spain, Sweden, Union of Soviet Socialist Republics, United Kingdom, United States, and Uruguay.

conserving marine mammals and their habitat in the Southern Ocean. In 1989, the Commission will continue to work with the Department of State, the National Science Foundation, the National Oceanic and Atmospheric Administration, the National Marine Fisheries Service, and other Federal agencies to help implement the Antarctic Treaty, the Convention for the Conservation of Antarctic Seals, the Convention on the Conservation of Antarctic Marine Living Resources, and the Convention on the Regulation of Antarctic Mineral Resource Activities.

#### The International Whaling Commission (IWC)

During 1988, representatives of the Marine Mammal Commission consulted with the U.S. Commissioner to the IWC and others in preparation for the Fortieth Annual Meeting of the IWC and participated in meetings of the IWC and its Scientific Committee. In addition, the Marine Mammal Commission consulted with the National Oceanic and Atmospheric Administration, the State Department, and others on matters related to participation of the United States in the IWC.

#### Pre-Meeting Activities

Certification of Japan -- Article VIII of the International Convention for the Regulation of Whaling of 1946 provides that any contracting government may grant a special permit to its citizens to take whales for purposes of scientific research and that any whales taken may be processed and sold according to the directions of the government of that member nation. The IWC's conservation program also provides that contracting governments afford the IWC and its Scientific Committee an opportunity to review the proposed permit and certain information on the proposed research activities. At the June 1987 IWC meeting, the Government of Japan submitted a research proposal to take 825 minke whales and 50 sperm whales from waters around Antarctica. The proposal was reviewed by the Scientific Committee according to criteria developed by the Committee and the IWC. Based on that review, the Committee identified a number of uncertainties regarding the proposed research protocol. In view of the Committee's findings, the IWC adopted a Resolution calling upon the Government of Japan to refrain from issuing the special permit until the uncertainties identified by the Scientific Committee were resolved.

As noted in the previous Annual Report, the Government of Japan responded by developing a revised research proposal involving the take of 300 Southern Hemisphere minke whales in the 1987-1988 whaling season. The revised proposal was submitted to the IWC after its June meeting, and a special meeting of the IWC Scientific Committee was scheduled for 15-17 December

1987 in Cambridge, England, to review the new proposal. In preparation for this meeting, the Marine Mammal Commission wrote to the U.S. Commissioner to the IWC on 12 November 1987 noting, among other things, that the revised proposal did not address the concerns raised by the IWC Scientific Committee during its review of the earlier proposal.

At the special IWC Scientific Committee meeting in December, participants differed on whether the revised research program satisfied the IWC's criteria for special permits. However, many nations participating in the meeting shared the Marine Mammal Commission's view that it did not. In view of the IWC Scientific Committee's findings, the IWC Commissioner for the United Kingdom submitted a proposed Resolution again calling upon Japan to refrain from issuing a special permit for the revised research proposal until identified concerns raised by the Committee had been resolved. The proposed Resolution was considered by a postal vote of IWC Commissioners with a voting deadline of 14 February 1988. Despite this pending IWC action, the Japanese whaling fleet's factory ship sailed for the Antarctic in late December 1987.

Early in February 1988, it was learned that Japanese whalers were killing Antarctic minke whales under a special permit for scientific research issued by the Japanese Government. Under provisions of two U.S. laws, the Packwood-Magnuson Amendment to the Magnuson Fishery Conservation and Management Act and the Pelly Amendment to the Fishermen's Protective Act, the Secretary of Commerce is required to notify the President when he determines that the nationals of a foreign country are conducting fishing operations, including whaling, in a manner that diminishes the effectiveness of an international fishery conservation program. In view of the above developments, the Secretary of Commerce wrote to the President on 9 February 1988, certifying that he had determined that nationals of Japan were conducting whaling operations in a manner that diminished the effectiveness of the IWC conservation program.

In his letter, the Secretary of Commerce cited the following points as the basis for his decision: the Resolution adopted by the IWC at its 1987 meeting calling upon Japan to refrain from issuing its special permit until uncertainties in the proposed research program had been resolved; the December 1987 IWC Scientific Committee meeting report which indicated that the revised Japanese research proposal did not succeed in resolving the Committee's uncertainties; and Japan's issuance of a special permit to take whales for scientific research and information indicating that whales were being taken under that permit.

The Packwood-Magnuson Amendment provides that the Secretary of State must immediately reduce by at least 50 percent the allocation of fish permitted to be taken from the U.S. Exclusive Economic Zone by any nation so certified. If remedial action by the offending nation is not taken within one year, all fish allocations must be withheld. At the time Japan was certified, it did not have a U.S. fishery allocation. In addition, under the Pelly Amendment, the President may direct the Secretary of the Treasury to prohibit imports of some or all fish products from a certified nation. Within 60 days of being advised of a certification finding, the President must advise Congress of any actions taken in response to the finding. Thus, the Secretary also advised the President in his letter that he was preparing recommendations for further steps that might be taken within the 60-day period for reporting to Congress.

On 15 February 1988, the Secretary of the IWC circulated the results of the IWC postal vote on the United Kingdom's proposed Resolution calling upon Japan to refrain from issuing a special permit for the revised whale research program. The Resolution, which required approval by a simple majority of Commissioners eligible to vote, was adopted by a vote of 19 in favor, 6 against, and 2 abstaining.

On 6 April 1988, the President wrote to the Speaker of the House and the President of the Senate to report on actions that were being taken in response to the certification of Japan. In his letter, the President noted that Japan had requested the opportunity to take 3,000 metric tons of sea snails and 5,000 metric tons of Pacific whiting from the U.S. Exclusive Economic Zone. Under the Packwood-Magnuson Amendment, the President noted that he was directing the Secretary of State to withhold 100 percent of the fishery allocation for those species, as well as any future fishery allocations, until the Secretary of Commerce determines that the situation has been corrected. The sanctions were the strongest possible under the Packwood-Magnuson Amendment. In addition, the President noted that he was asking the Secretary of Commerce, in cooperation with the Secretary of State, to monitor Japanese whaling practices, to report back to him by 1 December 1988 on further developments, and to work with other members of the IWC to bring about a halt to all whaling that diminishes the effectiveness of the IWC conservation program. In view of these steps, the President decided not to impose sanctions under the Pelly Amendment at that time.

Decertification of the Soviet Union -- As noted in previous Annual Reports, during the 1984-1985 Antarctic whaling season, the Soviet Union took more than 1,941 minke whales, causing the overall IWC Southern Hemisphere minke whale quota to be exceeded. Therefore, in April 1985, the Secretary of Commerce

certified to the President under provision of the Packwood-Magnuson and the Pelly Amendments that citizens of the Soviet Union were conducting fishing operations in a manner that diminished the effectiveness of the IWC conservation program. At the 1985 IWC meeting, the Soviet Union announced that it intended to suspend commercial whaling for technical reasons beginning with the 1987-1988 whaling season. However, its nationals continued to take whales commercially from the Antarctic Ocean in the 1986-1987 season despite the imposition of the moratorium provision under paragraph 10 (e) of the IWC Schedule of regulations.

As the Soviet Union had indicated in 1985, its citizens took no whales during the 1987-1988 Southern Hemisphere minke whaling season. Therefore, in view of its suspension of commercial whaling activity and its announced intention to comply with standards substantially equivalent to those of the IWC, the Secretary notified the President on 14 April 1988 that he was terminating his certification of the Soviet Union under both the Packwood-Magnuson and Pelly Amendments.

Bowhead Whales -- At its 1987 meeting, the IWC adopted an aboriginal/subsistence quota of 35 strikes for the Bering Sea stock of bowhead whales in the 1988 whaling seasons. This quota is allocated to Alaska Eskimos who take bowhead whales each year for cultural and subsistence purposes. As part of efforts to prepare a U.S. position on future quotas for this stock for the 1988 IWC meeting, the National Oceanic and Atmospheric Administration made available early in April 1988 a document entitled "Administrator's Initial Views on Bowhead Whale Information." The document analyzed potential recruitment rates for the Alaska bowhead whale population and cited information from a new draft contract report prepared for the Department of the Interior on Alaska Eskimo subsistence needs. The analysis of recruitment rates was based on a population estimate for the Bering Sea stock of bowhead whales accepted by the IWC (7,200 whales with a standard error of 2,400), and it concluded that annual recruitment may range from 55 to 173 whales for a population estimate of 7,200 whales. The new information from the draft Department of the Interior contract report suggested that present Alaska Eskimo subsistence needs would be satisfied by landings of 41 whales. Based on the information reviewed, the Administrator proposed that the United States recommend adoption of a three-year quota of 54 strikes or 41 landings per year at the 1988 IWC meeting.

The Marine Mammal Commission and its Committee of Scientific Advisors reviewed the above document and the draft Department of the Interior contract report entitled "Quantification of Subsistence and Cultural Need for Bowhead Whales by Alaska Eskimos" and, on 11 May 1988, provided comments to the National Oceanic and Atmospheric Administration. In its

comments, the Commission noted that if the actual population of bowhead whales was closer to the lower limit of the estimated range of the population size, rather than at the mid-point estimate of 7,200 whales, the proposed quota may not allow the stock to increase toward its maximum sustainable yield level as required by the IWC's aboriginal whaling subsistence management scheme. The Commission also commented that it believed it to be ill-advised for the United States to propose a three-year annual strike limit (54) that was more than 50 percent greater than the current strike limit (35) based, in large part, on a draft report of subsistence needs that had not been readily available for review by all interested parties.

#### The 1988 Meeting of the IWC

Membership and Participation -- Representatives of 29 of the IWC's 41 member nations participated in the IWC's Fortieth Annual Meeting, held in Auckland, New Zealand, on 30 May-3 June 1988.

Moratorium on Commercial Whaling -- In 1982, the IWC adopted a new provision, paragraph 10 (e), to its Schedule of regulations. The provision established catch limits for all commercial whaling at zero, beginning with the 1985-1986 pelagic and 1986 coastal whaling seasons, and provided that, by 1990 at the latest, the IWC would undertake a comprehensive assessment of the effect of this decision on whale stocks and consider modifying the provision and establishing catch limits other than zero. No action was taken at the 1988 meeting to change this provision and, therefore, catch limits for commercial whaling remained at zero for all stocks of whales during the 1988-1989 whaling seasons. Catch limits for commercial whaling will continue to be set at zero unless and until a three-quarters majority of the IWC's membership votes to modify Schedule paragraph 10 (e).

At the end of 1988, two nations, Norway and the Soviet Union, continued to maintain objections to Schedule paragraph 10 (e). Under the 1946 Whaling Convention, this action removes the obligation of their respective governments to comply with the requirements of this provision. Notwithstanding their respective objections, however, the Soviet Union, as noted above, suspended commercial whaling after the 1986-1987 Antarctic minke whaling season, and the Government of Norway expressed its intent in July 1986 to suspend commercial whaling after the 1987 whaling season. Both countries pursued their announced courses of action, and neither participated in commercial whaling in 1988. As noted in previous Annual Reports, pursuant to a 1984 agreement between the United States and Japan, the Government of Japan submitted a prospective withdrawal of its objection to paragraph 10 (e) in July 1986. The withdrawal took effect on 1 April 1988.

Thus, notwithstanding the killing of whales during the course of scientific research conducted under special permits (see below), all IWC member nations were refraining from commercial whaling at the end of 1988.

Comprehensive Assessment -- During an April 1986 meeting of the IWC Scientific Committee, a work plan and timetable were developed for conducting the comprehensive assessment required under Schedule paragraph 10 (e). As noted in previous Annual Reports, the IWC has supported various workshops and studies to help provide the basis for undertaking this assessment by 1990.

To consider progress and further work related to the comprehensive assessment, a Joint Working Group of the Scientific and Technical Committees of the IWC met shortly before the 1988 IWC meeting. Based on discussions during its meeting, the Joint Working Group recommended, and the IWC agreed, that funds be provided in the coming year for: (1) continuing contract studies on biochemical genetic research techniques to distinguish between whale stocks and holding a workshop on the analysis of tissue samples using such techniques; (2) completing analyses of Southern Hemisphere minke whale marking and sighting data for other Southern Hemisphere whales; (3) convening a workshop on procedures for managing whale stocks; (4) continuing field studies of Antarctic minke whales as part of the ongoing International Decade of Cetacean Research and analyzing data from previous cruises; (5) conducting surveys of right whales off South Africa; and (6) in cooperation with the Commission for the Conservation of Antarctic Marine Living Resources, convening a workshop on the feeding ecology of baleen whales in the Southern Hemisphere.

In addition to these actions, the Chairman of the IWC Scientific Committee noted that it is the Committee's intent to devote most of its 1989 Annual Meeting to the preparation of a report on progress towards the Comprehensive Assessment for presentation to the IWC in 1990.

Aboriginal/Subsistence Whaling -- As noted above, Alaska Eskimos harvest bowhead whales to meet subsistence and cultural needs and, during its 1987 meeting, the IWC adopted a one-year quota of 35 strikes for the 1988 whaling seasons. During the 1988 IWC meeting, the matter of a future quota for bowhead whales was considered. As part of deliberations on this matter, the United States presented the aforementioned report analyzing Alaska Eskimo nutritional, subsistence, and cultural needs. The report addressed various questions raised at previous IWC meetings concerning the data upon which estimates for subsistence need were based, and it concluded that, for 1989, Alaska Eskimo subsistence needs for bowhead whales would be met by landing 41 whales.

Based on the United States' report and deliberations during the meeting, the Technical Committee of the IWC recommended, and the IWC adopted, a three-year quota for the Bering-Chukchi-Beaufort Seas stock of bowhead whales. The quota allows an annual limit for each of the years 1989 through 1991 of no more than 44 strikes or 41 landings, whichever comes first. It also provides that up to 3 strikes not used in 1988, 1989, or 1990 may be reallocated to the following year.

Aboriginal catch limits for other stocks of whales were set as follows for the 1989 whaling seasons: 60 whales from the West Greenland minke whale stock; 23 whales from the West Greenland fin whale stock; and 12 whales from the central Atlantic minke whale stock. In addition, a three-year annual quota of 179 whales per year was adopted for the eastern North Pacific gray whale stock. At its 1987 meeting, the IWC had adopted a three-year quota of three humpback whales for each of the years 1987 through 1989 for St. Vincent and the Grenadines. No action was taken to alter that quota during the 1988 meeting.

Special Permits for Scientific Research -- As noted above, the IWC's conservation program provides that member nations may issue special permits to their citizens to take whales for purposes of scientific research. However, it also provides that member nations afford the IWC and its Scientific Committee an opportunity to review proposed permits. They also must submit certain information on the proposed research activities.

In view of the provisions of Schedule paragraph 10 (e) establishing a moratorium on commercial whaling and calling for a comprehensive assessment of whale stocks, the IWC and its Scientific Committee have devoted particular attention during recent meetings to matters pertaining to the issuance of special permits. In 1985, the Scientific Committee developed a series of guidelines for reviewing proposed permits and, in 1986 and 1987, the IWC adopted a series of resolutions providing advice to contracting governments on: criteria to be considered in issuing special permits; the disposition of whale meat and other products derived from whales taken; and actions to authorize special permits for certain research proposals. Although advice adopted through resolutions reflects the views of a majority of voting IWC members, the rules of the IWC provide that such advice is non-binding upon contracting governments.

As noted above, during its 1987 meeting, the IWC reviewed the proposal for a permit for scientific research submitted by Japan, and it adopted a resolution calling upon Japan to refrain from issuing a special permit for the proposed activities. During the 1987 meeting, it also reviewed a

scientific research proposal involving the killing of whales submitted by the Republic of Korea and an ongoing research program being undertaken in Iceland. Considering information submitted by the Republic of Korea and Iceland and comments thereon by the Scientific Committee, the IWC adopted separate Resolutions calling on the Governments of those two countries either to refrain from issuing or to revoke the special permits until uncertainties identified by the Scientific Committee are resolved to its satisfaction.

Following the 1987 IWC meeting, the Republic of Korea did not pursue its proposed research program. The Icelandic Government, however, did not revoke its special permit for research whaling, and Icelandic whalers continued to take whales. As discussed in the previous Annual Report, the United States and Iceland entered into discussions on Iceland's whale research program and possible United States actions under U.S. laws. Those discussions ended in September 1987. Among other things, it was agreed that, beginning in 1988, Iceland would submit its research program to the IWC Scientific Committee for review and carry out the Committee's scientific recommendations. In addition, the United States agreed it would not certify Iceland for taking 80 fin whales and 20 sei whales annually under its whale research program.

At the 1988 IWC meeting, Iceland submitted information on its ongoing research program, and Norway submitted information on a proposed research program involving the take of 35 North Atlantic minke whales. This information was reviewed by the IWC Scientific Committee. Considering findings noted in the Committee's report, the IWC adopted two separate Resolutions expressing the view that the Icelandic research program and the Norwegian research proposal did not satisfy all of the criteria set forth by the IWC in its 1986 and 1987 Resolutions pertaining to scientific research under special permits. Under terms of the 1987 IWC Resolution on Scientific Permits, contracting governments are requested either to refrain from issuing or to revoke special permits which do not meet all applicable criteria. The Government of Japan did not submit a research proposal to the IWC during the 1988 Annual Meeting.

Also during the 1988 Annual Meeting, the IWC adopted a resolution on procedures pertaining to intersessional meetings of its Scientific Committee and the review of proposals for special permits. The Resolution recommended that at least 60 days advance notice be given prior to holding an intersessional meeting of the Scientific Committee and that contracting governments refrain from issuing special permits reviewed at such special Scientific Committee meetings for at least 60 days following circulation of the Scientific Committee's Report. The post-meeting period was considered necessary to

provide the Chairman of the IWC time to consult with Commissioners on how to proceed on Committee findings.

### Post-Meeting Activities

Japan -- Following the 1988 IWC Annual Meeting, the Government of Japan submitted to the IWC a slightly revised research proposal that involved killing up to 330 Southern Hemisphere minke whales during the 1988-1989 whaling season. The proposal was distributed to members of the IWC Scientific Committee on 26 September 1988 with a request for comments from Committee members by 11 November. An intersessional meeting to review the proposal was not scheduled, however, because the new proposal was judged to be substantially similar to Japan's previous research proposal for the 1987-1988 whaling season.

On 20-21 September 1988, the Under Secretary for Oceans and Atmosphere of the Department of Commerce (who is also the U.S. Commissioner to the IWC) met with Japan's Minister of Agriculture, Forestry, and Fisheries and the Director General of Japan's Fisheries Agency in Tokyo to discuss the Secretary's ideas for resolving the whaling problem. The ideas involved compromises on both sides, including a decision by the Government of Japan not to permit further research whaling in the Southern Hemisphere. The Japanese participants responded on a preliminary basis that the ideas presented could not even serve as a basis for further discussion. Additional talks on the matter were not scheduled. Japanese officials subsequently advised the Under Secretary that Japan's research whaling fleet would depart for the Southern Hemisphere early in December.

As noted above, the President had asked the Secretary of Commerce, in consultation with the Secretary of State, to monitor Japanese whaling practices and to report back to him by 1 December 1988. On 1 December, the Secretary of Commerce advised the President of the above developments. In his report, the Secretary concluded that there had been no significant change in the circumstances which had led to him to certify Japan and he advised the President that he was therefore preparing recommendations for further sanctions to encourage Japan to embrace the IWC conservation program.

On 14 December 1988, the U.S. Commissioner to the IWC requested comments on Japan's new proposal from the Marine Mammal Commission. By letter of 20 December 1988, the Commission, in consultation with its Committee of Scientific Advisors, responded by noting that the new proposal was substantially unchanged from Japan's research proposal for the previous year. The Marine Mammal Commission stated that it therefore had nothing further to add to its letter of 12

November 1987 in which it had concluded that the Japanese proposal did not resolve the uncertainties identified by the IWC Scientific Committee.

On 17 December 1988, the factory ship for Japan's whaling fleet set sail for the Southern Hemisphere.

Iceland -- As noted above, the United States and Iceland reached an agreement concerning Iceland's whale research program in September 1987. Iceland agreed to submit its research program to the IWC in 1988 and thereafter and to follow the recommendations of the IWC Scientific Committee, and the United States agreed not to certify Iceland under applicable U.S. law for taking up to 80 fin whales and 20 sei whales annually. However, the material submitted by Iceland at the 1988 IWC meeting was not sufficient for the IWC Scientific Committee to resolve the uncertainties which it had identified during its 1987 meeting. Considering the Scientific Committee's report, the IWC therefore adopted a resolution at its 1988 meeting expressing the view that Iceland's research program still did not satisfy the criteria for special permits set forth in the relevant Resolutions adopted by the IWC in 1986 and 1987.

In light of actions taken at the IWC meeting, the United States and Iceland again entered into discussions following the 1988 IWC meeting on Iceland's research program and possible action under U.S. law. The meetings were held on 18-19 June 1988 in Reykjavik, Iceland, before additional whales were taken by Icelandic whalers. Also following the IWC's Annual Meeting, the Marine Mammal Commission wrote to the Secretary of Commerce on 20 June 1988 noting that, contrary to expectations, the Government of Iceland had made no showing at the 1988 IWC meeting of attempting to comply with the IWC Scientific Committee's recommendations. Therefore, unless there were immediate and substantive changes in the approach of Iceland prior to the taking of any whales, the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, recommended that the Government of Iceland be certified under the Pelly Amendment as acting in a manner diminishing the effectiveness of the IWC conservation program.

Based on the discussions between representatives of Iceland and the United States, the U.S. Ambassador to Iceland and Iceland's Foreign Minister exchanged letters on 22 June outlining the steps Iceland would take to improve the scientific basis of its research program and to reduce the number of whales taken. The terms of the agreement provided that: because research on fin whales began later in 1988 than in previous years, no more than 68 fin whales would be taken in 1988; no more than 10 sei whales would be taken, with this reduced take being for the purpose of research on cytogenetics

recommended by the IWC Scientific Committee; Iceland would increase krill sampling to improve information on prey availability; and Iceland would carry out five specific scientific recommendations identified by the IWC Scientific Committee during its 1988 meeting.

In addition, the exchange of letters put forth the understanding that, during the 1989 IWC meeting, Iceland would report on the following matters: the reasons why research on the ecological role of whales constitutes a reasonable and necessary contribution to the comprehensive assessment or a critical research need in its own right; the contributions of data gathered in 1986 and 1987 for estimating the ages of recruitment, the ages of sexual maturity, and pregnancy rates of sei and fin whales, including a comparison of those findings to data from earlier commercial catches; and the inferences that can be drawn regarding stock identities of fin and sei whales from electrophoretic and biochemical analyses conducted by Icelandic scientists. Based on the foregoing understandings, the United States agreed that Iceland's research program for 1988 would not diminish the effectiveness of the IWC conservation program.

As discussed below, however, a group of environmental and animal welfare organizations brought suit against the Secretaries of Commerce and State on 3 August 1988 for failing to certify that Iceland's 1988 whale research program was diminishing the effectiveness of the IWC conservation program under the Pelly Amendment. In addition, environmental groups took steps to encourage a voluntary boycott by commercial fish and fish product users in the United States and certain other countries against suppliers of Icelandic fish products. These non-government sponsored efforts resulted in the cancellation of several contracts between certain restaurant chains and suppliers and processors dealing in Icelandic fish.

Norway -- As noted above, during the 1988 IWC meeting, the Government of Norway submitted a research proposal involving the take of 35 minke whales. The IWC responded by adopting a resolution setting forth the view that the proposed research program did not meet all of its recommended criteria for proposed research activities. Therefore, after the 1988 meeting, U.S. officials advised representatives of the Norwegian Government that, based on available information on the proposed research and the IWC's actions at the 1988 meeting, the Secretary of Commerce would be faced with considering a new certification of Norway under the Pelly Amendment if Norway went forward with its proposed research program.

Representatives of Norway and the United States met in late July 1988 to discuss details of Norway's research proposal that were not fully explained at the IWC meeting. During the

meeting, Norwegian officials provided additional material on the proposed research program, which was designed to improve understanding of the Barents Sea ecosystem, and indicated that the research program was being further modified to better achieve its objectives.

On 29 July 1988, the Charge d'Affaires of Norway's Embassy in the United States and the Under Secretary for Oceans and Atmosphere for the U.S. Department of Commerce exchanged letters expressing views on the proposed research program. In his letter, the Norwegian official confirmed that: Norway's scientists were ready to comment fully on observations made during consideration of its research program by the IWC Scientific Committee; Norway fully intended to provide detailed and specific information on the manner in which the research is implemented at future meetings of the IWC; and it welcomed continued contacts between U.S. and Norwegian scientists on its North Atlantic minke whale research efforts.

In his letter, the Under Secretary for Oceans and Atmosphere noted that the information provided during the meeting gave a clearer understanding of the proposed research activities and that he welcomed Norway's commitment to provide the IWC with further details on its research program as well as the results of the research on an annual basis. He also noted that a preliminary review of the additional information was positive and he would provide a further response as soon as possible.

Also on 29 July, the National Marine Fisheries Service provided a copy of the materials received during the meetings with the Norwegian officials to the Marine Mammal Commission. The Service requested comments on the proposed activities. By letter of 5 August 1988, the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, responded to the Service. The Commission noted that the Norwegian scientists had made a good effort to explain the rationale for their research and the role of that research in developing a model to help manage human activities affecting the Barents Sea ecosystem. It also noted, however, that it was not entirely clear that the proposed sample size would be adequate to satisfy research objectives and it likely would require several years of additional sampling to yield meaningful results.

Notwithstanding these reservations, the Commission also noted that the proposed research was better justified than that put forward recently by other IWC members and that, given the scientific rationale and the small number of whales to be taken, the proposed activities appeared to be a legitimate scientific undertaking that would not reduce the effectiveness of the IWC conservation program. The Commission noted that

it would be in a better position to evaluate the long-term value of the research after the 1988 results have been analyzed and indicated that it would be pleased to review Norway's detailed research proposal to be submitted at next year's IWC Scientific Committee meeting.

On 31 August 1988, the Secretary of Commerce wrote to the President advising that he had reviewed matters pertaining to Norway's proposed 1988 research program and that he had determined that the proposed taking of whales, in conjunction with Norway's commitment to work within the IWC process, would not diminish the effectiveness of the IWC conservation program.

U.S. Review of Matters Pertaining to the Comprehensive Assessment and Special Permits -- In view of the increasing amount of work to be done for at least the next two years on the comprehensive assessment and the likely need for determinations under U.S. law on whether the taking of whales for research purposes by other members of the IWC would diminish the effectiveness of the IWC conservation program, the Marine Mammal Commission wrote to the National Oceanic and Atmospheric Administration on 7 November 1988. In its letter, the Commission noted that these matters involve complex questions and that plans to address them should be developed now. To help in this regard, the Commission suggested that a qualified cetacean data analyst be appointed full time for at least the next two years to perform tasks such as reviewing, analyzing, and critiquing data sets and statistical procedures critical to the comprehensive assessment and, as appropriate, analyses resulting from research conducted under special permits.

In addition, with respect to determinations under U.S. law on the killing of whales for research purposes, the Marine Mammal Commission noted that IWC guidelines call for reports of data and results to be put forward by nations wishing to extend their special permits. If such reports are not put forward in sufficient time for review by the IWC Scientific Committee, or if the Scientific Committee cannot conclude that the research is meeting critical research needs and/or contributing to the comprehensive assessment, the Commission expressed the view that further takings to continue that research be considered as diminishing the effectiveness of the IWC conservation program and thereby as justification for a certification finding under the Packwood-Magnuson and Pelly Amendments. With respect to timely submissions of interim reports, the Commission suggested that results of catches in the northern summer season should be made available prior to the next Scientific Committee meeting and that reports of catches in the austral summer season should be made available by January of the following year (i.e., within 9 to 10 months).

By the end of 1988, the Commission had not yet received a response from the National Oceanic and Atmospheric Administration to its 7 November 1988 letter.

### Litigation

As noted above, on 3 August 1988, environmental and animal welfare organizations filed a lawsuit against the Secretaries of Commerce and State seeking to enjoin the agreement entered into between the United States and Iceland on 22 June 1988. The plaintiffs alleged that the Secretary of Commerce, in entering into the agreement, acted arbitrarily: by reversing the U.S. position as to what Iceland must do to avoid certification under the Pelly and Packwood-Magnuson Amendments; by failing to certify Iceland when, under similar circumstances he had certified Japan; and by considering factors not related to Iceland's scientific whaling program in making his decision.

The plaintiffs also alleged that the Secretaries violated the National Environmental Policy Act by failing to prepare either an Environmental Impact Statement or an Environmental Assessment on the decision to enter into the bilateral agreement with Iceland and violated the Endangered Species Act by entering into the agreement without conducting a section 7 consultation. The Federal defendants filed an answer to the complaint on 3 October 1988. Except with respect to discovery issues, no briefs had been filed or hearings held at the end of 1988.

### The Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention)

The Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, commonly known as the Cartagena Convention, is part of the Caribbean Environment Program, one of eleven Regional Seas Programs developed and sponsored by the United Nations Environment Program. Regional Seas Programs seek to protect marine resources and habitats that are vulnerable to pollution by encouraging regional nations to commit financial and human resources to cooperative research and management programs. Each Regional Seas Program includes an Action Plan outlining needed environmental projects (e.g., watershed management, oil spill contingency planning, public awareness campaigns, environmental impact assessment, and protection and recovery of endangered species) and a Convention to provide a framework for agreement among Contracting Parties to cooperate in protecting and managing the regional marine environment.

The Action Plan for the Caribbean Environment Program was developed and approved in 1981. The Cartagena Convention,

which provides a complementary legal framework for the Action Plan, was concluded in 1983 and entered into force in 1986. Fifteen nations have ratified or acceded to the Convention and its Protocol on combating oil spills. At the end of 1988, 33 states and territories were participating in the Caribbean Environment Program.

The Convention calls for cooperation in: controlling marine pollution from ships, land-based and atmospheric sources, man-made structures at sea, and activities involving exploration and exploitation of the seabed; protecting and preserving rare and fragile ecosystems and the habitat of depleted, threatened, and endangered species; responding to emergencies caused by pollution; assessing the potential impacts of proposed activities on the environment and notifying any nation that could be affected by such impacts; and cooperating in scientific and technical matters, especially in the exchange of data that may be pertinent to the objectives of the Convention. The Convention also provides for concluding detailed agreements, or Protocols, as needs arise, to implement or augment it. To date, only one Protocol has been adopted. It provides for cooperation among Contracting Parties in responding to oil spill emergencies.

Article 10 of the Convention calls upon Contracting Parties to "take all appropriate measures to protect and preserve rare or fragile ecosystems, as well as the habitat of depleted, threatened, or endangered species" by establishing protected areas. When the Convention was concluded in March 1983, a resolution was adopted calling upon the Parties to develop a Protocol to provide protection for special areas and wildlife in the wider Caribbean region. The resolution encouraged "competent governmental and non-governmental organizations to prepare proposals for submission to the first meeting of the Contracting Parties after entry into force of the Convention."

The first meeting of the Contracting Parties was held jointly with the Fourth Intergovernmental Meeting of the Action Plan for the Caribbean Environment Program in Guadeloupe on 26-28 October 1987. Prior to the meeting, a coalition of non-governmental organizations, including Monitor International, the Center for Environmental Education (now the Center for Marine Conservation), Fund for Animals, Friends of the United Nations Environment Program, and Widecast-Antigua and Barbuda, prepared and transmitted a draft Protocol on Specially Protected Areas and Wildlife to the Contracting Parties for consideration in accordance with the Resolution mentioned above.

As noted in the Commission's previous Annual Report, the Contracting Parties met in Guadeloupe, noted the draft prepared by non-governmental organizations, and agreed that it

would be desirable to develop a Protocol on Specially Protected Areas and Wildlife in the Wider Caribbean Region. They also agreed that it would be desirable to develop a Protocol on land-based sources of pollution. In addition, the U.S. delegation noted the need to increase awareness of the problem of ship-generated marine debris and the need to amend the existing Protocol on oil spill emergencies to include other hazardous substances.

The United States offered to host a meeting of experts in the U.S. Virgin Islands or Puerto Rico in 1988 to prepare a draft Protocol on Specially Protected Areas and Wildlife for consideration at the second meeting of Contracting Parties to be held in Mexico City in 1989. The Contracting Parties accepted the U.S. invitation and a meeting of experts was held in St. Croix on 24-26 October 1988. To facilitate preparations for the meeting, the Department of State, in consultation with the National Oceanic and Atmospheric Administration, the National Marine Fisheries Service, the Fish and Wildlife Service, the National Park Service, the Environmental Protection Agency, the Marine Mammal Commission, and other interested Federal agencies, prepared and, in May 1988, provided a draft Protocol to the Executive Director of the United Nations Environment Program. The draft Protocol provided by the United States was used, in part, to prepare a draft negotiating text which was distributed by the United Nations Environment Program in September 1988.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviewed the draft Protocol prepared by the United Nations Environment Program and, by letter of 30 September 1988, provided comments to the Department of State. In its comments, the Commission noted that, as drafted by the United Nations Environment Program, the Protocol would: (1) defer establishment of procedures for identifying and designating areas and species meriting special protection until the first meeting of Parties (following adoption of the Protocol) rather than specifying the procedures in the Protocol itself; (2) focus narrowly on the identification and protection of rare and fragile ecosystems and rare, threatened, and endangered species rather than on the broad range of marine and associated ecosystems and key ecosystem components that make up the wider Caribbean region; and (3) provide that funding would be channeled through the Caribbean Action Plan, rather than independently, so that Contracting Parties apparently would be unable to insure that contributed funds were used exclusively for specified Protocol-related purposes. The Commission suggested that, in developing the U.S. position for the negotiating session to be held in St. Croix on 24-26 October, the Department of State consider the desirability of seeking: (1) revision of the general objective of the Protocol to provide for protecting more than rare and fragile ecosystems

and rare, threatened, and endangered species; (2) expansion of the definition section of the Protocol to include definitions of the terms "protected area" and "critical habitat"; (3) specification of the procedures whereby areas and species meriting protection would be identified and designated or listed as "protected areas" and "protected species"; (4) provisions for the development and implementation of coordinated, area-wide species recovery plans; (5) clarification of the functions and responsibilities of institutions that would be created by the Protocol; and (6) clarification of the process that would be used to develop and adopt budgets.

The Commission's comments and those from other agencies were used to develop U.S. positions on various aspects of the United Nations Environment Program draft Protocol considered during the 24-26 October 1988 Meeting of Experts held in St. Croix. Although progress was made during the St. Croix meeting, there was insufficient time to completely review and develop an agreed revision of the draft Protocol. It was tentatively agreed that the group would meet again for five full days early in April 1989 to complete development of a text which could be considered and adopted at the October 1989 meeting of the Convention Parties.

At the end of 1988, the Department of State, in consultation with the Commission and other Federal agencies, was preparing drafting suggestions to be provided to the United Nations Environment Program to assist in preparing a revised draft Protocol for consideration by the Group of Experts in April 1989.

The area covered by the proposed Protocol includes habitat for the endangered West Indian manatee, the endangered humpback whale, and the Caribbean monk seal, which is thought to be extinct. The Marine Mammal Commission believes that a properly structured Protocol can contribute significantly to the identification and protection of a number of species and habitats critical to their survival in the wider Caribbean region. In 1989, the Commission will continue to work with the Department of State, the National Oceanic and Atmospheric Administration, the National Marine Fisheries Service, the Environmental Protection Agency, the Fish and Wildlife Service, the National Park Service, other Federal agencies, and public interest groups to seek conclusion, adoption, and implementation of a functional Protocol.

Convention on International Trade  
in Endangered Species of Wild Fauna and Flora (CITES)

The Convention on International Trade in Endangered Species of Wild Fauna and Flora regulates trade among signatory nations in animals and plants that are or may become threatened

with extinction. The extent of trade control depends upon the extent to which a species is endangered which, in turn, is reflected by its inclusion on one of three Appendices to the Convention. Species included under Appendix I are those considered to be threatened with extinction; they also are or may be affected by trade. Species on Appendix II are not necessarily threatened with extinction, but may become so unless trade in them is strictly controlled. Appendix III includes species that any Party identifies as being subject to regulation within its jurisdiction for the purpose of preventing or restricting exploitation and for which the Party needs the cooperation of other Parties to control trade. There are 96 Parties to the Convention, including the United States.

Additions or deletions of species listed on Appendices I and II can be made by agreement of the Parties and, in the case of Appendix III, by individual Parties. Parties to the Convention meet biennially to consider, among other things, changes to the lists of species in the Appendices. The Sixth Conference of Parties to the Convention was held on 12-24 July 1987 in Ottawa, Canada, and is discussed in the previous Annual Report. The Fish and Wildlife Service acts as the lead agency on U.S. delegations to such meetings.

As noted in the Annual Report for Calendar Year 1986, the National Marine Fisheries Service suggested to the Fish and Wildlife Service that the United States submit a proposal to the Sixth Conference to delete northern elephant seals (Mirounga angustirostris) from Appendix II. This proposal was not put forward by the U.S. delegation, nor was it raised by other delegations during the Sixth Session. At the end of 1988, however, it was the Commission's understanding that the Fish and Wildlife Service would consider submitting such a proposal to the Seventh Conference of Parties, scheduled to be held in Lausanne, Switzerland, in October 1989.

With respect to other species of marine mammals, a proposal was put forward at the Sixth Conference of Parties by the Government of The Netherlands to list both the Atlantic and Pacific walrus (Odobenus rosmarus) on Appendix II. The Commission, in consultation with its Committee of Scientific Advisors, reviewed that proposal and available information on walrus populations in the Atlantic and Pacific Oceans and, on 28 April 1987, wrote to the Service recommending that the U.S. delegation oppose the proposal put forward by The Netherlands. The Service concurred with the Commission's assessment that neither the Pacific nor Atlantic walrus population was in danger of becoming threatened with extinction, and a U.S. position opposing its listing on Appendix II was adopted.

During the Sixth Conference of Convention Parties, representatives of the five walrus range states (Denmark, Canada, Norway, the Soviet Union, and the United States) held two informal meetings with proponents of the proposal to review recent information on the status of the species and applicable management measures. Based on the information presented and commitments made by the five range states to carry forward certain research and management actions, The Netherlands withdrew its proposal to add walrus to Appendix II. In satisfaction of one of those commitments, the Fish and Wildlife Service, in June 1988, published marking and tagging regulations that will assist it in monitoring the harvest of walrus for subsistence and handicraft purposes and in obtaining essential biological data needed to effectively manage the Alaska walrus population.

The only other suggested change in the Appendices involving marine mammals made during the Sixth Conference of Parties was a proposal submitted by the Government of Switzerland concerning the West African manatee (Trichechus senegalensis). This species is listed on Appendix II and, as part of a ten-year review of the status of species listed on the Appendices, consideration was given to removing the species from Appendix II or transferring it to Appendix I. After consideration, the West African manatee was retained on Appendix II. The chairman of the ten-year review committee, however, proposed that the newly established Animals Committee investigate and report on such trade problems as may exist for any of the four species of Sirenia. The proposal was referred to the Committee for consideration, and it is expected that the matter will be reviewed at the Conference of Parties in 1989.

In preparation for the Seventh Conference of Parties, the Fish and Wildlife Service published a 14 September 1988 Federal Register notice soliciting suggestions for additions to, removals from, or reclassification of species listed on the Convention's appendices. The public comment period closed on 13 December 1988 and, as of the end of 1988, no listing changes for marine mammals had been proposed.

### Arctic Research and Policy

Environmental factors in the Arctic influence regional and global climatic processes and living resources of national and international importance. Some of the world's most productive fishing grounds are found in or adjacent to Arctic areas. Marine mammals inhabiting Arctic and adjacent areas include more than ten pinniped species, more than ten cetacean species, the polar bear, the walrus, and the sea otter. Effective conservation of these and other wildlife species and prediction of global climate and weather patterns require

an understanding of the interrelationships between the physical and biological processes in the Arctic and adjacent areas. Conservation also requires knowledge of human activity and patterns of resource use. Obtaining this information requires cooperation among field scientists, research institutions, Federal and State of Alaska agencies, Native Alaskans, the private sector, and international organizations.

The U.S. Arctic Research and Policy Act, passed in 1984, provides authority to establish national policy, priorities, and goals for Arctic research and to coordinate Federal Arctic research programs to meet identified needs. To focus and help coordinate the overall Federal effort in Arctic research, the Act requires the development of a five-year Arctic research plan. The plan is to be developed by an Interagency Arctic Research Policy Committee in consultation with the Arctic Research Commission, the two administrative bodies established by the Act. The five-member Arctic Research Commission, appointed by the President, is charged with recommending Arctic research policy and priorities and promoting Arctic research, as well as providing guidance for developing the research plan. The Interagency Committee is comprised of representatives of Federal agencies with Arctic programs and is chaired by the National Science Foundation, the agency responsible for implementing U.S. Arctic research policy. Meetings of the Interagency Committee are held annually or as needed. The Interagency Committee is assisted in its work by a staff group which meets monthly. In addition to developing the research plan, the Interagency Committee's duties include developing a coordinated research budget and promoting coordinated research activities, including logistics, by working cooperatively with the Arctic Research Commission, state and local governments, and other countries.

International aspects of U.S. Arctic policy generally are considered by the Interagency Arctic Policy Group, established in 1971 and subsequently guided by National Security Decision Memoranda Numbers 144 and 90. The Policy Group, chaired by the Department of State, aims to develop a national policy for the Arctic in accordance with a broad directive on overall national interests in the Arctic and to assist in developing bilateral agreements.

Since early in 1987, the Marine Mammal Commission has participated in planning and policy meetings associated with the activities of the Arctic Research Commission, the Interagency Arctic Research Policy Committee, and the Interagency Arctic Policy Group. Background information and a description of these and other Arctic-related activities undertaken in 1988 are provided below.

## Arctic Research Plan

In July 1987, the Interagency Arctic Research Policy Committee, pursuant to the Arctic Research and Policy Act, transmitted to the President and the Congress the United States Arctic Research Plan.<sup>4</sup> In preparing the Plan, the Interagency Committee sought the advice of Federal and State of Alaska agencies, the Arctic Research Commission, the Arctic scientific community, the private sector, public interest groups, and Alaska residents.

The Plan describes national research needs and priorities in the areas of national security, resource development, and acquisition of new scientific knowledge in the Arctic. The Plan is intended to serve as a guide for Federal agencies as they plan and implement Arctic programs and responsibilities. It describes Arctic research programs currently being conducted or sponsored by Federal agencies, identifies additional programs necessary to better address national issues, and offers suggestions for interagency and interdisciplinary cooperation. Research issues that cut across most disciplines, such as remote sensing, data management, logistics, and involvement of Arctic residents in research, are noted as areas requiring further evaluation and consideration by the Interagency Committee in subsequent revisions of the Plan.

The Arctic Research and Policy Act requires a biennial update of the Plan. In preparing the revised Plan, due in July 1989, the Interagency Committee staff group, including a Marine Mammal Commission representative, met in 1988 to: assess preliminary steps needed to improve the existing Plan; analyze the status of existing programs; assist agencies in developing short- and long-term cooperative interagency research objectives; and evaluate research-related activities. A first draft of the revised Plan was being formulated at the end of 1988.

The revised Plan will include a section on coordinated interagency programs. Because of agency interest in studies of global climate and climatic change, the focus of coordinated programs is likely to be the role of the Arctic in global environmental change. Better understanding of Arctic processes, including biological and physical aspects of change, as well as human response to climate change, will improve forecasting of environmental conditions such as weather, sea-ice formation, and ocean dynamics, which in turn will help to identify actions

---

<sup>4</sup> Copies of the Plan are available from the Polar Coordination and Information Section, Division of Polar Programs, National Science Foundation, 1800 G Street, N.W., Washington, D.C. 20550.

necessary to improve living conditions for Arctic residents and to develop ecologically sound approaches to resource development.

The revised Plan will include recommendations concerning needed studies of Arctic marine ecosystems, including several proposed studies regarding marine productivity, ice-edge ecosystems, and sea-ice processes by the National Oceanic and Atmospheric Administration, the National Science Foundation, and the Office of Naval Research. These recommendations will be based in part upon a Commission-sponsored study conducted from 1985 through 1988 by the National Research Council's Committee on Arctic Marine Science. The report of this study, entitled "Priorities in Arctic Marine Science," was issued by the National Academy Press in 1988. The report identifies two areas of Arctic marine research requiring further emphasis: (1) ecosystem dynamics of the Arctic shelf and adjacent seas; and (2) circulation of the Arctic Ocean.

To help disseminate information on Government-sponsored Arctic research programs, the National Science Foundation, on behalf of the Interagency Arctic Research Policy Committee and in cooperation with the Arctic Research Commission, publishes the journal, Arctic Research of the United States.<sup>5</sup> The biannual journal is aimed at national and international audiences of government officials, scientists, engineers, educators, private and public groups, and residents of the Arctic. In the future, the Marine Mammal Commission plans to contribute an article describing its Arctic-related activities for publication in the journal.

In 1989, the Commission will continue to provide assistance in updating and encouraging cooperative implementation of the United States Arctic Research Plan.

#### Arctic Data Management

The Arctic Research and Policy Act charges the Arctic Research Commission and the Interagency Arctic Research Policy Committee with identifying methods to improve the management and dissemination of Arctic environmental data. Under the auspices of the Interagency Committee, the National Oceanic and Atmospheric Administration, the National Aeronautics and Space Administration, the National Science Foundation, and the U.S. Geological Survey cosponsored a workshop on 21-24 March 1988 to consider the data standards and formats and the computer

---

<sup>5</sup> Copies of the journal are available from the Polar Coordination and Information Section, Division of Polar Programs, National Science Foundation, 1800 G Street, N.W., Washington, D.C. 20550.

technology needed to establish an Arctic environmental data system. Representatives from a broad range of U.S. and Canadian Government agencies, including the Marine Mammal Commission, and from several universities participated in the Workshop.

The Workshop report, published and distributed by the National Oceanic and Atmospheric Administration, notes that a successful Arctic data system would have to be coordinated with and contribute to several ongoing efforts to establish data management systems for national and international programs related to global environmental change and to support the study of Arctic ecosystems.<sup>6</sup> The data entered into this system should be accessible and useful to Arctic scientists, residents, and resource managers. Consequently, the report recommends that the Interagency Arctic Research Policy Committee initiate efforts to: develop an Arctic environmental data directory; create a multi-organizational working group to help establish a data management system; determine what technology should be used to ensure that data would not be lost or altered if the technology changes; and define the categories of data needed to understand global and Arctic environmental changes.

At its meeting on 2 May, in which Commission representatives participated, the Interagency Committee endorsed the Workshop recommendations. The Committee noted that the next step should be to create a multi-organizational working group to develop an Arctic environmental data directory and that this task should be done in consultation with the ad hoc Interagency Working Group on Data Management for Global Change, formed in June 1987 by the Committee on Earth Science of the President's Office of Science and Technology Policy. This ad hoc Working Group is tasked with creating a national data system for global change research by 1995 that is consistent across agencies and involves and provides support to universities and other user communities. Linking an Arctic directory with global change data is important because some Arctic processes affect global climate and some global climate processes affect the Arctic. The Arctic environmental data directory would be a useful prototype for the global change directory, a good source of historical information about Arctic conditions, and an appropriate repository for monitoring data.

In June 1988, the Arctic Environmental Data Directory Working Group was constituted with representatives from Federal agencies holding Arctic environmental data (the U.S. Geological

---

<sup>6</sup> Copies of the Report of the Arctic Environmental Data Workshop are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

Survey, the National Science Foundation, the National Aeronautics and Space Administration, and the National Oceanic and Atmospheric Administration) and from involved scientific organizations and institutions. The Working Group is coordinating the entry of references to data sets from each member's organization into the data directory. Once this process is completed, training courses and publications will be established to ensure that the data directory is available to the research community and other users.

### Arctic Logistics

Many Arctic areas of particular scientific interest are inaccessible except by icebreaking ship, aircraft, or satellite. Arctic research is generally more expensive than research in lower latitudes because of the logistic requirements. No single agency has all the required logistic support or responsibility for coordination of Arctic logistics. Facilities and platforms generally are managed by individual agencies according to agency responsibilities, budget, need, and schedule. Consequently, other agencies and researchers often are unaware of existing platforms and facilities. Logistical platforms that require multi-agency commitments for development, maintenance, or use -- e.g., a dedicated polar research vessel -- are particularly difficult to obtain and support. Yet, the lack of such facilities inevitably limits the scientific capabilities of the scientists and institutions, the agencies, and the Nation.

The Arctic Research and Policy Act requires the Arctic Research Commission and the Interagency Arctic Research Policy Committee to consider the logistical planning and support of Arctic research, as well as scientific research programs themselves. In July 1988, the Arctic Research Commission issued a report on logistic support of Arctic research. Among other things, the report notes that an Arctic logistical system should be developed to support scientific opportunity and national needs, not to dictate scientific priorities. The report also recommends that the United States charter an Arctic research vessel with icebreaking capabilities with an option to purchase over the long-term. In 1988, the Interagency Arctic Research Policy Committee established a sub-group, chaired by the National Oceanic and Atmospheric Administration, to evaluate Arctic logistics and to compile a directory of all logistic facilities and platforms available through Federal and state agencies to support Arctic research. Directory entries will provide information on ownership, management, and availability. A draft report is expected early in 1989.

## Ship Design

Research by U.S. scientists in Arctic seas, which are seasonally or permanently covered by ice, is severely restricted by the lack of a dedicated research vessel capable of operating in sea ice. Therefore, national Arctic marine interests in the field of biology, atmospheric sciences, and oceanography are not being given the attention required for a thorough understanding of the region and the potential impact of environmental disturbances. Multi-disciplinary studies, logistically supported by suitable ice-worthy ships, are the acknowledged requirement for detailed and long-term examination of these topics. Other nations which have Arctic interests are better equipped in this regard than is the United States.

The U.S. national concern and responsibility for Arctic marine mammals are most evident in the Bering, Chukchi, and Beaufort Seas, all of which are dominated for several months of the year by sea ice. U.S. scientists have for several years managed to visit these seas when seasonally ice-covered only as guests aboard Soviet or West German ships and occasionally on U.S. Coast Guard icebreakers. Marine mammal species of the region are important subsistence resources for coastal Native peoples. The understanding of their life history, abundance, distribution, and integration into Arctic marine ecosystems requires ready access to their environment throughout the year. Knowledge acquired by this means is essential for intelligent ecosystem and marine mammal management.

Much of the mammal and bird activity is concentrated at or near the ice edges and in the southern few miles of sea ice. There are some indications that polynyas, areas of open water deeper within the ice, may also be regions of intense biological activity important to some marine mammals. These areas are mostly in first-year ice. Scientific operations within the ice require a sturdy, specially designed ship having an ice-breaking capability and hull strength sufficient to assure its maneuverability and safety. It requires enough endurance to sustain long independent cruises distant from sources of supplies and assistance. It must be able to withstand besetting in dense ice which may occasionally be encountered, and it must also be able to operate in high-latitude open seas. A design intended to satisfy these requirements was developed in 1977-1982 by the National Science Foundation and the Alaska Council on Science and Technology.

## International Arctic Science Committee

Arctic countries share similar environmental conditions on their northern borders, Native peoples who now are residents of separate nations, expanded access to and development of

resources, and the need for information on a variety of topics ranging from the effects of technological development on Native peoples to the status of fish and wildlife populations. Coordination of scientific research and cooperative use of research platforms and facilities would improve the contribution of Arctic science to resolving Arctic problems and to world science. The scientific community thus has long sought to establish an international body to coordinate research and to organize the exchange of information regarding Arctic science.

In June 1986, the Chairman of the Arctic Research Commission hosted a meeting of Arctic scientists who were participating in an Antarctic scientific meeting in San Diego, California, to discuss possible interest in establishing an international Arctic science committee. Participants agreed on the desirability for such a group and for further discussions. Subsequently, representatives of Canada, Denmark (for Greenland), Finland, Iceland, Norway, Sweden, the Union of Soviet Socialist Republics, and the United States met in Oslo, Norway, in February 1987 and in Stockholm, Sweden, in March 1988, and agreed to develop a proposal for an International Arctic Science Committee. Representatives from the National Science Foundation and the Arctic Research Commission participated in the meeting. The meeting report notes that the objectives of the committee would be to: maximize the scientific knowledge of the Arctic necessary to develop resources and manage the environment; determine priorities for Arctic research; increase the efficiency and effectiveness of scientific resource and facility use; promote interdisciplinary programs; improve the cooperation and exchange between scientists; and ensure that Arctic research contributes to world science. Discussions also included the possible roles, guiding principles, structure, and scientific agenda for the proposed international scientific organization. A Planning Group, composed of representatives of five of the eight countries previously noted, was established to develop founding articles for the organization. It subsequently met in Moscow, U.S.S.R., in July 1988 and in Stockholm, Sweden, in October 1988. An expanded Planning Group composed of representatives of all eight countries met in Leningrad, U.S.S.R., on 6-8 December 1988 and completed draft founding articles for the organization.

Although the proposal calls for a non-governmental organization, there was interest in the U.S. Arctic scientific community in involving appropriate governmental bodies in the negotiations to assure full and open communication of ideas and issues regarding the possible establishment of the committee. The Interagency Arctic Policy Group staff, including a Commission representative, was asked to review documents and provide advice on substantive matters related to the formation of the Committee. A representative of the National Science Foundation was asked to head the U.S. delegation and report

back to the Policy Group staff. The Policy Group staff provided background papers and guidance for each of the informal meetings of the Planning Group previously mentioned. In preparing for the most recent meeting in Leningrad, the Policy Group developed and advised the National Science Foundation representative of U.S. positions on several key issues. In particular, the Policy Group noted that the International Arctic Science Committee should be a broadly based, open, non-governmental organization which would promote and coordinate, but not govern, scientific cooperation in the Arctic and that the U.S. representative should take such steps as might be possible to guide the development of a proposal to satisfy these requirements.

On 23 December 1988, the State Department transmitted informally a draft copy of proposed Founding Articles for the International Arctic Science Committee. In 1989, the Marine Mammal Commission will comment on the draft Founding Articles and will continue to provide advice on establishment of the proposed International Arctic Science Committee.

#### Scientific Organization for the North Pacific

At the same time that discussion of the International Arctic Science Committee was underway, representatives of Federal agencies, including the Marine Mammal Commission, and the U.S. scientific community began discussions to develop a convention for an international marine science organization for the North Pacific Ocean and Bering Sea. Increased scientific understanding of the North Pacific Ocean and Bering Sea is necessary to conserve living marine resources and to describe and predict physical oceanographic conditions and processes. Despite this need, basic and applied science programs necessary to reliably assess and monitor the nature and dynamics of marine ecosystems in the North Pacific have not kept pace with exploitation of resources. This is due in part to the fact that the study of large marine ecosystems, which include international waters and overlap national jurisdictions, requires effective international cooperation.

In September 1987, a concept paper on a possible marine science organization for the North Pacific Ocean and Bering Sea was transmitted to the State Department by the Canadian Embassy, along with an invitation to participate in a meeting on 8-9 December 1987 in Ottawa, Canada, to exchange views on the paper. The invitation was also extended to the Governments of Japan, the People's Republic of China, and the Union of Soviet Socialist Republics. All invited nations sent representatives to the meeting. Representatives from the National Oceanic and Atmospheric Administration, the Department of State, the U.S. Embassy in Ottawa, and the U.S. scientific community participated in the meeting. It was agreed that an organization might be useful to foster scientific cooperation

in the area, that cost-effectiveness should be considered in all aspects of the proposed organization, and that further consultation should take this into account. These points were reiterated by a Commission representative at a meeting on 5 February 1988 at the Department of State to discuss the accomplishments of the Canadian meeting.

The Canadian delegation followed the meeting by distributing, in September 1988, two draft proposals for a Convention for an International North Pacific Marine Science Organization. The proposals were identical except that one provided for a coordinating scientific body. On 27 October 1988, an inter-agency group, including a Commission representative, met to discuss the Canadian proposals and a draft paper describing possible benefits of U.S. participation in the proposed organization. On 4 November 1988, the Commission received draft papers from the Department of State suggesting U.S. positions on the proposed organization in general terms and, specifically, on the Canadian drafts. The Commission subsequently provided suggestions for ensuring that the structure and function of the organization complements, rather than duplicates, the efforts of other organizations, such as the proposed International Arctic Science Committee described above, and that the scientific priorities include consideration of the scientific bases for conservation of marine living resources.

The Commission also expressed concern that, since the establishment of the organization intends to bring the collective scientific knowledge and resources of participating nations to bear on scientific issues for which one country's expertise or resources might be insufficient, the organization should be structured to facilitate free and open scientific exchange among its members and adhering bodies and to encourage participation by knowledgeable and interested experts from all parts of the scientific community. The Commission noted that the scientific priorities of the organization should be established by a scientific body, in consultation with subsidiary groups of specialists, to facilitate scientific openness and the development of expert scientific opinions.

On 14-15 November 1988, a meeting was held in Sydney, British Columbia, to discuss the Canadian draft conventions and related issues. Although a formal report had not been received by the end of 1988, the Commission was advised that: ocean scientists from all invited countries except Japan participated; all countries agreed to proceed with drafting a convention on living resources and fisheries; a draft should be made available by 1 April 1989; and, based on the availability of the draft convention, a meeting to complete a draft negotiating text and a plenary meeting to adopt the convention should be held in July 1989 and before the end of 1989, respectively.

In 1989, the Commission will continue to work with the Department of State to establish a marine scientific organization for the North Pacific Ocean and Bering Sea.

#### U.S./U.S.S.R. Environmental Agreement

The U.S./U.S.S.R. Agreement on Cooperation in the Field of Environmental Protection was signed in 1972. Among other things, the agreement provides a forum for discussion of marine mammal issues in the North Pacific.

In 1973, a Marine Mammal Joint Working Group was established under Area V of the Environmental Agreement. Since 1976 this group has been known as the U.S./U.S.S.R. Marine Mammal Project. The goal of the Project is to conduct cooperative research on the biology, ecology, and population dynamics of marine mammal species of interest to both countries, with the objective of developing methods for the management and protection of these animals. Approximately once each year, delegates from both countries exchange schedules of activities to be conducted under the Marine Mammal Project and agree on the number of participating scientists and the nature of each project to be conducted during the following year. Publications and statistical data on harvests, as appropriate, have been exchanged, and studies have been conducted concerning the walrus, ice seals, the northern sea lion, the sea otter, the northern fur seal, and several cetacean species. Representatives of the Commission and its Committee of Scientific Advisors on Marine Mammals participate in these scientific meetings.

The ninth meeting of the Marine Mammal Project was held in Tallin, Union of Soviet Socialist Republics, on 23-30 September 1988. The report of the meeting recommends that the Joint Committee of the U.S./U.S.S.R. Environmental Agreement consider the desirability of establishing an international convention on conservation of marine mammals in the North Pacific Ocean to increase the effectiveness of conservation measures, including rational use of marine mammals.

The Environmental Agreement also provides for cooperation in legal and administrative structures for the management and protection of living resources under Area XI, Legal and Administrative Measures for Protection of the Environment. At the tenth (1986) meeting of the U.S./U.S.S.R. Joint Committee, participants agreed to initiate a study of Soviet and U.S. laws relating to environmental protection and conservation of living resources in the Bering Sea, a conference for which the Marine Mammal Commission has provided partial support (see Chapter XI). In response to this agreement, the Council on Environmental Quality, the U.S. adhering body for Area XI, and the Center for Marine Conservation are co-sponsoring a Conference on the Shared Living Resources of the Bering Sea.

The purposes of this conference are to identify opportunities for jointly enhancing protection of the Bering Sea environment; to consider the foundation of international law, particularly bilateral agreements, with respect to managing and protecting migratory species and shared natural resources; and to compare and discuss applicable domestic statutes and regulations. The Conference is scheduled to be held on 6-8 June 1989 in Fairbanks, Alaska. Representatives from the U.S. and Soviet Governments, the State of Alaska, municipal and village or tribal governments, trade associations and industry, Native peoples, and public interest groups will be invited to participate in the Conference.

#### Polar Bear Agreement

As noted in Chapter III, the International Agreement on Conservation of Polar Bears was concluded in 1973 by the Governments of Canada, Denmark, Norway, the United States, and the Union of Soviet Socialist Republics, and entered into force in 1976. The signatories to the Agreement designated the Polar Bear Specialist Group, which was established in 1967 by the International Union for the Conservation of Nature and Natural Resources, to act as an advisory group to facilitate discussion of scientific issues and exchange of information relating to conservation and management of polar bears. The Group met in October 1988 in Sochi, U.S.S.R., to exchange research and management information and to discuss possible cooperative research programs.

In 1989, the Commission will continue to work with the Interagency Arctic Research Policy Committee, the Arctic Research Commission, and the Interagency Arctic Policy Group to help develop and implement U.S. Arctic research policy and programs. Further, the Commission will devote attention to a careful examination of issues relating to polar bear conservation, including the question of U.S. compliance with the Agreement on Conservation of Polar Bears.

## CHAPTER VI

### IMPACTS OF MARINE DEBRIS

The tendency of marine mammals, sea birds, turtles, fish, and invertebrates to become entangled in net fragments, packing bands, and other synthetic materials lost and discarded at sea has been recognized for many years. More recently, problems caused by ingestion of plastic bags and other plastic materials by marine animals and the fouling of beaches and shorelines by all types of flotsam also have become increasingly apparent. Plastic debris represents a worldwide pollution problem that is particularly acute in certain ocean areas. For example, in the North Pacific Ocean, debris-related injuries and mortality may be contributing to declines in populations of North Pacific fur seals, Hawaiian monk seals, northern sea lions, harbor seals, and a number of other marine species.

Since the early 1980s, the Marine Mammal Commission has played a major role in focusing domestic and international attention on ways to better assess and reduce the extent of the problem for marine mammals and other species. The Commission's past efforts have been discussed in its previous Annual Reports. Activities undertaken by the Commission and others during 1988 are discussed below.

#### Background

Since the early 1950s, plastics have become commonly used for more and more purposes. The growing presence of these and other synthetic materials has led to a corresponding increase in the amount of plastic debris entering the marine environment. Many of the products manufactured from such materials degrade very slowly. Those that float remain suspended at the sea surface for extended periods of time and those that sink may remain on the sea floor for years or even decades. As the amount of such debris increases, so too does its threat to marine mammals, sea birds, turtles, fish, and crustaceans. These organisms become entangled in loops and openings of floating and submerged debris and they ingest items, such as plastic bags and small plastic objects, because these may resemble natural prey. Animals that become entangled may drown, lose their ability to catch food or avoid predators, or incur wounds and infections from the abrasion of attached debris. Ingested plastics may block digestive tracts, damage stomach linings, or reduce feeding drives.

Until recently, the magnitude of these threats was masked by the size of the ocean, the deceptively simple nature of

the threat, the erroneous perception that chance encounters between marine animals and debris would be unlikely, and an absence of large numbers of marine animals being found on beaches or at sea strangled, drowned, starved, or choked by marine debris. It is becoming apparent, however, that plastic debris may be concentrated through disposal patterns, winds, and ocean currents in coastal areas where marine mammals and other species are most likely to occur. In addition, many species actively seek out marine debris because of the associated prey species attracted by the cover it provides, because it represents an object of play, or because the debris itself may resemble natural prey. Thus, encounters between certain marine species and marine debris may be relatively common. At the same time, however, evidence of such encounters may not be readily apparent because animals affected at sea may be consumed by predators, decompose, sink, or be scattered.

The potential magnitude of these effects became apparent at an International Workshop on the Fate and Impact of Marine Debris held on 27-29 November 1984 in Honolulu, Hawaii. As noted in previous Annual Reports, this Workshop was convened by the National Marine Fisheries Service at the recommendation of and with initial support from the Marine Mammal Commission, which also provided initial terms of reference for the Workshop. The results of the Workshop identified an urgent need for: educating vessel operators and others about the marine debris problem; regulating the disposal of synthetic materials; and developing better data to assess related impacts on living marine resources.

In response to concerns identified during the Workshop, Congress appropriated funds to the National Marine Fisheries Service in Fiscal Year 1985 to initiate a research and management program. Congressional support for this Program has been carried forward since then. In addition, other Federal agencies have become increasingly involved in addressing related aspects of the problem. For example, the Coast Guard and the State Department have pursued efforts to ratify and implement Annex V of the 1978 Protocol Relating to the Convention for the Prevention of Pollution from Ships, which, among other things, prohibits the disposal of plastics from ships at sea; the Environmental Protection Agency has supported a study to assess the nature and extent of problems created by plastic pollution in the marine environment; and the National Marine Pollution Program Office has factored the problem of plastic pollution into its Federal Plan for Ocean Pollution Research, Development, and Monitoring.

The Commission has assisted these efforts while also taking steps to support related research and increase international awareness and involvement. Among other efforts, the Commission has: supported an analysis of domestic and

international authorities related to the problem of marine debris; funded studies to document and clean up debris on beaches; provided relevant background information for a global study of the problem by the United Nations Food and Agriculture Organization; brought the problem of marine debris to the attention of parties to the Convention on Conservation of Antarctic Marine Living Resources for responsive action (see Chapter V); encouraged the Intergovernmental Oceanographic Commission to develop a manual on procedures for monitoring marine debris; and provided information on the issue to scientists and government officials in New Zealand and Australia.

#### Domestic Activities in 1988

During 1988, the Commission focused considerable attention on efforts to strengthen the effectiveness of domestic programs involved in addressing problems created by marine debris. In particular, it continued to work with the National Marine Fisheries Service in developing and implementing the Marine Entanglement Research Program, and participated on a Marine Debris Task Force established by the White House Domestic Policy Council to assess and strengthen the response of Federal agencies to the marine debris problem.

#### The U.S. Marine Entanglement Research Program

As noted earlier, each Fiscal Year since 1985, Congress has appropriated funds to the National Marine Fisheries Service to support efforts to resolve problems created by marine debris. In appropriating funds for this work, Congress also directed that the Service obtain the concurrence of the Marine Mammal Commission on how those funds are to be spent. Thus, in 1985, the Commission, in consultation with the Service, developed a program plan outlining priority tasks to be undertaken during the first year of work. Since 1985, the Service has developed annual recommended program plans which have been reviewed and approved by the Commission.

Activities supported by the National Marine Fisheries Service to address marine debris problems are carried out through its Marine Entanglement Research Program. For the first year of work, Congress appropriated \$1,000,000 in Fiscal Year 1985. For each of Fiscal Years 1986, 1987, and 1988, Congress appropriated \$750,000. Actual amounts spent to support the program have been somewhat lower than appropriated levels due to requirements of the Balanced Budget and Emergency Deficit Control Act and other reasons. For example, in Fiscal Year 1988, \$685,000 was allocated by the Service for the Marine Entanglement Research Program.

To begin developing program plans for Fiscal Year 1988, the Service convened a meeting in Seattle, Washington, on 30 June-1 July 1987. Representatives of the Commission participated in that meeting, and, based on its results, the Service developed a proposed Program Plan, which was transmitted to the Commission for review on 4 December 1987. The Plan recommended allocating funds among 19 tasks, 11 of which were continuations of projects begun in previous years. Among the projects to be continued were: education and public awareness efforts; monitoring high seas squid drift net fishing in the North Pacific Ocean; monitoring and destroying accumulations of marine debris hazardous to Hawaiian monk seals in the Northwest Hawaiian Islands; and monitoring entanglement of pinnipeds on the California Channel Islands.

In addition, the Service proposed eight new projects: planning and organizing a Second International Conference on Marine Debris; assessing the feasibility of using technology for controlled-lifetime plastics to manufacture certain plastic items; assisting a remote fishing port in the Aleutian Islands in developing a system to receive waste fishing gear and other ship-generated garbage returned to port by regional fishermen; two studies on the impact of entanglement of North Pacific fur seals; assessing the effects of pollutants along drift lines (*i.e.*, lines of floating material concentrated by winds, tides, or ocean currents) on sea turtles; and a cooperative study with the National Park Service to assess and monitor debris accumulation rates at selected National Seashores.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the proposed Program Plan and, by letter of 12 January 1988, provided comments to the Service. In its letter, the Commission noted that the Program Plan was well done and that it addressed high priority actions needed to better define and resolve critical problems. With the exception of two proposed tasks, the Commission concurred with the Service's task and funding proposals and recommended that the Service immediately implement the Plan.

The two tasks for which the Commission withheld approval involved studies to monitor and assess entanglement rates of North Pacific fur seals. In its letter, the Commission noted that the Service had scheduled a Workshop for the end of January to assess possible methods for determining the potential magnitude of entanglement-related mortality on northern fur seals, and that a final decision on support for the two fur seal proposals should be deferred until after that Workshop. The Commission therefore recommended that the Service evaluate and, as appropriate, revise its fur seal related proposals in light of Workshop results and then resubmit them for review by the Commission.

As discussed in Chapter III of this Report, the Service convened its Workshop on fur seal entanglement-related research needs on 28-29 January 1988 at the Northwest and Alaska Fisheries Center in Seattle. Participants reviewed possible and proposed research on the role of marine debris in the fur seal population decline and, based on preliminary results from the Workshop, the Service developed three new or revised research proposals related to fur seal entanglement. The three proposed studies involved: (1) continuing an existing study to collect and synthesize available data on entanglement of northern fur seals in marine debris; (2) tagging and monitoring entangled juvenile male fur seals to assess survivorship rates; and (3) comparing haul-out patterns of entangled and unentangled juvenile male fur seals to help interpret tag resighting data. On 3 May 1988, the Service provided the Commission with details on the research proposals for its review and approval.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the three proposals and, by letter of 27 May, provided comments to the Service. In its letter, the Commission noted that it agreed with the Service that work should proceed on all three studies. However, the Commission noted that funding for the studies should be provided by funds from the Service's fur seal research program rather than the Marine Entanglement Research Program unless it was clear that all other fur seal research was of higher priority. Therefore, the Commission conditioned its concurrence for allocating Marine Entanglement Research Program funds to the three fur seal studies on a determination by the Service that no research supported under the fur seal research program in Fiscal Year 1988 was of lower priority.

In addition, the Commission noted in its letter that it was not clear whether the proposed study to synthesize information on fur seal entanglement could be accomplished within given time and cost estimates. The Commission therefore recommended that the Service adopt a phased approach in which most funding would be withheld pending development of a detailed project description and review and acceptance of the project design by the Commission and other appropriate reviewers.

On 7 July 1988, the Service responded to the Commission's 27 May letter. In its letter, the Service stated that all Fiscal Year 1988 fur seal research ranked higher in priority than the proposed entanglement studies and that it therefore planned to fund the three fur seal projects with Fiscal 1988 entanglement funds. In addition, the Service provided the Commission with a detailed project outline for the study to synthesize information on fur seal entanglement. On 1 August, the Commission, in consultation with its Committee of Scientific Advisors, wrote to the Service noting that the detailed program

plan was much improved and that, based on the expanded project description and a summary of completed and remaining project activities, it agreed with the Service that it would be appropriate to fund the project under the Fiscal Year 1988 Marine Entanglement Research Program.

For Fiscal Year 1989, Congress again appropriated \$750,000 to the National Marine Fisheries Service for its Entanglement Program. As in previous years, the Service convened a meeting to review the status and results of research undertaken to date and to identify priority tasks for future funding. The meeting was held 9-10 June 1988 in Seattle, and a representative of the Marine Mammal Commission participated. Based on meeting results, the Service developed a proposed program plan for Fiscal Year 1989, which was forwarded to the Commission for its review and concurrence on 6 December 1988.

The Service's recommended program plan proposed allocating \$702,700 among 21 tasks, including thirteen continuing research projects and eight new research tasks. The tasks to be continued included: support for Marine Debris Information Offices in Seattle, Washington, and Washington, D.C.; preparing for and convening the Second International Conference on Marine Debris; removing marine debris from beaches frequented by Hawaiian monk seals; monitoring high seas drift net fisheries in the North Pacific Ocean; determining the effect of plastic particle ingestion on survival of larval fish; determining the effects of marine pollution on juvenile pelagic sea turtles; assessing the role of entanglement as a cause of sea turtle deaths; documenting survivorship rates for juvenile male fur seals entangled in marine debris; determining the effects of ingested plastic on albatross; supporting marine debris surveys at selected National Seashores; surveys of debris accumulation on Alaska beaches; and monitoring entanglement of pinnipeds on the Channel Islands.

The eight new tasks proposed in the Service's recommended Fiscal Year 1989 Plan included: reproducing educational materials for distribution to the public and industry groups through existing domestic and international offices and programs; developing a marine debris education program for shipping and cruise line industries; developing and maintaining computerized databases of information collected during voluntary beach clean-ups; convening a workshop on marine debris to develop advice on mitigation measures, particularly for fisheries; experiments on ways to mitigate effects of "ghost" gill nets; determining the ingestion of marine plastics by western Atlantic sea birds; assessing factors bearing on the length of time different types of floating marine debris remain at the surface where they can be particularly hazardous to seals, sea turtles, and other surface-living species; and developing a system to record and analyze benthic marine

debris in the Eastern Bering Sea based on debris caught during annual trawl surveys for fish and shellfish.

On 23 December 1988, the Commission, in consultation with its Committee of Scientific Advisors, wrote to the National Marine Fisheries Service noting that, with one exception, the Commission agreed that the proposed task descriptions were appropriate and that they offered a sound basis for implementing priority actions. The one exception involved support for monitoring high seas squid drift net fisheries. The task proposed placing U.S. observers aboard foreign commercial squid fishing vessels in the North Pacific Ocean to monitor fishing areas, times, catch rates, bycatch, gear loss, etc.

Placement of the observers had been arranged through negotiations with Japanese officials last winter. It was the Commission's understanding, however, that agreements reached through those negotiations may have been affected by recent developments prohibiting Japanese salmon drift net vessels from fishing in U.S. waters and that the agreements may have been voided. Therefore, the Commission asked that it be advised by the Service as to whether the proposed work was still possible and, if the study had to be revised or funding had to be reallocated to other priority work, to provide the Commission with modified or new task descriptions for work to be supported with funds proposed for the squid drift net monitoring study. The Commission concurred with the allocation of funds to the other tasks proposed in the Fiscal Year 1989 Program Plan and at the end of 1988, it looked forward to the Service's response regarding the high seas squid fishery.

#### Domestic Policy Council Task Force on Marine Debris

During 1987, Administration and Congressional leaders recognized the need to assess problems being caused by persistent marine debris and to develop a comprehensive, coordinated Federal strategy to address those problems. As discussed in the previous Annual Report, growing concern about the problem led the White House Domestic Policy Council to establish the Interagency Marine Debris Task Force, chaired by the National Oceanic and Atmospheric Administration. Other participants on the Task Force included representatives of the Coast Guard, the Council on Environmental Quality, the Department of Agriculture, the Department of the Interior, the Department of State, the Environmental Protection Agency, the Marine Mammal Commission, the Navy, the Office of Management and Budget, and the White House Office of Domestic Policy.

The Task Force was charged with preparing a report that assessed the problem and the need for research, identified potential reduction measures, and suggested alternative actions to address the problem of plastic marine pollution. On 23

December 1987, the National Oceanic and Atmospheric Administration's Task Force leader provided Task Force members with an initial draft report. The Commission returned comments on the initial draft by letter of 24 February 1988. In its letter, the Commission provided a list of recommended Federal actions to respond to problems being caused by marine debris. Among other things, the Commission emphasized the need for steps to: (1) establish a system for monitoring the types, amounts, and effects of marine debris so as to direct and determine the effectiveness of mitigation measures; (2) undertake or encourage clean up efforts at recreational beaches and certain wildlife habitats where seals, seabirds, and turtles may be particularly threatened; and (3) encourage and cooperate in international efforts to better document and resolve problems created by marine debris.

A final draft Task Force report was provided to the Commission on 6 May 1988. The final draft incorporated most of the Commission's comments and recommendations. Among other things, the draft report put forth five general recommendations endorsing actions in the areas of: Federal leadership; public awareness and education; implementation of laws related to marine debris; research and monitoring; and beach clean-ups. Within these five areas, the Report proposed specific recommendations aimed at reorienting and coordinating Federal activities to address problems of persistent marine debris. Although the report did not call for any new Federal budget authority to address the marine debris issue, it recommended that the Administration include the National Marine Fisheries Service's Marine Entanglement Research Program in the Fiscal Year 1990 budget request and continue this for at least five more years.

On 10 May, the Final Draft Report of the Interagency Task Force on Persistent Marine Debris was presented to the Domestic Policy Council's Working Group on Energy, Natural Resources, and the Environment. By letter of the same day to the Domestic Policy Council, the Commission noted that the report provided a useful overview of the marine pollution problem and contained sound recommendations to guide cooperative Federal, State, and private actions to address research and management issues. The letter emphasized the importance of continued funding of the Marine Entanglement Research Program. It noted that the Program had attained a high international profile and that it had helped establish the United States as a leader in efforts to secure entry into force of Annex V of the International Convention for the Prevention of Pollution from Ships. Accordingly, the Commission noted that it concurred with the Task Force on all proposed recommendations and stated its willingness to help in any way it could to implement them.

On 18 May 1988, the Domestic Policy Council endorsed the final report of the Interagency Task Force on Persistent Marine Debris and, by White House memorandum dated 27 May, the chairman of the Council forwarded the Report to the heads of all Cabinet-level departments, the Administrator of the Environmental Protection Agency, and the Chairman of the President's Council on Environmental Quality.

#### U.S. Ratification of MARPOL Annex V

MARPOL, a contraction of the term "marine pollution," is the common name used to refer to the International Convention for the Prevention of Pollution by Ships, an agreement concluded in 1973 at a conference of the Intergovernmental Maritime Consultative Organization (now the International Maritime Organization). The Convention, which was amended by Protocol in 1978, is designed to control ship-generated marine pollution on a global scale. The amended Convention includes five annexes, each of which addresses a particular type of vessel-related pollution. Annex V contains regulations governing the disposal of garbage from ships, which is a major source of marine debris in the world's oceans. Among other things, the Annex prohibits the disposal of plastics into the marine environment, establishes discharge limitations for other types of ship-generated garbage, and requires that port reception facilities be provided.

Before Annex V can take effect, the Convention requires that the Annex be ratified by at least 15 nations representing fifty percent or more of the world's commercial shipping tonnage. As noted in previous Annual Reports, criteria for its entry into force had not been met as of the end of 1986, and the Annex had not been ratified by the United States. The importance of Annex V provisions in reducing marine pollution prompted the Marine Mammal Commission to recommend that steps be taken by the U.S. Coast Guard and the State Department to obtain ratification by the U.S. Government. Both agencies shared the Commission's view and took steps to complete documentation necessary for ratification.

On 9 February 1987, President Reagan transmitted Annex V to the Senate and, on 5 November 1987, the Senate unanimously adopted a resolution providing its advice and consent to ratify the Annex. In doing so, the Senate, among other things, recognized that the Annex provided for designating "Special Areas" in which dumping of all garbage is prohibited except for food wastes beyond 12 nautical miles from land. Referencing marine debris problems on Texas beaches and the large number of endangered sea turtles which occur in the Gulf of Mexico, the Senate included an understanding in its resolution that the U.S. Government would make every reasonable effort to designate the Gulf of Mexico as a Special Area under the Annex.

The final step in the ratification process is depositing the instrument of ratification with the Secretariat of the International Maritime Organization. However, it is U.S. policy not to deposit such an instrument unless domestic legislation is in place to implement the provisions of an agreement, and existing U.S. law did not provide clear authority to regulate disposal of garbage by ships as set forth in Annex V.

To address this need, the House of Representatives and the Senate passed H.R. 3674 on 18-19 December 1987. Title II of the bill, entitled the "Marine Plastic Pollution Research and Control Act of 1987," amended the Act to Prevent Pollution from Ships so as to provide authority in the United States to implement Annex V requirements. The bill was signed into law on 29 December 1987 and, on 30 December 1987, the President transmitted the U.S. instrument of ratification to the Secretary of the International Maritime Organization. In doing so, the United States became the thirty-first nation to ratify Annex V. As a result, MARPOL's requirements for Annex V entry into force were met, and a one-year period was begun during which contracting governments were to develop their respective domestic programs to implement the Annex's provisions.

The implementing legislation passed by Congress in December 1987 (the amended Act to Prevent Pollution from Ships) became effective on 31 December 1988. The U.S. Coast Guard has responsibility for administering and enforcing the Act's new provisions and, on 24 June 1988, the Coast Guard published a notice in the Federal Register requesting comments on its intention to draft rules pursuant to the implementing legislation. Among other things, the notice indicated that Coast Guard regulations would address discharge requirements, criteria for the adequacy of required port reception facilities for garbage returned to port, enforcement, and penalties. It also noted that its rules would not address requirements related to "Special Area" status for the Gulf of Mexico because that designation, which would require amending Annex V, had not yet been adopted under MARPOL.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the Federal Register notice and, by letter of 25 July 1988, forwarded comments to the Coast Guard. In its letter, the Commission noted that marine mammals and other species of marine life may be killed or injured by entanglement in or ingestion of debris lost or discarded from ships. Thus, it noted that entry into force of Annex V and implementation of the amended Act are important steps to address the global problems created by marine debris in general and plastic debris in particular.

With respect to provisions to be included in the implementing rules, the Commission recommended that the Coast Guard: (a) define the term "disposal" to include the loss of garbage into the sea due to improper handling and storage aboard ship as well as intentional disposal of garbage over the side; (b) provide a regulatory definition of "plastics" that cites examples of wastes that are particularly hazardous to marine life and aesthetic quality; (c) consider steps to inform ship operators of the availability, location, and proper use of port reception facilities when assessing the adequacy of such facilities; (d) require large ports and marinas serving commercial and recreational vessels using only U.S. waters to obtain Certificates of Adequacy; and (e) consider developing operational guidelines for handling, processing, and storing garbage aboard ship to encourage and facilitate the use of procedures and technology that would enhance compliance with Annex V and the amended Act.

In its letter, the Commission also noted that it was cooperating with the National Oceanic and Atmospheric Administration's National Ocean Pollution Program Office to support a study to assess available information on marine debris in several areas, including the Gulf of Mexico and the Caribbean Sea. The Commission noted that the final report of that study would be useful for considering possible designation of the Gulf of Mexico as a Special Area under Annex V and stated that it would forward a copy of the report to the Coast Guard when it became available.

In the Federal Register of 27 October 1988, the Coast Guard published proposed rules to implement MARPOL Annex V. The proposed rules addressed most of the Commission's comments although they did not include provisions for requiring Certificates of Adequacy for large ports and marinas servicing commercial and recreational vessels which only ply U.S. waters. At the end of 1988, it was the Commission's understanding that final rules would be published by the Coast Guard early in 1989.

### International Activities

Plastic debris enters the world's oceans from ships and shores of all coastal nations. Many of the most harmful plastic materials may drift with ocean currents hundreds or thousands of miles from their points of origin. Therefore, successful resolution of the marine debris problem requires cooperative action at the international level. To facilitate responsive international actions, the Commission, in cooperation with other agencies and organizations, undertook the following actions in 1988.

## Planning for a Second International Conference on Marine Debris

In November 1984, the National Marine Fisheries Service, at the recommendation and with the financial and planning assistance of the Marine Mammal Commission, convened a Workshop on the Fate and Impact of Marine Debris. The Workshop was the first meeting ever undertaken to comprehensively assess information on the amounts, distribution, sources, effects, and management needs pertaining to problems of trash and other human-related debris lost or discarded into the ocean. The Proceedings of the Workshop provided what continues to be perhaps the best single source of information on the issue.

As indicated in previous Annual Reports and above, much has been done to address the problem both in the United States and abroad since that Workshop. For example, internationally: more than thirty nations representing over half the world's commercial ship tonnage are now implementing programs consistent with the provisions of MARPOL Annex V to address ship-generated sources of marine debris; the Intergovernmental Oceanographic Commission has endorsed efforts to develop a manual on procedures for monitoring the amounts and effects of marine debris; the United Nations Food and Agriculture Organization has completed a major assessment of marine debris-related problems; and various Regional Seas Programs under the United Nations Environment Program have begun to identify and carry out related research and management actions. Domestically, a great deal of research and management experience has been gained through work under the National Marine Fisheries Service's Marine Entanglement Research Program, and Federal agencies are reviewing and responding to recommendations set forth by the Domestic Policy Council's Marine Debris Task Force Report.

Anticipating the need for a comprehensive review of the findings and status of these and other domestic and international initiatives, the Commission wrote to the National Marine Fisheries Service on 26 December 1986 recommending, among other things, that planning for a Second International Conference on Marine Debris be initiated so as to provide a basis for sharpening the focus and effectiveness of future research and management measures. The Service agreed with the Commission's recommendation and programmed funds as part of its Fiscal Year 1988 Marine Entanglement Research Program to begin planning and organizing the Conference, now scheduled for 2-7 April in Honolulu, Hawaii.

As with the first meeting, the Commission has played a major role in helping the Service organize and plan for the Conference. In 1987, the Commission started informal discussions with people in the United States and abroad on what might be accomplished at the Conference. On 26 December

1987, it provided further comments and suggestions to the Service. Because of the outstanding work done by the Director of the Service's Honolulu Laboratory, the Hawaii Sea Grant College Program, and the Workshop Steering Group in arranging for the 1984 Workshop, the Commission recommended that responsibility for the Second Conference again be vested with those groups and that the Conference Steering Group be convened early in 1988.

The Service agreed with these recommendations and, on 17 March 1988, an initial Steering Group meeting, which included a representative of the Marine Mammal Commission, was convened by the Service in Hawaii. During the meeting, the Commission provided recommendations on: terms of reference and an agenda for the meeting; key participants; preparation of a Proceedings volume; and various other matters. The Commission subsequently provided funds to develop the Conference announcement, assisted efforts to solicit sponsors and funds for the Conference, agreed to support the participation of a professional rapporteur for the Conference, and helped distribute information on the Conference to organizations and individuals working on marine debris issues in about thirty other countries. The objectives for the Conference are to:

- o evaluate new information on the types, amounts, sources, fates, and distribution of marine debris in different ocean areas;
- o evaluate what has been done in the North Pacific basin as a prototype of activities that might be usefully undertaken in other regions;
- o identify and evaluate existing and potential methods for gathering data on and monitoring trends in the sources, types, fates, amounts, and distribution of debris at sea and on beaches;
- o identify and evaluate information on the nature and extent of marine debris-related impacts on species and populations of marine life, including seals, turtles, sea birds, crustaceans, fish, etc., in different ocean areas;
- o identify and evaluate impacts of marine debris on human health and safety of ships at sea;
- o identify and evaluate aesthetic and other impacts of marine debris on coastal environments;
- o review and evaluate information on existing and potential technological and procedural ways to reduce or eliminate the problem of marine debris;

- o assess the effectiveness and future role of programs to educate the public and promote awareness of the problem;
- o evaluate international, intergovernmental, domestic, and informally constituted regional authorities that might be usefully drawn upon to strengthen cooperative efforts to address regional issues;
- o describe programs necessary to assess the effectiveness of measures presently being taken to address various elements of the problem; and
- o prepare a report summarizing results of the Conference and steps that should be taken to address different aspects of the problem.

At the end of 1988, plans for the Conference were well developed, and abstracts for papers had been submitted by individuals from more than twelve countries. The Second International Conference on Marine Debris promises to mark another major step in the evolution of global efforts to address the problem.

#### 26th Session of the Marine Environment Protection Committee

The Marine Environment Protection Committee of the International Maritime Organization is the international body responsible for overseeing efforts to regulate, in accordance with MARPOL Annex V, the disposal of garbage from ships. Discharge limitations of Annex V are summarized on the following page. At the request of the State Department, the U.S. Coast Guard heads U.S. delegations to periodic Committee meetings, which are held at the International Maritime Organization's headquarters in London, England.

As noted in previous Annual Reports, the Marine Mammal Commission, in consultation with the National Oceanic and Atmospheric Administration, drafted a paper that was submitted by the Coast Guard to the 24th Session of the Committee on 16-20 February 1987. That paper described problems associated with the disposal of ship-generated garbage and actions that might be taken to address those problems. Among other things, the paper recommended that the Committee develop guidelines to assist contracting governments and others in developing programs to implement provisions of Annex V.

The paper drafted by the Commission and presented by the Coast Guard was well received by the Committee, and there was agreement to proceed with efforts to develop the recommended guidelines. To assist in doing so, the U.S. delegation, which included a representative of the Marine Mammal Commission, volunteered to prepare a draft set of guidelines for

consideration at the Committee's 25th Session on 30 November-3 December 1987. The National Oceanic and Atmospheric Administration subsequently took the lead in initial drafting of the guidelines, and the Marine Mammal Commission assisted by drafting the chapter of the guidelines on procedures for handling and storing garbage aboard ship.

The draft guidelines were submitted by the Coast Guard for consideration by the Committee at its 25th session. With some modifications made during the meeting, the Committee indicated that it agreed with the scope and content of the draft guidelines but that further editorial improvements were needed. Therefore, it was agreed that the modified guidelines would be distributed to the full Committee to be revised as necessary and adopted at the 26th Session of the Committee on 5-9 September 1988.

During its 26th Session, the Committee considered and adopted "Guidelines for the Implementation of Annex V, Regulations for the Prevention of Pollution by Garbage from Ships." In doing so, the Committee approved certain modifications, which, among other things, clarified that disposal of ship-generated garbage at port reception facilities should be encouraged even for those types of garbage that were allowed under the Annex to be discharged at sea. It was noted that the guidelines would provide useful guidance for national authorities in developing their respective programs for implementing Annex V, and the Committee asked the Secretariat of the International Maritime Organization to request that knowledge of the guidelines be included in the curriculum of the World Maritime University.

The objectives of the adopted guidelines are to:  
(1) assist governments in developing and enacting domestic laws which give force to and implement Annex V; (2) assist vessel operators in complying with the requirements set forth in Annex V and domestic laws; and (3) assist port and terminal operators in assessing the need for, and providing, adequate reception facilities for garbage generated on different types of ships. The guidelines include sections on: training, education, and enforcement; minimizing the amount of potential garbage; shipboard garbage handling and storage procedures; shipboard equipment for processing garbage; port reception facilities for garbage; and ensuring compliance with the Annex.

As noted above, Annex V provides for designating Special Areas where more stringent garbage disposal requirements apply. When the U.S. Senate gave its advice and consent to ratify Annex V, it expressed its understanding that every reasonable effort would be taken to secure that status for the Gulf of Mexico. Within Special Areas, no ship-generated garbage may be discharged, except for food wastes, which can

only be discharged beyond 12 miles from land. In addition, each government party to the Convention with a coastline bordering the Special Area must undertake efforts to ensure that adequate port reception facilities are provided in all bordering ports as soon as possible. To pursue development of a proposal to designate the Gulf of Mexico as a Special Area, the Coast Guard and the Department of State initiated consultations with the Government of Mexico, which presently is not a party to the Convention.

During the 26th Session of the Committee, the U.S. delegation advised the Committee of the status of its efforts regarding Special Area status for the Gulf of Mexico. The U.S. delegation reported that, while representatives of the Government of Mexico indicated that they agreed in principle with the proposed designation, they felt that final agreement must await their accession to the Convention and, thus, a proposal for designating the Gulf of Mexico as a Special Area was not put forward during the 26th Session.

#### Research Activities

To help improve information on marine debris in certain ocean areas, the Marine Mammal Commission and the National Oceanic and Atmospheric Administration's National Ocean Pollution Program Office jointly supported a contract study to review information on the status of marine debris problems in the Northwest Atlantic Ocean, the North Sea, the Gulf of Mexico, the Caribbean Sea, and waters off the west coast of Baja California. The purpose of the study was to: (a) obtain published and unpublished information on the sources, amounts, types, and effects of marine debris in these areas, and (b) to identify programs being undertaken to define and mitigate problems caused by marine debris in this area.

The study report, entitled "Persistent Marine Debris in the North Sea, the Northwest Atlantic Ocean, the Wider Caribbean Area, and the West Coast of Baja California," was completed in July 1988 (see Appendix B, Heneman and the Center for Environmental Education 1988). Among other things, the report concludes that: vessel traffic appears to be the major source of marine debris in the North Sea, and the greatest problems in the area involve effects on sea birds and aesthetic impacts on certain beaches; aesthetic impacts near major urban centers in the northeast United States is the best documented marine debris problem in the Northwest Atlantic Ocean, and numerous sources of debris complicate potential mitigation efforts; tar appears to be the most prevalent type of floating marine pollutant in the Wider Caribbean area (including the Gulf of Mexico) while plastics, glass, and other litter from ships and land-fills near island shorelines are sources of significant amounts of marine debris; the greatest impacts of marine

debris in the Wider Caribbean area appear to be on aesthetic quality (particularly on Texas beaches, downwind of major shipping lanes, and on windward sides of island shorelines), and on endangered and threatened sea turtles; and little information is available with which to assess marine debris problems on the west coast of Baja California.

The authors recommended that: both the North Sea and the Wider Caribbean area be designated as Special Areas under Annex V of MARPOL; international collaboration on regional marine debris related research and management issues be increased; marine debris programs emphasize mitigation efforts with highest priority given to educating particular user groups and developing new ways of disposing of solid wastes; and research efforts focus on filling critical information gaps, evaluating mitigation efforts, monitoring long-term debris trends, and investigating the role of oceanic fronts in concentrating marine debris and magnifying effects on wildlife.

On 30 September 1988, the Commission provided copies of the report to the U.S. Coast Guard for consideration with respect to deliberations on designating the Gulf of Mexico as a Special Area under Annex V. It suggested that the report be provided for information purposes to other members of the Marine Environment Protection Committee. The Commission also provided copies to the Honolulu Laboratory of the National Marine Fisheries Service to distribute as a background document to participants at the Second International Conference on Marine Debris. In addition, the report was distributed widely among domestic and foreign researchers and organizations working on marine debris problems.

## CHAPTER VII

### INCIDENTAL TAKE OF MARINE MAMMALS IN THE COURSE OF COMMERCIAL FISHING OPERATIONS

The Marine Mammal Protection Act directs the Secretaries of Commerce and the Interior, in consultation with the Commission, to develop regulations governing the incidental taking of marine mammals by persons subject to the jurisdiction of the United States. It also calls upon the Secretaries, again in consultation with the Commission, to develop effective international arrangements, through the Secretary of State, for the purpose of reducing the incidental taking of marine mammals to insignificant levels approaching a zero mortality and serious injury rate.

Although the incidental taking of marine mammals occurs in the course of many fisheries and involves many different species of marine mammals, the "tuna-porpoise" issue involving the incidental mortality and serious injury of porpoises entrapped in purse seine nets used by commercial yellowfin tuna fishermen has, over the past decade, been the subject of the most intense concern, attention, and controversy. More recently, there has been concern over the incidental taking of Dall's porpoises and other marine mammals in the course of the Japanese salmon gill net fishery in the North Pacific Ocean, a portion of which occurs within the United States' 200-mile Fishery Conservation Zone. The Commission's activities during 1988 related to the tuna-porpoise and Dall's porpoise issues are discussed below. Interactions between fisheries and other marine mammals are discussed in Chapter VIII.

#### The Tuna-Porpoise Issue

Discussions of the Commission's past activities and a historical summary of the efforts to resolve the tuna-porpoise problem are presented in previous Annual Reports. As discussed below, the Commission, the National Marine Fisheries Service, the U.S. Congress, the U.S. tuna industry, and others continued to devote substantial attention to the issue in 1988. In 1986, the U.S. tuna fleet reached the incidental kill quota of 20,500 porpoises in mid-October. As a result, the U.S. tuna purse seine fleet was prohibited from fishing for tuna by setting on marine mammals for the remainder of the year. The level of marine mammal mortality observed in 1987 was considerably lower than that for 1986 and there was no need to prohibit setting on porpoise in 1987. The mortality of eastern spinner dolphins, however, was unusually high and necessitated close monitoring to ensure that the allowable level of take of 2,750 would not be exceeded.

In 1988, porpoise mortality incidental to U.S. tuna fishing operations again approached the overall quota of 20,500 with an estimated mortality of 19,712. The mortality of eastern spinner dolphins remained high and, during the final week of 1988, the incidental mortality quota for this stock was exceeded.

The 1988 Fishing Season

The National Marine Fisheries Service issued final regulations on 31 October 1980 establishing an annual allowable take (quota) of 20,500 animals for each of the five years, 1981-1985. On 7 December 1980, a general permit to take porpoise in compliance with the final regulations and the quota was issued to the American Tunaboat Association. By means of the 1984 amendments to the Marine Mammal Protection Act, Congress extended indefinitely the annual quota, as well as the regulations and the general permit, and added quotas for eastern spinner and coastal spotted dolphins. Estimates of the annual incidental kill of porpoise by the U.S. and foreign tuna purse seine fleets since passage of the Marine Mammal Protection Act are listed in the following table.

Estimated Incidental Kill of Porpoise in the  
Tuna Purse Seine Fishery  
In the Eastern Tropical Pacific Ocean\*

<u>Year</u>	<u>U.S. Vessels</u>	<u>Non-U.S. Vessels</u>
1972	368,600	55,078
1973	206,697	58,276
1974	147,437	27,245
1975	166,645	27,812
1976	108,740	19,482
1977	25,452	25,901
1978	19,366	11,147
1979	17,938	6,837
1980	15,305	29,598
1981	18,780	17,146
1982	22,736	5,065
1983	9,589	(no data)
1984	17,732	15,018
1985	19,205	36,032
1986	20,696	103,905
1987	13,992	97,941
1988	19,712**	--

\* Figures do not include possible deaths of seriously injured porpoise released alive.

\*\* Preliminary estimate.

As noted above, in 1986, the U.S. tuna fleet reached the allowable mortality level of 20,500 and was required to cease setting for tuna on schools of porpoise. There are several possible reasons why the quota was reached. One is that the tuna fleet experienced an increased number of problem sets which resulted in abnormally high levels of deaths. Another possible explanation was the record high tuna catch rate of approximately 25 tons of tuna per set. Large schools of tuna may be associated with large schools of porpoise and, therefore, more porpoise than usual may have been encircled per set. The large number of tuna in the net may also have contributed to the high mortality by making it more difficult to release porpoise during the backdown procedure.

Porpoise mortality in the U.S. tuna fishery during 1987 was significantly less than in 1986 with a total estimate of 13,992 porpoise killed. In 1987, the catch rate of tuna was somewhat below 20 tons of tuna per set, well below the record level of 1986, suggesting that a lower incidental mortality of porpoise may be correlated with a lower tuna catch per unit effort. Porpoise mortality in the U.S. tuna fleet for 1988 again approached the maximum allowable level, with an estimated total mortality of 19,712. As in 1986, the fleet experienced a relatively high percentage of problem sets, those that account for the highest porpoise mortality. The catch rate of tuna in 1988 was similar to that for 1987, with an average of approximately 19 tons of tuna caught per set in each year.

The 1984 amendments to the Marine Mammal Protection Act established a quota of 2,750 for the eastern spinner stock. In 1987, despite a relatively low overall mortality of marine mammals, it was estimated that 2,688 eastern spinner dolphins had been killed. In comparison, during 1986, when the overall quota of 20,500 porpoise was reached, the estimated mortality of eastern spinners was only 1,608. The incidental take of eastern spinner dolphins was again high in 1988. The quota for this stock was exceeded for the first time with an estimated mortality of 2,832 by the U.S. fleet. One possible explanation for the high eastern spinner mortality during the past two years is that tuna, and, hence, fishing effort, were concentrated in the area of the eastern tropical Pacific Ocean where eastern spinner dolphins are more abundant.

While the number of sets on porpoise per year by the U.S. fleet has fluctuated over the past three years, there has been a declining trend in the percentage of tuna caught in such sets. During 1986, 94 percent of the tuna caught by U.S. fishermen was taken in sets on porpoise. In 1987, sets on porpoise accounted for 78 percent of the U.S. tuna catch and, in 1988, only 64 percent of the tuna caught by the U.S. fleet was from marine mammal sets.

Questions concerning the methodology that should be used to estimate porpoise mortality were raised by the Commission and others in 1986. As a result of deliberations among the National Marine Fisheries Service, the Commission, and other interested parties, it was determined that the same methodology that had been used previously would be used in 1987, but that further review of alternative approaches would take place. In addition, the Service decided to provide 100 percent observer coverage for the first trip of the U.S. tuna fleet in 1987. In response to comments from the tuna industry that the methodology being used to estimate porpoise mortality tended to overestimate the true level of kill and that the 1986 season was closed prematurely, the Service initiated a study of the issue and set a target of 100 percent observer coverage throughout the 1987 season. The Service has reviewed the data from the 1987 season to better determine the optimal level of observer coverage and has prepared a draft report of its findings. A final report of the study is expected to be issued early in 1989.

The 1988 amendments to the Marine Mammal Protection Act, discussed in Chapter II, addressed the issue of observer coverage in the tuna fleet, at least in the near term. Under the amendments, the Service is required to place an observer on board each certificated vessel for all trips during 1989 and subsequent years unless, for reasons beyond the Service's control, an observer is not available. The 100 percent observer requirement may be waived after the 1991 fishing season if the Service determines, after notice and opportunity for public comment, that lesser coverage will provide sufficiently reliable information.

As noted previously, the Service published emergency interim regulations in 1986 that imposed a ban on catching, possessing, or landing yellowfin or bigeye tuna from the eastern tropical Pacific Ocean once the porpoise quota had been reached. An exception to the ban was established for vessels that voluntarily carried a National Marine Fisheries Service observer to verify compliance with the prohibition on fishing on porpoise. By letter of 3 October 1986, the Commission supported the adoption of the regulations and recommended that permanent regulations including similar requirements be established for future fishing seasons. The emergency regulations went into effect on 21 October 1986, and no additional takes of porpoise were reported for that year. On 23 December 1986, the Commission again recommended that the Service adopt permanent regulations to enforce the quota. At the close of 1988, no such regulations had been proposed by the Service.

At the end of 1986, the Service took the first step toward establishing regulations that would govern the performance of individual vessels and/or captains in the U.S. tuna

fleet by issuing a discussion paper on possible alternative types of performance standards. These performance standards, which would have been set forth as regulations, were intended to address the problem that arose in 1986 when certain vessels and/or captains experienced exceptionally high kill rates. The standards would have been implemented along with increased observer coverage to provide a more effective method for monitoring the operations of the U.S. fleet, reducing kill rates, and imposing appropriate sanctions, such as the revocation of certificates of inclusion, on captains and/or vessels with poor performance records.

The American Tunaboat Association voiced strong opposition to implementation of the regulations, stating that "there is no significant, widespread skipper performance problem in the U.S. fleet that supports the complicated and financially burdensome regulatory process instituted by the draft proposed rules" and, on 8 April 1987, submitted an alternative proposal, setting forth the criteria and procedures that it believes should be used to evaluate the porpoise mortality performance of vessel operators. Under the American Tunaboat Association proposal, the Expert Skippers Panel would review the circumstances surrounding the trip in which a disaster set occurred, would consider other relevant factors such as the operator's experience, and would work with the operator to improve performance. If performance problems recur, the Service could sanction the operator by suspending his Certificate of Inclusion.

The 1988 amendments to the Marine Mammal Protection Act direct the National Marine Fisheries Service to develop and implement, not later than the beginning of the 1990 fishing season, a system of performance standards to maintain the diligence and proficiency of U.S. tuna fishermen. The system must include a mechanism for identifying and providing supplemental training to certificate holders whose incidental marine mammal mortality is consistently and substantially higher than the fleet average. It must also provide for suspension or revocation of certificates for those fishermen whose unacceptably high rate of incidental take reflects a lack of diligence or proficiency in the use of required fishing techniques and gear. The Service is expected to begin development of performance standards early in 1989, using its earlier proposal as a starting point.

At the Senate reauthorization hearing held on 13 April 1988, representatives of Earth Island Institute asserted that there was a systematic underestimation of marine mammal mortality in the U.S. and foreign tuna fisheries. To support its claim with respect to the reliability of mortality data for the U.S. fleet, Earth Island Institute, on 15 May 1988, provided the Commission with affidavits from three former

U.S. observers. Among other things, the former observers alleged that: vessel captains and crews harassed, threatened, and coerced them in efforts to force the reporting of lower than observed mortality figures; mortality in sundown sets is seriously underestimated due to difficulty in viewing the backdown area during such sets; animals with fatal injuries were counted as "released alive" if they showed any sign of life and were not included in mortality estimates; and vessels do not always use prescribed dolphin-saving gear and techniques when observers are not present.

On 17 June 1988, the Commission wrote to the National Marine Fisheries Service recommending that these allegations be investigated. The Commission further recommended that the Service: arrange for independent interviews with observers to assess the prevalence and types of coercion and intimidation which occur; publicize the fact that regulations make it illegal to interfere with the performance of an observer's duties; restrict a captain's access to observer logs and data sheets; determine whether reported mortality figures for sundown sets are accurate; re-evaluate the methods used to estimate mortalities and injuries, particularly with respect to the reporting of seriously injured animals; and re-evaluate the need for 100 percent observer coverage as a means of ensuring use of porpoise-saving gear and techniques. The Commission, on 8 December 1988, sent a second letter to the Service seeking a response to the allegations made by the former observers in their affidavits. The Service had yet to reply at year's end.

#### Foreign Nation Compliance Programs

During the 1984 reauthorization hearings on the Marine Mammal Protection Act, concern was expressed by the Commission, the National Marine Fisheries Service, the tuna industry, and the environmental community that progress realized by the U.S. fleet in reducing incidental porpoise mortality was being offset by the high kill rates of foreign fleets. It was believed that, if further progress were to be made in achieving the Act's goal of reducing incidental mortality to insignificant levels approaching zero, foreign fleets would have to comply with porpoise saving regulations similar to those applicable to the U.S. fleet. As a result, Congress amended the Act to require that each nation exporting tuna to this country provide documentary evidence that it has adopted a program to regulate the incidental take of marine mammals that is comparable to that of the U.S. and that the average rate of incidental take by its fleet is comparable to that of the U.S. fleet. Failure to meet these requirements would result in a ban on the import of tuna and tuna products from the nation involved.

On 21 July 1984, the Commission wrote to the Service urging that it promulgate regulations to implement the foreign nation certification requirements of the amendments. The Commission noted that prompt action was needed because the Service's existing foreign nation reporting and certification standards were not as stringent as those required by the 1984 amendments. Concerned about the lack of progress, the Commission wrote to the Service again on 22 May 1986, pointing out the need for immediate action. The Service responded by letter of 30 June 1986, stating that it was in the process of developing the proposed regulations. The Commission wrote to the Service again on 24 July 1986, asking when the proposed regulations would be published and requesting that a pre-publication version of the proposed regulations be provided to the Commission for review.

On 13 August 1986, the Service published in the Federal Register proposed regulations to implement the foreign nation reporting and certification requirements of the 1984 amendments. The proposed regulations called for a performance-based approach requiring a showing that the foreign nation's regulatory program is comparable to that of the U.S. and that reliable data indicate a level of take in the foreign fleet which is comparable to that of the U.S. fleet. The proposed regulations stated that a comparable level of take would be one that is not more than 50 percent higher than the U.S. level. For each nation that is certified as satisfying U.S. standards, an annual review would be conducted to assess whether the program remains in compliance.

By letter of 14 November 1986, the Commission advised the Service that it supported the adoption of the proposed regulations, subject to certain modifications. In its letter, the Commission recommended that the regulations specify that the only method of monitoring take levels that would be in compliance with U.S. standards is one that is based on observer data. The Commission also expressed its view that a level of take that is 50 percent higher than that of the U.S. is unacceptably high and does not satisfy the requirements of the 1984 amendments that the level of take be comparable to that of the U.S. fleet. Final regulations were expected to be published early in 1987.

Because of comments received on the proposed rule, however, the Service delayed issuing the final regulations to incorporate several modifications and clarifications. Publication of the final rule was further delayed to accommodate consultations between the Service and the Inter-American Tropical Tuna Commission seeking to devise a system that would provide reliable data upon which to make comparisons between the U.S. and foreign fleets.

The Commission worked closely with the Service during 1987 on various drafts of the final regulations and, by letter of 29 December 1987, recommended to the Service that the regulations, with certain modifications, be promptly adopted. Among the modifications recommended by the Commission were that: (a) the comparability of foreign and domestic kill rates reflect the variability found in the U.S. kill rate and the number of vessels in the foreign fleet; (b) the Service fully explain why the standards it eventually adopts for foreign nations are considered to be comparable; (c) the comparison of porpoise kill rates between U.S. and foreign fleets begin in 1988 and that full comparability be required in 1989; (d) mortality data be provided by foreign governments on a stock-by-stock basis; and (e) a showing be made that tuna were caught when a positive finding of comparability was in effect for the exporting nation before tuna may be imported into the United States from that nation.

On 18 March 1988, the National Marine Fisheries Service published an interim final rule implementing the 1984 amendments. The interim final rule did not address several of the points raised in the Commission's 29 December 1987 letter and, in a 17 May 1988 letter, the Commission reiterated the recommendations noted above.

The Service met with interested parties, including representatives of the Commission, the Inter-American Tropical Tuna Commission, the tuna industry, and environmental organizations, on 1 June 1988 to discuss the comments received on the interim final rule. The Service planned to respond to the public comments on the interim rule and publish a "permanent" final rule before the end of 1988. However, as noted in Chapter II, during the reauthorization of the Marine Mammal Protection Act, amendments were made to the importation provisions, further delaying promulgation of "permanent" final regulations. At the end of 1988, the Service was redrafting the interim final regulations to reflect the recently enacted amendments. Publication of the interim final rule is expected early in 1989.

The 1988 amendments to the Act provided further guidance with respect to the comparability of foreign tuna-porpoise programs to that of the United States and imposed additional requirements on foreign nations seeking to import yellowfin tuna into the United States. By the end of the 1989 fishing season, each foreign fleet must have achieved a porpoise mortality rate that is not more than twice that of the U.S. fleet and, by the end of the 1990 season, the foreign nation's mortality rate must be no more than 1.25 times that of the U.S. fleet. Beginning in 1990, comparable foreign programs must include all prohibitions on encircling pure schools of marine mammals, conducting sundown sets, and other activities as are

made applicable to U.S. tuna fishermen. Although no stock-specific numerical quotas were imposed on foreign nations that export tuna to the United States, the amendments require that no more than 15 percent of their total annual mortality be eastern spinner dolphins and no more than 2 percent be coastal spotted dolphins. To be found comparable to the U.S. program, the incidental take by a foreign nation must be monitored by the observer program of the Inter-American Tropical Tuna Commission or an equivalent international program in which the United States participates. In addition, observer coverage for the foreign fleet must be equal to that achieved for the U.S. fleet unless the National Marine Fisheries Service determines that an alternative observer program will provide sufficiently reliable documentary evidence of the nation's incidental take rate.

The amendments also imposed restrictions on tuna imports from intermediary nations. Before it can import tuna into the United States, each such nation must now provide reasonable proof that it has acted to prohibit the importation of tuna from any nation prohibited from directly importing tuna into the United States. In addition, any fishing or intermediary nation that has been banned from importing tuna into the United States for a six-month period must be certified under the Pelly Amendment to the Fishermen's Protective Act. Pelly Amendment certification may result in the imposition of a ban on the importation of all fish products from the offending nation.

Under the terms of the 18 March 1988 interim final rule, all findings of comparability for tuna fishing nations then in effect expired on 15 October 1988 unless, by 17 August 1988, the nation filed a substantially complete application for a new finding under the new regulations. Only Mexico filed such an application by the deadline and beginning on 15 October, the importation into the United States of yellowfin tuna from all other nations was prohibited. Shortly before the import ban was to go into effect, four nations (Ecuador, Vanuatu, Panama, and Venezuela) filed applications seeking findings of comparability. By letters of 8 and 9 November 1988, the Commission provided the Service with comments on the applications submitted by Vanuatu and Ecuador. The Commission expressed its view that neither country had provided the detailed description of its enforcement program required by the Service's interim final regulations and recommended that the Service defer issuing findings of comparability until such detailed descriptions had been provided. In a 16 November letter, the Commission provided similar recommendations for Venezuela and Panama, which, in the Commission's opinion, had also not sufficiently described their enforcement programs.

Despite the Commission's recommendations, the Service issued positive determinations of comparability for the programs of all four countries. In a 5 December 1988 letter to the Commission, the Service indicated that the four nations had provided "limited information" on the details of their enforcement programs, but the Service had found them to be adequate "since these [foreign] laws or regulations are newly enacted and, as a result, there is no enforcement experience to document at this time." The Service further explained that it will be able to judge the nations' enforcement programs better after the submission of annual reports by the four countries in July 1989.

### Research Activities and Planning

The 1984 amendments to the Marine Mammal Protection Act directed that the National Marine Fisheries Service undertake a scientific research program to monitor indices of abundance and trends in porpoise populations affected by the yellowfin tuna purse seine fishery in the eastern tropical Pacific Ocean. The research program was to begin on 1 January 1985 and continue for at least five years. In response to this directive, the Service, in consultation with the Marine Mammal Commission, the U.S. tuna fishing industry, and the Inter-American Tropical Tuna Commission, convened a series of meetings in 1984 to plan the monitoring program. However, as noted in previous Commission reports, because of funding and logistics constraints, the program was not initiated until July 1986.

The porpoise monitoring program begun in July 1986 was continued in 1987 and 1988. In 1988, as in 1987, two National Oceanic and Atmospheric Administration research vessels, the David Starr Jordan and the MacArthur, conducted porpoise surveys and related oceanographic studies in the eastern tropical Pacific Ocean. The 1988 surveys, which began in July and ended early in December, provided sighting data necessary to determine and detect changes in the distribution, number, size, and composition of porpoise schools in the eastern tropical Pacific Ocean. In addition, a number of porpoise schools were photographed from a helicopter carried aboard the David Starr Jordan. The data obtained provided a basis for calibrating shipboard estimates of porpoise school size and can be used to estimate the relative ages (size) of animals making up the schools.

In addition to the shipboard surveys, the National Marine Fisheries Service has developed and is using a computer model to evaluate possible methods for using porpoise sighting data collected by observers aboard tuna purse seiners for estimating trends in porpoise abundance.

As noted in Chapter II, the 1988 amendments to the Marine Mammal Protection Act direct the National Marine Fisheries Service to contract with the National Academy of Sciences to conduct an independent review to identify research necessary to evaluate potentially promising new methods for locating and catching yellowfin tuna without the incidental taking of marine mammals. To help develop terms of reference for this contract study, the National Marine Fisheries Service convened a workshop at its Southwest Fisheries Center on 11-12 October 1988 to review what has been done and what more might reasonably be done to identify and evaluate possible alternatives to the practice of setting or porpoise schools to catch tuna. Workshop participants included representatives of the Service, the Marine Mammal Commission, the U.S. tuna fishing industry, environmental groups, and other organizations with interest or expertise relative to the problem.

At the end of 1988, it was the Commission's understanding that the National Marine Fisheries Service expected to be able to complete the remainder of the porpoise monitoring program initiated in 1986 and that it had initiated discussions with the National Academy of Sciences to agree on the terms of the contract study mandated by the 1988 amendments.

#### The Dall's Porpoise Issue

Dall's porpoise (*Phocoenoides dalli*) become entangled and die in gill nets used in drift gill net fishing operations in the North Pacific Ocean and Bering Sea. Most of this take has occurred incidental to operations of the Japanese high seas salmon fleet. In past years, the Japanese were permitted to fish for salmon inside the U.S. 200-mile Fishery Conservation Zone pursuant to the International Convention for the High Seas Fisheries of the North Pacific. As a result of recent litigation, however, the Japanese are prohibited under the Marine Mammal Protection Act from fishing for salmon within the U.S. Fishery Conservation Zone. The Court decision in this litigation received considerable attention during 1988 in association with reauthorization of the Marine Mammal Protection Act (see Chapter II). It also has implications for other activities such as offshore oil and gas exploration and development that result in the incidental take of marine mammals.

#### The Dall's Porpoise Permit, 1981-1986

As discussed in previous Annual Reports, beginning in 1981, the Japanese were required to obtain a Marine Mammal Protection Act incidental take permit for salmon fishing operations in U.S. waters under the North Pacific Fisheries Act. A general permit authorizing the Federation of Japan

Salmon Fisheries Cooperative Association to incidentally take up to 5,500 Dall's porpoise, 450 northern fur seals, and 25 northern sea lions per year was issued by the National Marine Fisheries Service in 1981 for the 1981-1983 fishing seasons. Through the 1982 amendments to the North Pacific Fisheries Act, the general permit was extended until 9 June 1987.

Under the North Pacific Fisheries Act, Japan was required to introduce new gear or fishing techniques into its entire salmon drift gill net fleet by the 1987 fishing season. The National Marine Fisheries Service has authority under the Act to determine what types of fishing gear or techniques offer the most practical and effective opportunity for reducing porpoise mortality and to specify which of those must be adopted by the Japanese fleet. In 1987, two types of nets were used. Twenty-one percent of the fleet used nets with three strands of multi-filament material along the midline of the net. The remainder of the fleet used nets with three strands of hollow tube material along the midline. It was hoped that these gear modifications would make it easier for porpoise to detect and avoid gill nets through echolocation. Preliminary reports suggest that there were no significant differences in the incidental catch of porpoise in the two net types.

Estimates based on U.S. observer coverage of the Japanese fishing operations indicate that, except through the reduction of fishing effort, there had been no progress in reducing the total level of Dall's porpoise mortality since the permit was issued. Making note of this trend, the Administrative Law Judge presiding over proceedings for the 1987 permit application concluded that the Federation had been without success in reducing the incidental take rate. Estimates for incidental take in each fishing season under the permit, including the 1987 season, are as follows:

Estimated Incidental Take of Dall's Porpoise  
by the Japanese Salmon Drift Net Fishery  
in the U.S. Fishery Conservation Zone  
in the North Pacific Ocean

<u>Year</u>	<u>Estimated Take</u>
1981	1,850
1982	4,187
1982	2,906
1984	2,443
1985	2,760
1986	1,456
1987	741

The low level of take in 1987 reflects, in large part, a substantial reduction in fishing effort. The take rate in the

U.S. Fishery Conservation Zone before the 1987 season is estimated at 0.47 porpoise per gill net operation. The mean observed take rate for the 1987 season was 0.26 porpoise per set.

#### The 1987 Permit

The extension of the 1981 general permit under the North Pacific Fisheries Act expired on 9 June 1987. To fish for salmon with gill nets in the U.S. Fishery Conservation Zone beyond that date, the Federation was required to have its permit renewed, pursuant to the requirements of the Marine Mammal Protection Act.

On 21 July 1986, the Federation applied to the National Marine Fisheries Service for a five-year general permit to incidentally take 5,500 Dall's porpoise, 450 northern fur seals, and 25 northern sea lions. Pursuant to section 103 of the Marine Mammal Protection Act, a formal rulemaking procedure was initiated. The Marine Mammal Commission participated in this procedure. The Administrative Law Judge issued his recommended decision on 6 March 1987. He recommended that a five-year permit be issued allowing the Federation to incidentally take 1,750 Dall's porpoise and 45 northern fur seals during 1987, and that, for each of four subsequent years, the quota be reduced by five percent from the previous year. He recommended denial of the request to take northern (Steller) sea lions. The Administrative Law Judge also made findings and recommendations concerning permit terms and conditions and further research needs.

The final decision of the Under Secretary of Commerce and the general permit were issued on 22 May 1987. The final decision was published in the Federal Register on 28 May 1987. The permit was issued for three years and established an aggregate three-year quota of no more than 789 Dall's porpoise from the Bering Sea stock and no more than 5,250 porpoise from the North Pacific Ocean stock. During any calendar year, no more than 448 animals could be taken in the Bering Sea and no more than 2,494 from the North Pacific Ocean. In accordance with the Commission's recommendation, the request to take fur seals and sea lions was denied on the grounds that the Federation had failed to meet its burden of proof to demonstrate that the affected stocks were within their optimum sustainable population levels and that the projected levels of take would not be to the disadvantage of those stocks. The permit was subject to numerous conditions, including requirements for observer coverage and gear modifications. Under the permit, the Federation began fishing operations within the U.S. Fishery Conservation Zone on 12 June 1987 and completed operations by 12 July 1987.

## Litigation

Shortly after the final decision, lawsuits were filed in the U.S. District Court for the District of Columbia by the Kokechik Fishermen's Association, representing Alaskan subsistence fishermen; the Center for Environmental Education, representing numerous environmental organizations; and the Federation. Kokechik and the Center alleged, among other things, that the permit violated the Marine Mammal Protection Act because it applied to only Dall's porpoise when it was certain that other marine mammals would be taken incidentally. The Federation claimed that the denial of the request to take fur seals was improper, that it was unlawful to require the placement of U.S. observers on Japanese vessels outside U.S. waters, and that the quota levels were improper. Subsequently, the Federation voluntarily dismissed its causes of action on the observer coverage and the quota.

On 15 June 1987, the U.S. District Court issued its decision in Federation of Japan Salmon Fisheries Cooperative Association v. Baldrige, and ruled in favor of Kokechik and the Center. The Court preliminarily enjoined the permit and held that Kokechik and the Center had demonstrated a substantial likelihood of success on the merits of their claim that the permit unlawfully allowed the taking of one species of marine mammal, Dall's porpoise, even though it was known that other species would be taken by the same fishing operations. The Court denied the request of the National Marine Fisheries Service and the Federation for a stay pending appeal. However, the injunction was withheld for 20 days to allow the parties to request a stay from the Court of Appeals. During this time, the Federation continued its fishing operations.

On 10 July 1987, the Federation requested a stay of the injunction from the U.S. Court of Appeals for the District of Columbia Circuit. The National Marine Fisheries Service moved for expedited review and a stay on 13 July 1987, the same day that the District Court's preliminary injunction took effect. Both motions were denied on 16 July 1987. The Federation voluntarily terminated its operations within the U.S. Fishery Conservation Zone on 12 July 1987.

The Federation and the Secretary of Commerce appealed the District Court decision. On 16 February 1988, the U.S. Court of Appeals for the District of Columbia Circuit issued its decision in Kokechik Fishermen's Association v. Secretary of Commerce and affirmed the District Court, with one judge dissenting. In so holding, the Court stated that the Secretary of Commerce has no authority to disregard incidental takings of certain species or stocks, even if the impact is negligible, in issuing a permit that authorizes the take of another species or stock. On 11 May 1988, the Court denied the Federation's

and the Secretary's petitions for rehearings en banc. At the end of 1988, a petition for a writ of certiorari filed by the Secretary was pending before the U.S. Supreme Court. A decision on the petition is expected early in 1989. As a result of these decisions, the Federation did not conduct salmon fishing operations inside the U.S. Fishery Conservation Zone in 1988.

#### Marine Mammal Protection Act Reauthorization

In response to the decision on Kokechik Fishermen's Association v. Secretary of Commerce, domestic fishing groups expressed concern during the 1988 Marine Mammal Protection Act reauthorization process that the Court's interpretation would prevent the National Marine Fisheries Service from renewing their incidental take permits when they expired at the end of 1988. This concern was based on the fact that those permits did not cover all marine mammals likely to be taken incidental to domestic fishing operations.

In response to these concerns, the Act was amended to provide a limited five-year exemption from the incidental take prohibition for domestic fisheries other than the tuna industry. In establishing this exemption, Congress made it clear that this amendment would not be available to the Japanese salmon gill net fleet. Requirements of this amendment are discussed in Chapter II of this Report.

#### Administrative Review and Research

In its 9 January 1987 reply brief to the Administrative Law Judge, the Commission made numerous recommendations concerning research and monitoring conditions that should be included in the permit. Most of these recommendations were adopted by the Administrative Law Judge in his recommended decision, accepted by the Under Secretary in the final decision, and incorporated into the permit. With the termination of fishing operations as a result of the litigation, those monitoring conditions ceased to have application after the 1987 fishing season. Research has been drastically curtailed.

On 20 November 1987, the Commission recommended to the National Marine Fisheries Service that the annual report/action plan requirements of the North Pacific Fisheries Act, which expired on 9 June 1987, be formally extended for every year the Federation conducts activities in U.S. waters. In its 20 November 1987 letter, the Commission also requested that the Service comply with the North Pacific Fisheries Act by preparing a report on the results of the Federation's fishing activities for 1986 and publishing a notice of availability of that report in the Federal Register. Finally, the Commission requested information on the enforcement actions taken by the Service with respect to unauthorized incidental takes of

marine mammals other than Dall's porpoise during 1987 fishing operations.

The Service responded by letter of 25 February 1988. It stated that, although there may be value in continuing the public review annual report/action plan requirement, budget constraints would prevent the Service from following that course. Alternative public review strategies were set forth by the Service, and responses were provided to the Commission's information requests.

Under the current legal regime, the Japanese are prohibited from drift net fishing for salmon within the U.S. Fishery Conservation Zone. The Commission will monitor future developments with respect to this fishery, including, as possible, the effects of its activities on marine mammals outside the U.S. Fishery Conservation Zone.

## CHAPTER VIII

### OTHER MARINE MAMMAL/FISHERY INTERACTIONS

Marine mammals may interact with fisheries in a number of ways in addition to those described in the previous chapter. They may be disturbed, harassed, injured, or killed, either incidentally or deliberately, during fishing operations; they may take or damage bait and fish caught on lines, in traps, and in nets; they may damage or destroy fishing gear while trying to remove bait or caught fish or when they accidentally become entangled in fishing gear; and they may compete with commercial and recreational fishermen for the same fish and shellfish resources.

Before passage of the Marine Mammal Protection Act in 1972, regulated and unregulated hunting, bounty programs, and various forms of harassment were used in a number of areas to eliminate or reduce marine mammal populations and thus eliminate or reduce damage and loss of gear and catch being caused, or thought to be caused, by marine mammals. As a result, marine mammal populations in a number of areas were reduced to and held at very low levels.

The Marine Mammal Protection Act recognized that marine mammal/fishery interactions could have significant adverse effects on marine mammals, on fish and shellfish stocks, on fisheries, and on the ecosystems of which they are a part. The Act mandates that the primary objective of marine mammal management should be to maintain the health and stability of the marine ecosystem. It provided that marine mammals could be taken incidentally in the course of commercial fishing operations and that permits authorizing such take could be issued to fishermen, subject to regulations prescribed by the Secretaries of Commerce and the Interior.

To insure that marine mammal populations were not affected adversely by incidental take, the Act: prohibited the taking of depleted species and populations (*i.e.*, those that are below their level of maximum net productivity); directed that all feasible efforts be made to reduce to insignificant levels the incidental killing and injury of marine mammals during commercial fishing operations; and required that, before waiving the moratorium on taking or issuing permits authorizing the take of marine mammals during commercial fishing operations, the Secretary of Commerce or the Interior must determine that the affected population is at or above its maximum net productivity level and will not be adversely affected by the authorized taking. In addition, the Act requires that, in cases where waivers are requested to permit population

reduction, the Secretary shall determine whether it would be preferable to capture and transport the excess animals to another location within the species' historic range, rather than killing them.

### Summary of Commission Actions

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has devoted considerable attention and funds to efforts to identify and determine how best to resolve problems caused by marine mammal/fishery interactions. In December 1977, the Commission convened a workshop to gather and review available information on the nature, extent, and impacts of interactions between fisheries and marine mammal populations in Oregon, Washington, California, Alaska, and Hawaii. The workshop concluded that the most acute problem seemed to involve seals, sea lions, and salmon gill net fisheries in the Copper River Delta area of Alaska and in the Columbia River area of Washington and Oregon (for more information, see Mate, 1980, Appendix B). In response to the workshop findings, the Commission, among other things, provided funds to initiate assessment of the interactions in the Copper River Delta (see Matkin and Fay 1980, Appendix B) and to begin development of a plan to assess and determine how to resolve the problems being caused by interactions in the Columbia River and adjacent areas.

As noted in previous Annual Reports, additional studies subsequently were initiated by the National Marine Fisheries Service, the North Pacific Fishery Management Council, and the States of Alaska, Washington, Oregon, and California. These studies were undertaken to better determine the nature and extent of interactions between certain fisheries and marine mammals in the Bering Sea, in waters off the U.S. west coast from Washington to California, and off New England. The studies were not planned or carried out cooperatively and, in October 1981, the Commission convened a second workshop to review and determine what steps should be taken to improve and coordinate ongoing and planned studies.

Participants in the 1981 workshop concluded that: (1) it is not possible to make broad generalizations about marine mammal/fishery interactions in different areas and each situation must therefore be considered individually; (2) because of the potentially complex nature of indirect (food chain) interactions among marine mammals, fisheries, and fish and shellfish resources, there is a substantial risk of making bad management decisions; (3) to minimize the risk of making bad management decisions, marine mammals and fisheries should be managed cooperatively in areas where they may be competing for, or otherwise affecting, the same fish or shellfish stocks;

(4) because funding is limited and direct interactions are less complex and therefore easier to assess and deal with, high priority initially should be afforded to research on direct rather than indirect interactions; (5) ongoing efforts to determine and document the nature and extent of impacts on both the involved fisheries and marine mammal populations should be expanded to identify and evaluate the relative cost and benefits of possible mitigation measures; and (6) when remedial measures are determined to be necessary, non-lethal measures should be considered before lethal measures.

As noted in previous Annual Reports, expansion of both domestic and foreign fisheries in the southeastern Bering Sea and other areas off Alaska since the mid-1960s has increased the potential for marine mammal/fishery interactions and has focused attention on possible competition between marine mammals and fishermen for the same fish and shellfish resources. Because of the potential adverse effects on marine mammals, fisheries, and the fish and shellfish stocks upon which both depend, the Marine Mammal Commission and the North Pacific Fishery Management Council initiated cooperative efforts in 1980 to develop and implement an ecosystem approach to the management of marine mammals and fishery resources in areas under the Council's jurisdiction. As part of this effort, the Commission and the Council jointly supported a workshop in October 1983 to review available information concerning biological interactions among marine mammals and commercial fisheries in the southeastern Bering Sea. Papers presented during the workshop indicated significant potential for interactions between the following marine mammals and fisheries:

North Pacific fur seal	groundfish, capelin, squid, herring
Northern (Steller) sea lion	groundfish, herring, capelin, salmon
Harbor seal	groundfish, herring, capelin, salmon
Spotted seal	groundfish, herring, capelin
Beluga whale	salmon, herring, capelin
Harbor porpoise	groundfish, herring, capelin
Dall's porpoise	salmon
Killer whale	salmon
Gray whale	salmon
Fin whale	herring
Minke whale	herring

Workshop participants concluded that available information generally was insufficient to assess accurately the effects of the interactions on the affected fisheries, fish stocks,

or marine mammals. They identified the types of research and monitoring programs necessary to determine the nature, magnitude, and effects of the interactions.

Although substantial effort has been devoted to determining the nature, magnitude, and effects of marine mammal/fishery interactions, relatively little has been done to identify and evaluate the relative cost and benefits of measures that possibly could be taken to avoid or reduce the adverse effects of interactions. This fact was noted during the Commission's meeting in San Diego, California, in October 1985. Following that meeting, the Commission and the California Department of Fish and Game agreed to cooperatively sponsor a workshop to determine and describe such additional measures as may be necessary to assess, avoid, and reduce the adverse effects of interactions between marine mammals and fisheries in California. The workshop, held on 26-28 March 1986, was planned and supported cooperatively by the Commission, the California Department of Fish and Game, the California Sea Grant Program, the National Marine Fisheries Service, and the Fish and Wildlife Service. Participants included representatives of these agencies, commercial fisheries, the academic community, and public interest groups. Workshop participants concluded that several fisheries and marine mammal populations in California were being affected so severely that measures may be necessary to reduce or mitigate interactions.

Workshop participants noted that steps taken by the California Department of Fish and Game and the California State Legislature to prohibit the use of drift nets and set nets at certain times and in certain areas to prevent or reduce the incidental take of sea birds and marine mammals were having an adverse economic impact on some fishermen. They recommended that a feasibility study and, if appropriate, an engineering/assistance program be carried out to assess the potential utility of converting small gill net vessels to alternative types of gear (e.g., Danish seines and pair trawls) to permit resumption of halibut and other fisheries in areas where use of set nets have been prohibited to protect birds, sea otters, harbor porpoise, and gray whales. Participants also noted that studies should be done to identify factors (e.g., the length of time that nets are left in the water) that may be causing or contributing to the incidental take of harbor porpoise, harbor seals, and other marine mammals in California and elsewhere.

Because of uncertainties concerning the effects of some fisheries on marine mammals, workshop participants concluded that survey, reporting, and observer programs should be continued and, in some cases, expanded to provide more reliable information on the species, numbers, ages, sex, and reproductive condition of marine mammals being taken, both deliberately

and incidentally, in set net, drift net, troll, and other fisheries in California. Participants noted that depredation by California sea lions and harbor seals of fish caught by party boat fishermen, by gill net fisheries, and by salmon troll fisheries could be caused by a small number of "nuisance" animals who have learned that food is easy to obtain in the vicinity of fishing gear and vessels or by a general cross-section of animals present in fishing areas. Participants pointed out that it might be possible to use non-lethal aversive stimuli to frighten and keep seals and sea lions away from fishing gear and fishing areas. They concluded that additional studies should be done to evaluate this potential. Finally, the participants noted that long-term monitoring of both the affected fisheries and the affected marine mammal populations is necessary to evaluate the relative advantages and disadvantages of measures taken to avoid or reduce interactions.

#### The 1988 Marine Mammal Protection Act Amendments

Although the Marine Mammal Protection Act, as noted earlier, provided that the Secretaries of Commerce and the Interior may issue permits authorizing the incidental take of marine mammal species and populations that are at or above their maximum net productivity (MNP) level, available information often is insufficient to determine whether the affected marine mammal species and populations are at, above, or below their MNP level and what if any level of take can be sustained without causing the species or population to be reduced or to be maintained below its MNP level. Also, the Act prohibits the take of depleted species and populations, except in a few restricted instances such as for Native subsistence and for research purposes, even in cases where the take would have little or no effect on the recovery of the affected species or population.

In addition, as noted in Chapter II of this report, a 1988 decision by the United States Court of Appeals (Kokechik Fishermen's Association v. Secretary of Commerce, 839 F.2d 795, D.C. Cir. 1988) invalidated an incidental take permit which the National Marine Fisheries Service had issued to the Federation of Japan Salmon Fisheries Cooperative Association and cast doubt on the Service's ability to issue incidental take permits without sufficient information to demonstrate that all species and populations likely to be taken are at or above their MNP level.

It was generally recognized that a total prohibition on the incidental taking of depleted species could have severe economic impact on certain U.S. fisheries. In addition, it was clear that available information was insufficient to accurately assess and determine how best to avoid or mitigate

the adverse effects of marine mammal/fisheries interactions. In response to these concerns, representatives of the U.S. conservation community and fishing industry proposed to Congress in May 1988 that the Marine Mammal Protection Act be amended to allow for a limited, three-year exemption to the provisions of the Act dealing with incidental take permits. During this time, programs would be initiated to compile and analyze data on the types, levels, and implications of marine mammal/fisheries interactions.

Congress generally concurred with the proposal and in October 1988 passed amending legislation which, among other things, suspends until 1 October 1993 the general permit and small take provisions of the Marine Mammal Protection Act applicable to U.S. fishermen and those foreign fishermen authorized to fish in U.S. waters pursuant to Section 204 of the Fishery Conservation and Management Act. The amendments also require that owners of vessels engaged in fisheries that take marine mammals more than rarely in U.S. waters register with the Secretary of Commerce (National Marine Fisheries Service) and report all incidents of interactions with marine mammals.

To help implement these provisions, the amendments require that: (a) by 23 March 1989, the National Marine Fisheries Service, in consultation with the Commission and after an opportunity for public comment, develop a list identifying those fisheries that take marine mammals frequently, occasionally, and rarely; (b) 20 to 35 percent of the fishing effort by vessels engaged in fisheries identified as taking marine mammals frequently be monitored by National Marine Fisheries Service observers onboard the vessels; (c) a volunteer observer program or alternative observation program be developed by the National Marine Fisheries Service to obtain statistically reliable information on the species and numbers of marine mammals being taken incidentally by fisheries for which required observers are not available or for which reliable information is not available; and (d) the National Marine Fisheries Service design and implement an information management system capable of processing and analyzing incidental take and related data provided by fishermen, observers, and others.

The amendments, which were signed by the President and became law on 23 November 1988, also provide that, if the Secretary finds that the incidental taking of marine mammals in a fishery is having an immediate and significant adverse impact on a marine mammal population or, in the case of Steller sea lions and North Pacific fur seals, that more than 1,350 and 50 animals, respectively, will be killed incidentally during a calendar year, the Secretary shall consult with the appropriate Regional Fishery Management Councils and State fishery managers, and prescribe emergency regulations to

prevent, to the maximum extent practicable, any further taking. In addition, the amendments require that the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, develop and, by 1 February 1990, provide to the Secretary of Commerce recommended guidelines to govern the incidental taking of marine mammals in the course of commercial fishing operations after 1 October 1993.

By letter of 6 December 1988, the Marine Mammal Commission advised the National Marine Fisheries Service of steps that should be taken to begin implementing the amendments. The Commission recommended that, if the Service had not already done so, it consult with the Fish and Wildlife Service to determine the species and the frequency with which marine mammals under the Fish and Wildlife Service's jurisdiction (e.g., sea otters, manatees, and walrus) are being taken incidental to various fisheries.

The Commission noted that fishermen would be required to compile and report information concerning interactions with marine mammals and, to define and help fishermen meet these new reporting requirements, recommended that the Service consult with its regional research and management staffs, the Regional Fishery Management Councils, State regulatory agencies, and other interested persons to determine what incidental catch data are presently being reported, how the reports are filed, and what additional data or standardization of reporting forms would be necessary to meet the new reporting requirements. The Commission also pointed out that it may be necessary to allocate the established quotas of Steller sea lions and North Pacific fur seals among different fisheries and that it would be necessary to develop a system to insure that the quotas are not exceeded. It recommended that the Service work with the North Pacific Fishery Management Council, the State of Alaska, affected fishermen, and other interested parties to develop guidelines for allocating the quotas among those fisheries known to take Steller sea lions and North Pacific fur seals, and to develop procedures for monitoring the incidental take and regulating fisheries, when necessary, to insure that the quotas are not exceeded.

In 1989, the Marine Mammal Commission will continue to work with the National Marine Fisheries Service, the State agencies, the fishing industry, public interest groups, and the academic community to implement the amendments.

## CHAPTER IX

### MARINE MAMMAL MANAGEMENT IN ALASKA

Since enactment of the Marine Mammal Protection Act in 1972, issues concerning marine mammals in Alaska have assumed greater significance and have been the focus of more attention than those in any other state. A number of states are confronted with important conservation problems that involve one or more species of marine mammals. Alaska, however, by virtue of the large number of marine mammal species found there, its extensive coastline, the use of marine mammals for subsistence purposes by Alaska Natives, interactions with commercial fisheries, and many other management issues concerning marine mammals, presents extraordinary conservation challenges. In recognition of this fact, the Commission has made marine mammal issues in Alaska a matter of high priority.

#### Marine Mammal Working Groups and Species Reports

The Marine Mammal Protection Act makes provision for management of marine mammals by the Federal Government and, under certain conditions described in the next section, by states. It has been the Commission's view that, whether management authority resides with the State, the Federal Government, or a cooperating group of interests, such authority must rest upon a foundation of carefully described and generally accepted research and management programs. To develop such programs, the Commission established, in 1984, Alaska Marine Mammal Working Groups to oversee development of species reports for ten species of marine mammals in Alaska: walrus (Odobenus rosmarus), polar bear (Ursus maritimus), ringed seal (Phoca hispida), bearded seal (Erignathus barbatus), ribbon seal (Phoca fasciata), spotted seal (Phoca largha), harbor seal (Phoca vitulina), northern sea lion (Eumetopias jubatus), beluga whale (Delphinapterus leucas), and sea otter (Enhydra lutris).

The Commission adopted the working group approach as a way of further focusing attention on the species in question, not upon bureaucratic processes, and in the belief that:

(a) research and management plans should be developed in a non-political environment with benefit of carefully developed and generally agreed-upon species accounts and problem descriptions as base documents; (b) research upon which to base an effective marine mammal conservation program must be derived from, among other things, careful consideration of both research and management issues; and (c) to be useful, species reports

should be cooperatively developed by groups of people with broadly representative marine mammal interests and experience.

The ten Working Groups involved biologists, biometricians, Native subsistence users, conservationists, and State and Federal wildlife resource managers. The Groups were asked: (1) to prepare comprehensive summaries of available information on biological, ecological, and other factors affecting conservation; (2) to describe the research and management activities which they believed should be undertaken; and (3) to provide estimates of costs and priorities for the identified research and management tasks.

Recognizing the need to coordinate the Working Groups' efforts, the Marine Mammal Commission asked Jack W. Lentfer, a marine mammal and resource management specialist in Alaska, to oversee the effort. Since drafting the species accounts required considerable effort, the Commission contracted with a number of people to act as lead authors. Completed drafts of each paper were circulated among members of the appropriate Working Group for review and comment. The consultative process among lead author, Working Group members, other interested persons, and the Commission continued until there was general agreement on each paper's content. The papers' strengths come, in no small measure, from the fact that they represent a broadly agreed-upon body of factual information and recommendations.

The Marine Mammal Commission believes that these ten species reports help provide the needed basis for developing and implementing marine mammal conservation plans in Alaska. Therefore, in 1988, the Commission allocated funds to publish the reports in a document titled, "Selected Marine Mammals of Alaska, Species Accounts with Research and Management Recommendation" (see Lentfer 1988, Appendix B).

When viewed collectively, information provided in the species reports identified ten high priority research and management tasks. They are: 1) identify and conduct such additional studies as necessary to determine what is causing and how to stop and reverse the ongoing declines of Steller sea lions and harbor seals in parts of Alaska; 2) continue and improve monitoring and sampling programs to obtain more reliable information on the numbers, ages, sex, reproductive status, general condition and other characteristics of polar bears, walruses, seals, beluga whales, sea otters and other marine mammals being taken for subsistence purposes by Alaska Natives; 3) obtain more reliable information on the relative discreteness and current status of various species and populations being affected, or potentially being affected, by Native subsistence hunting, Soviet commercial hunting, oil and gas exploration and development, and other activities;

4) identify and initiate the types of periodic, long-term survey and sampling programs necessary to detect and monitor changes in key populations parameters; 5) improve reporting and verification of the species, number, ages, sex, reproductive status, stomach contents, and general condition of marine mammals being caught and killed in Alaska fisheries, and the nature and extent of fish loss, fish damage, and gear damage being caused by marine mammals; 6) obtain more reliable information on the key food species, habitat requirements, and essential habitats of polar bears, beluga whale, walruses, ice seals, and sea otters, and how these species and the species they depend upon for food may be affected by noise, oil spills, drilling muds, and other contaminants or disturbance produced by exploration, development, and transport of oil and gas; 7) identify and evaluate the feasibility, cost, and likely effectiveness of possible means for establishing and maintaining sea otters in designated zones so as to enhance sea otter protection and minimize the impacts of sea otters on crab and shellfish fisheries; 8) determine and monitor levels and sources of heavy metals and other contaminants present in Alaska marine mammals, particularly those species eaten by Alaska Natives; 9) continue and improve statewide information and education programs to ensure that Native hunters are aware of: relevant statutes and regulations regarding the reporting and collection of biological samples from animals taken for subsistence or other purposes; the status of the marine mammal species and populations they are hunting; and the possible dangers from consuming certain species or parts of marine mammals; and 10) develop and implement cooperative programs with Canada and the U.S.S.R. to jointly monitor and manage shared populations of polar bears, walruses, beluga whales, and other species.

The publication was widely distributed to Federal and State agencies, Native groups, and others with responsibilities for or interests in the conservation of marine mammals in Alaska. It is being used by agencies such as the Fish and Wildlife Service, the National Marine Fisheries Service, the Alaska Department of Fish and Game, and the Alaska Eskimo Walrus Commission to develop or update research and management plans for species under their jurisdiction.

#### Background Information on Transfer of Management

The Marine Mammal Protection Act sets forth certain procedures whereby the Secretaries of Commerce and/or the Interior may, in response to a properly submitted request, transfer authority for marine mammal management from the Federal Government to a State Government. In order to transfer Federal management authority, the Secretary with jurisdiction over the species in question must determine, after notice and opportunity for public comment, that the state has developed and

will implement a program that satisfies the requirements of section 109 of the Act for the conservation of the affected species. In making this determination, the Secretary must issue a finding that the state has, among other things, established a process to determine the optimum sustainable population of each affected species and the maximum number of animals that may be taken without reducing the species below that level.

Certain additional points are germane to requests for transfer of management to the State of Alaska. For example, in the case of depleted species, the State of Alaska's conservation and management program must include mechanisms to determine the maximum numbers of animals that can be taken by subsistence users while still allowing the species to increase towards its optimum sustainable population. Furthermore, Alaska's program must include a State statute and regulations requiring that subsistence takings not be wasteful and that priority use be given to subsistence rather than other consumptive uses of the species.

As discussed in previous Annual Reports, in 1976 the State of Alaska sought and received authority to manage walrus but, due to a subsequent court decision which effectively prevented the State from regulating Native subsistence hunting, relinquished that authority in 1979 to the Fish and Wildlife Service. In 1982, the State of Alaska again took preliminary steps to request a transfer of management for ten species of marine mammals -- the same species, listed above, for which species reports have been prepared. Early in 1984, the State solicited public comments to help it make a final decision on whether to proceed with the request. As a part of this process, the Alaska Department of Fish and Game conducted 49 public meetings to provide information on the transfer process requirements, to explain the likely consequences of a State management program, and to solicit comments from coastal residents and other affected parties. The meetings were completed early in 1985.

On 22 February 1985, the Alaska Supreme Court, in Madison v. Alaska Department of Fish and Game, invalidated a Board of Fisheries regulation designed to identify eligibility for subsistence fishing in the Cook Inlet region. The decision called into question the consistency of the State's subsistence requirements with provisions of the Marine Mammal Protection Act, thereby complicating the State's decision to request return of management authority for marine mammals.

On 30 May 1986, the State amended its subsistence law to remove the discrepancies between State and Federal subsistence requirements. By letter of 18 November 1986, the Department of the Interior's Assistant Secretary for Fish and Wildlife and Parks informed the State that the amendment brought State

law into compliance with the subsistence requirements of the Alaska National Interest Lands Conservation Act. Those requirements are virtually identical to the subsistence provisions of section 109(f)(1) of the Marine Mammal Protection Act. Thus, it appears that the impediment to transfer of management imposed by the Madison decision has been removed.

On 21 December 1987, the Alaska Department of Fish and Game wrote to the Commission advising it that another series of 17 public meetings had been completed to obtain views on matters related to three species, polar bear, walrus, and sea otter, being considered as the possible focus of a more limited request for management authority. Twelve other meetings with various agencies, organizations, and interest groups were also held to discuss what was under consideration, to identify major concerns about management of marine mammals in Alaska, and to exchange views with Alaskans interested in the issue.

By letter of 9 March 1988, the State of Alaska Department of Fish and Game notified interested parties that the State had decided not to apply for management authority for walruses, polar bears, or sea otters under the Marine Mammal Protection Act. Instead, the State noted that it planned to initiate efforts to establish a system for developing comprehensive management plans for marine mammals through a process involving the Alaska Department of Fish and Game, appropriate Federal agencies, user groups, and other interested parties. As explained in the 9 March letter, it is the State's intention to submit the management plans to the Secretary of Commerce or the Interior for approval, and to seek to implement the plans through federal procedures or cooperative agreements.

#### Federal Marking and Tagging Regulations

In 1981, the Marine Mammal Protection Act was amended to provide the Fish and Wildlife Service with authority to promulgate regulations requiring the marking, tagging, and reporting of marine mammals taken by Alaska Natives. The purpose of the amendment was to make it possible to obtain better information on the numbers of marine mammals taken for subsistence and handicraft purposes.

On 3 December 1985, the Fish and Wildlife Service published proposed marking and tagging regulations to implement the new statutory requirement. During the comment period, 32 public meetings were held throughout Alaska to discuss the proposed regulations and to solicit comments from affected individuals and interested parties. By letter of 3 March 1986, the Commission, in consultation with its Committee of Scientific Advisors, recommended that the regulations be adopted, subject to certain modifications. Among other changes, the Commission

recommended that: (a) the data obtained as a result of the regulations should be summarized each year in the annual report which the Fish and Wildlife Service submits to Congress under the Marine Mammal Protection Act; (b) the penalty provisions of the regulations should apply to the transport and export of unregistered marine mammal parts; and (c) a cost-effective, administratively flexible approach should be established for designating the villages where authorized Service representatives would be stationed for marking, tagging, and reporting purposes.

Final regulations were published by the Service on 28 June 1988. The regulations require Alaska Natives, within 30 days of the taking, to report the take of polar bears, walrus, and sea otters and to present for marking or tagging specified animal parts. Polar bear and sea otter skins and skulls and walrus tusks must all be marked or tagged. Reports must include, among other things, the date and location of the take and the sex of the animal taken. Parts from these three marine mammal species taken between 21 December 1972 (the date the Marine Mammal Protection Act was enacted) and 26 October 1988 (the effective date of the regulations) and which have not yet been converted into handicrafts must be presented for marking by 24 April 1989. Possession or transportation of unmarked marine mammal parts, except as authorized in the regulations, will constitute a violation of the Act.

#### Litigation

In a lawsuit filed in 1985 (Katelnikoff v. U.S. Department of the Interior), an Alaska Native challenged the validity of the Fish and Wildlife Service's regulatory definition of "authentic Native articles of handicraft and clothing." That definition requires that, in order to qualify for the Marine Mammal Protection Act's Native-take exemption, handicraft articles fashioned from marine mammal parts and products must have been "commonly produced on or before December 21, 1972." The plaintiff's complaint alleged that the cutoff date has no basis in the Marine Mammal Protection Act.

The litigation arose as a result of a seizure by Fish and Wildlife Service and National Marine Fisheries Service enforcement agents of several articles of handicraft made by the plaintiff out of sea otter skins. The items -- which included teddy bears, hats and mittens, fur flowers, and pillows -- were confiscated because there is no record indicating that such articles were commonly produced by Alaska Natives before the regulatory cutoff date. The plaintiff claimed that, by seizing these items, the Federal Government deprived her of the right to take marine mammals for handicraft purposes. A second plaintiff, whose sea otter handicrafts had also been seized

by Fish and Wildlife Service agents, intervened in the proceeding, adopting the legal arguments of the original plaintiff.

On 21 July 1986, the U.S. District Court for the District of Alaska issued a decision in favor of the Fish and Wildlife Service. Relying on both the express provisions and the legislative history of the Marine Mammal Protection Act, the Court held that it was a reasonable exercise of the Service's authority to establish a 1972 cutoff date as part of its regulations. The question of whether the seized handicrafts of the original plaintiff were commonly produced by Alaska Natives prior to the regulatory cutoff date was expected to be reviewed in an administrative proceeding. However, the intervenor, on 13 October 1987, raised a new challenge to the validity of the regulatory definition of "authentic Native articles of handicrafts and clothing," claiming that the regulation is unconstitutionally vague because it is unclear what handicrafts were produced prior to 21 December 1972.

On 27 June 1988, the Court issued an order stating that it would entertain the new argument despite the fact that civil penalty proceedings against the intervenor had been dismissed by the Fish and Wildlife Service. To do otherwise, the Court ruled, would be "manifestly unfair" to the intervenor, who still lacked clear guidance on what handicrafts could or could not be legally made.

While not ruling on the merits of the case, the Court strongly suggested that the regulatory definition was unconstitutionally vague since it was not clear to the Court what items could legally be made and sold as handicrafts. The Court indicated that, while the definition of "authentic Native articles of handicrafts and clothing" may be appropriate for other species of marine mammals, it may not be workable for sea otters because there has been so little traditional use of sea otters by Alaska Natives during the 19th and 20th centuries. As such, the Court suggested that the best way to resolve the issue would be for the Service to undertake an administrative review of the issue for the purpose of ascertaining whether the special case surrounding Native uses of sea otters calls for a special regulation or, at least, a definitive interpretation of the handicraft definition as it applies to sea otters.

In response to the Court's recommendation, the Service, on 14 November 1988, published a proposed rule to provide additional guidance on the allowable use of sea otters for the making and selling of traditional handicrafts and clothing. After reviewing the available information, the Service preliminarily concluded that sea otters were not being taken for handicraft purposes when the Marine Mammal Protection Act was passed and, apparently, had not been taken legally by

Alaska Natives for such purposes within living memory. Noting that the intent of the Act was to preserve existing Native uses of marine mammals, the Service proposed to amend the definition of "authentic Native articles of handicrafts and clothing" to indicate clearly that no items created in whole or in part from sea otters fit within the definition and, therefore, such items cannot be sold. Public comments on the proposed rule are due early in 1989.

A second matter involved the criminal prosecution of an Alaska Eskimo whaler for allegedly hunting and killing a bowhead whale in excess of his village quota, in violation of the Cooperative Agreement between the National Oceanic and Atmospheric Administration and the Alaska Eskimo Whaling Commission (see Chapter III). Under the regulations implementing the Whaling Convention Act, it is illegal to whale except in accordance with the Cooperative Agreement. On 24 October 1988, the defendant filed a motion to dismiss the charges against him, arguing that: the Cooperative Agreement was not in force when the alleged violations occurred since notice of its extension beyond 31 December 1987 had not been published in the Federal Register; the Cooperative Agreement impermissibly delegated management and enforcement authority over subsistence whaling to the Alaska Eskimo Whaling Commission, a non-governmental body; and the charged offenses are unconstitutionally vague.

A United States Magistrate in the District of Alaska reviewed the defendant's motion to dismiss and, on 15 November 1988, recommended that it be denied. In support of that recommendation, the Magistrate found that: the three applicable statutes, the Whaling Convention Act, the Marine Mammal Protection Act, and the Endangered Species Act, when read in concert, authorized entry into the Cooperative Agreement; the defendant had actual notice of the applicability of the provisions of the Cooperative Agreement when he allegedly undertook the prohibited activities; under the regulatory scheme, whaling may only be conducted in accordance with the Cooperative Agreement and, if the Cooperative Agreement had lapsed, no whaling would be authorized; and the statutes and regulations challenged by the defendant provide fair notice of the conduct that they forbid.

A trial was scheduled for 18 November 1988, but when the District Court adopted the Magistrate's recommended positions, the defendant entered a guilty plea, reserving the right to appeal the interpretations of the applicable law. Sentencing is scheduled for 27 January 1989.

## CHAPTER X

### OUTER CONTINENTAL SHELF OIL AND GAS DEVELOPMENT

Activities and oil spills associated with exploration and development of offshore oil and gas resources may adversely affect marine mammals and the ecosystems of which they are a part. Under the Outer Continental Shelf (OCS) Lands Act, the Department of the Interior's Minerals Management Service is responsible for predicting, detecting, and avoiding or mitigating the adverse effects of OCS exploration and development. The National Marine Fisheries Service and the Fish and Wildlife Service are responsible, under the Marine Mammal Protection Act and the Endangered Species Act, for reviewing proposed actions and advising the Minerals Management Service of measures that may be needed to assure that those actions will not be to the disadvantage of marine mammals and other wildlife. The Commission reviews relevant policies and activities of these agencies and recommends actions that appear necessary to protect marine mammals and their habitats. The Commission's activities in this regard in 1988 are discussed below.

#### Proposed OCS Lease Sale #91 Northern California

Lease Sale #91, tentatively scheduled for February 1989, involves leasing up to 223 blocks (approximately 1.1 million acres) of submerged lands 3 to 27 miles off the coast of northern California. Marine mammal species occurring in the area include at least 21 species of cetaceans (including seven species of endangered whales), five species of seals and sea lions, and the southern sea otter (listed as threatened under the Endangered Species Act). The Minerals Management Service's Draft Environmental Impact Statement (DEIS) on the proposed action was provided to the Commission and others for review and comment in December 1987. The Commission, in consultation with its Committee of Scientific Advisors, reviewed the DEIS and, by letter of 11 March 1988, provided comments to the Minerals Management Service.

In its letter, the Commission noted that the DEIS provided a thorough assessment of the ways that marine mammals hypothetically could be affected by seismic surveys, vessel and aircraft traffic, drill rig and pipeline construction and operation, oil spills, etc. that could result from Sale #91. However, the DEIS did not identify possible indirect (food-chain) effects or provide a thorough, objective, and adequate assessment of

the degree to which specific species and populations of marine mammals could be affected directly and indirectly if oil and gas exploration and development proceeded as proposed.

The Commission therefore recommended that the Statement be revised or expanded to: (1) identify and consider the possible effects of the proposed action on important marine mammal prey species and feeding areas; (2) provide more thorough assessments of possible direct and indirect effects on humpback whales, blue whales, North Pacific fur seals, Steller sea lions, harbor porpoise, and harbor seals; and (3) clearly identify the assumptions, data, or published reports upon which conclusions concerning the possible effects of the proposed action on marine mammals and their habitat were based. The Commission also recommended that the Minerals Management Service consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to identify the types of monitoring programs that would be necessary to verify predicted effects and to detect possible unforeseen effects of the proposed action on marine mammals in time to take effective mitigation measures.

Subsequent to its 11 March letter, the Commission received a copy of the National Marine Fisheries Service's Biological Opinion on Proposed Lease Sale #91, which had been submitted to the Minerals Management Service. The Commission, in consultation with its Committee of Scientific Advisors, reviewed the Biological Opinion and, on 24 May, provided comments to the National Marine Fisheries Service. In its letter, the Commission iterated the statements in the Biological Opinion that increasing numbers of humpback whales are found along the central and northern California coast in the vicinity of the proposed Lease Sale and that the observed movements of humpback whales may be in response to shifts in distribution of prey species. The Commission noted that the Biological Opinion addressed possible direct effects of noise and oil spills on humpback and other endangered whales, but did not appear to consider possible effects on important prey species and feeding areas, and thus the possible indirect effects on endangered whale species occurring in or near the proposed lease sale area. The Commission recommended that, if the Service had not already done so, it assess the possible indirect effects of the proposed sale on endangered cetaceans, particularly humpback whales, and advise the Minerals Management Service of its findings.

On 25 July, the National Marine Fisheries Service responded to the Commission's 24 May letter. In its response, the Service indicated that its Opinion addressed only leasing and exploration activities (not possible development activities) associated with Lease Sale #91. The response also noted that the Service had considered indirect (food chain) as well as

direct effects on humpback whales and other listed species, but it did not include a discussion of those effects in the Opinion. In this regard, the Service expressed the view that indirect effects would be insignificant because of the restricted scope of activities during the leasing and exploration phase considered in the Opinion and the large distance between the area being leased and areas where feeding concentrations of humpback and blue whales have been identified.

Proposed OCS Lease Sale #96  
North Atlantic

Lease Sale #96, tentatively scheduled for February 1989, involves leasing up to 1,014 blocks (approximately 5.5 million acres) of submerged lands 51 to 215 miles off the northeastern United States. Approximately 26 species of cetaceans, including six species of endangered whales (blue, fin, sei, humpback, right, and sperm), are found in the North Atlantic OCS region, 16 of which may be found in the lease sale area on a seasonal or year-round basis.

The Minerals Management Service prepared a Draft Environmental Impact Statement (DEIS) on the proposed action, which was distributed to the Commission and others for review and comment in February 1988. The DEIS concluded that, although the proposed action might result in a loss of some individual animals of endangered species, such losses were not expected to jeopardize the continued existence or recovery of any species or population. This conclusion was supported by the National Marine Fisheries Service's Biological Opinion for Lease Sale #96, which was transmitted to the Minerals Management Service on 10 February 1988.

With respect to pinnipeds, the DEIS indicated that, of the five species inhabiting the coastal and near-shore waters of the North Atlantic region (grey, harbor, harp and hooded seals and the walrus), only the grey and harbor seals have "noticeable" populations in the Gulf of Maine. Of these, it indicated that the grey seal was of particular concern because it has only one known breeding site in U.S. waters.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the DEIS and provided comments to the Minerals Management Service on 19 April 1988. The Commission indicated that the DEIS did not provide an adequate assessment of what and to what extent species and populations of marine mammals likely would be affected, both directly and indirectly, by the proposed action, particularly if oil and gas resources were to be developed in the proposed lease sale area. The Commission recommended that the Final Statement be revised and expanded to: (1) provide more information on the

natural history, feeding habits, diet, important habitats, status, abundance, and relative numbers of marine mammals that could be affected by the proposed action, particularly right and humpback whales, pilot whales, bottlenose dolphins, and harbor seals; (2) identify and consider the possible effects of the proposed action on important marine mammal prey species, feeding areas, breeding areas, and migratory paths; and (3) more clearly indicate the data, analyses, and assumptions on which the conclusions were based.

In its letter, the Commission noted that it was unlikely that available information is adequate to fully and accurately assess both the direct and indirect effects of the proposed action on marine mammals and the ecosystems of which they are a part. The Commission therefore recommended that the Minerals Management Service, in consultation with the National Marine Fisheries Service, develop and implement monitoring programs to verify predicted effects and to detect possible unforeseen effects before they reach unacceptable levels. The Commission also recommended that, if it had not already done so, the Minerals Management Service consult the National Marine Fisheries Service to determine measures it should take to help complete, adopt, and implement Recovery Plans for humpback and right whales. In this regard, the Commission recommended that the Service consult with the National Marine Fisheries Service and undertake such additional studies as necessary to: (1) identify the feeding and seasonal distribution and movement patterns of right whales in the region; (2) assess the possible effects of OCS activities on the availability of food species and how right whales in the area might respond to short- and long-term changes in the availability of food; and (3) determine the nature and possible cumulative effects of OCS activities along the Atlantic coast on the endangered right whale population and habitats critical to its survival.

Proposed OCS Lease Sales # 118 and #122  
Gulf of Mexico

Two OCS lease sales are planned for the Gulf of Mexico during 1989. These are Lease Sale #118, scheduled for March 1989, and Lease Sale #122, planned for August 1989. The former involves 6,265 blocks (approximately 33.5 million acres) of submerged lands from 3 to 220 miles offshore in the north-central Gulf area, and the latter involves 5,080 blocks (approximately 27.9 million acres) from 9 to 222 miles offshore in the northwestern Gulf area.

The Minerals Management Service prepared a Draft Environmental Impact Statement (DEIS) on the proposed actions, which was distributed to the Commission and others for review and comment in March 1988. The DEIS noted that 28 species of

marine mammals have been reported to occur in or migrate through the northern Gulf of Mexico and that six of these species (the West Indian manatee and the right, humpback, sei, fin, and sperm whale) are designated as endangered under the U.S. Endangered Species Act.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the Draft Statement and, by letter of 27 May 1988, provided comments to the Minerals Management Service. In its letter, the Commission noted that the DEIS identified the species of marine mammals that could be affected by the proposed action, but did not provide assessments of: marine mammal habitats and food resources that could be affected; the number of animals of the various species that could be affected, indirectly as well as directly; what proportion of the potentially affected species and populations are at risk; and the extent to which potentially affected species and populations have been and are being affected by other human activities.

The Commission further noted that the bottlenose dolphin is the most common marine mammal species in the proposed lease sale area and, therefore, the species most likely to be exposed to and affected by disturbances, oil spills, waste discharges, etc. that could result from the proposed action. The Commission recommended that the Statement be expanded to provide more complete descriptions of the natural history, demography, habitat requirements, diets, and essential habitats of marine mammals, particularly bottlenose dolphins, that may occur in and near the proposed lease sale areas. The Commission also recommended that the Statement be expanded to provide assessments of the possible indirect, as well as direct impacts of the proposed action, especially on possible "local" populations of bottlenose dolphins. The Commission further recommended that the Minerals Management Service consult with the National Marine Fisheries Service to determine what additional measures may be necessary to more reliably assess both direct and indirect effects and to detect and monitor possible unforeseen effects of the proposed action on bottlenose dolphins.

The Minerals Management Service's  
Environmental Studies Program

As noted above, the Minerals Management Service is responsible for assessing and avoiding or mitigating the possible adverse effects of offshore oil and gas exploration and development. To help meet this responsibility, the Service has established an Environmental Studies Program, which is administered regionally by its OCS offices in New Orleans, Louisiana; Los Angeles, California; Anchorage, Alaska; and Vienna, Virginia. The Service also has contracted with the

National Oceanic and Atmospheric Administration's Office of Oceanography and Marine Assessment to plan and administer the Alaska Outer Continental Shelf Environmental Assessment Program.

To help the Service meet its responsibilities with regard to the conservation and protection of marine mammals, the Commission, in consultation with its Committee of Scientific Advisors: reviews and provides comments on regional studies plans, environmental impact statements, and requests for proposals related to marine mammal research developed by the Service; participates, as requested, in meetings of Technical Proposal Evaluation Committees convened by the Service to review research proposals; and helps plan and participates in meetings and workshops to review and coordinate relevant research programs being conducted or planned by the Minerals Management Service, the National Marine Fisheries Service, the Fish and Wildlife Service, and other Federal, state, and private agencies and organizations.

Alaska Region: During 1988, the Commission reviewed the Minerals Management Service's Alaska Regional Studies Plans for Fiscal Years 1989 and 1990. By letter of 21 April 1988, the Commission provided comments to the Alaska OCS Office on the final Plan for FY 1989 as it pertained to marine mammals. In its letter, the Commission, among other things, questioned the need for and the scientific merit of a proposed study to experimentally determine the probable effects of crude oil on cetaceans trapped in an ice lead. The Commission noted that available information may be sufficient to develop a reasonably accurate model of what likely would happen to various species of whales entrapped in oil-covered ice leads and suggested that the Service contract for a "paper" study before committing to an experiment that could provide meaningless results or needlessly harm live animals. In its letter, the Commission also noted the lack of plans for polar bear studies, particularly in light of uncertainties regarding the number of female bears denning near existing or proposed lease sale areas. It suggested that the Service contact polar bear experts to help determine critical data gaps and how they can best be filled.

On 29 September, the Commission commented to the Service's Alaska OCS Office on the draft Alaska Regional Studies Plan for Fiscal Year 1990 as it pertained to marine mammals. Among other things, the Commission suggested that the Service expand the draft Plan to include a study to determine the number of female polar bears that den on land and ice near existing and proposed lease sale areas in Alaska. As evidence of the need for such a study, the Commission noted that oil exploration and development could affect polar bears in several ways, including disturbance during the winter denning period. The Commission further noted that the number of bears denning in and near Alaska OCS lease sale areas and the availability

of alternative denning sites outside these areas are not known. Consequently, additional studies are needed to determine what proportion of the Alaska polar bear population or populations could be affected by offshore oil and gas exploration and development. The Commission suggested that the Minerals Management Service consult with the Fish and Wildlife Service and the Alaska Department of Fish and Game to determine how the necessary information can best be obtained.

Pacific Region: On 16 November 1988, the Minerals Management Service's Pacific OCS Region provided and requested comments on the draft Fiscal Year 1990 Regional Studies Plan for the Pacific OCS Region. The Commission reviewed the portions of the plan related to marine mammals and, by letter of 14 December, provided comments. In its letter, the Commission advised the Service that, if it did not already plan to do so, it should develop and implement a program to detect and monitor possible long-term changes in selected marine mammal, bird, and fish populations that could result from offshore oil and gas exploration and development. The Commission noted that salvage and necropsy of dead animals that wash up on beaches may provide one of the most practical and economical means for detecting and monitoring effects of offshore development on coastal marine mammal populations. In this context, the Commission noted that the National Marine Fisheries Service coordinates recovery and study of both live and dead marine mammals that strand on U.S. beaches. The Commission advised that, if the Minerals Management Service had not already done so, it contact the person responsible for the West Coast stranding program to determine how the program might contribute to detecting and monitoring changes in marine mammal condition and population parameters that could result from offshore oil and gas activities.

In its comments on the Pacific Regional Studies Plan, the Commission also questioned whether all the proposed marine mammal-related studies were necessary and whether all necessary studies had been identified. In this context, the Commission noted that it was not clear whether the Pacific Region had identified studies necessary to assess possible second order (food chain) effects or to detect and monitor both possible first order and second order effects of offshore oil and gas exploration and development on marine mammals.

Gulf of Mexico Region: As noted above, in its comments on the DEIS for Proposed OCS Lease Sales #118 and #122, the Commission questioned whether available data are adequate to reliably assess the impacts of oil and gas exploration and development on local bottlenose dolphin populations and other marine mammal species in the Gulf of Mexico. The National Marine Fisheries Service shared this concern and, in November 1988, the Minerals Management Service convened a meeting in

St. Petersburg, Florida, to discuss possible means for identifying and determining how best to obtain needed information. Representatives of the Marine Mammal Commission, the Minerals Management Service, the Fish and Wildlife Service, and the National Marine Fisheries Service participated in the meeting. Participants agreed that it would be desirable to hold a workshop, involving scientists and others with expertise and interest in marine mammals and sea turtles in the Gulf of Mexico. The purpose of the workshop is to: identify critical information needs; describe the research that would be required to obtain needed information; and estimate the time, money, and other resources that would be required to do the described research. At the end of the year, plans for the workshop, scheduled to be held in August 1989, were being finalized.

#### Small Take Exemption

Under section 101(a)(5) of the Marine Mammal Protection Act, as amended, U.S. citizens engaged in activities other than commercial fishing may, under certain conditions, be authorized to incidentally take small numbers of marine mammals. On 16 February 1988, six oil and gas exploration companies jointly petitioned the National Marine Fisheries Service for permission to take small numbers of bowhead and gray whales incidental to oil and gas exploration activities in the Beaufort and Chukchi Seas adjacent to the coast of Alaska. The Commission, in consultation with its Committee of Scientific Advisors, reviewed the petition and, by letter of 13 July 1988, forwarded its comments to the National Marine Fisheries Service.

In its letter, the Commission concurred with the petitioners' statement that it is reasonable to assume that noise and disturbance from exploration activities likely would have negligible effects on bowhead and gray whale survival and productivity, and no more than temporary, localized effects on the availability of whales to Native subsistence hunters. However, the Commission questioned other conclusions and assumptions contained in the petition. Specifically, it questioned whether the probability of an oil spill occurring and contacting whales or important whale habitats was sufficiently small that the possible impacts of oil spills need not be considered, particularly since there is no proven technology for dealing with an oil spill under such circumstances. The Commission further noted that, while it believed it was reasonable to assume that noise and disturbance from exploration activities are likely to have negligible effects on the survival and productivity of gray whales and bowhead whales, this does not mean that noise and disturbance from development and production activities would also have negligible effects.

The Commission therefore recommended that the Service: (1) clearly indicate any assumptions and uncertainties concerning the possible effects of offshore oil and gas exploration activities on gray and bowhead whales; (2) specify the additional baseline research and monitoring programs that would be required to verify the predicted effects and detect any unforeseen effects in time to insure that they too are negligible; (3) provide for issuing letters of authorization to each company authorized to take bowhead whales, gray whales, and/or other species under the exemption and make continued authorization after the first year contingent, among other things, on the submission of reports indicating when, where, how, and how many animals may have been affected by the activities during the preceding year; (4) make it clear that, because they likely would be greater in duration and scale, it may not follow that the effects of disturbance and noise from development and production activities would also be judged negligible; and (5) as possible, indicate the additional information that might be required to accurately predict the possible direct, indirect, and cumulative effects of development and production activities on the survival and productivity of bowhead whales, gray whales, and any other species or population stocks covered by the exemption.

## CHAPTER XI

### RESEARCH AND STUDIES PROGRAM

The Marine Mammal Protection Act requires that the Commission: maintain a continuing review of research programs conducted or proposed to be conducted under the authority of the Act; undertake or cause to be undertaken such other studies as it deems necessary or desirable in connection with marine mammal conservation and protection; and take every step feasible to prevent wasteful duplication of research. To accomplish these tasks, the Commission: conducts an annual survey of Federally-funded marine mammal research; reviews and recommends steps that should be taken to prevent duplication and improve the quality of marine mammal research programs conducted or supported by the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, the Minerals Management Service, and other Federal agencies; convenes meetings and workshops to review, plan, and coordinate marine mammal research; and contracts for studies to help define and develop solutions to domestic and international problems affecting marine mammals and their habitats so as to facilitate and complement other agencies' activities.

#### Survey of Federally-Funded Marine Mammal Research

Research directly or indirectly relevant to the conservation and protection of marine mammals and their habitat is conducted or supported by a broad spectrum of Federal departments and agencies. To determine the precise nature of this research, examine ways in which it can best be used to facilitate marine mammal conservation and protection, and prevent wasteful duplication, the Commission annually requests and reviews information on the marine mammal research programs being conducted, supported, or planned elsewhere in the Federal Government.

In 1988, the Commission requested information from 22 Federal agencies, departments, and offices, at least 16 of which had in the past conducted or supported research relevant to the conservation and protection of marine mammals. Those departments, agencies, and offices were the Department of the Air Force, the Department of Energy, the Department of State, the Minerals Management Service, the National Aeronautics and Space Administration, the National Institutes of Health, the National Marine Fisheries Service, the National Park Service, the National Sea Grant College Program, the National Science Foundation, the Naval Ocean Systems Center, the Office of Naval Research, the Office of Ocean and Coastal Resources Management,

the Office of Oceanography and Marine Assessment, the Smithsonian Institution, and the U.S. Fish and Wildlife Service. The Minerals Management Service, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service have had the largest and most diverse marine mammal research programs.

Responses to the 1988 survey were received in December 1988. After the information provided has been compiled and verified, the Commission, in consultation with its Committee of Scientific Advisors, will evaluate the information and make such recommendations as may be appropriate to better develop, focus, and coordinate agency programs.

#### Research Program Reviews, Workshops, and Planning Meetings

In 1988, the Commission, in consultation with its Committee of Scientific Advisors, reviewed, commented on, and/or made recommendations concerning: the Hawaiian monk seal, North Pacific fur seal, bottlenose dolphin, tuna/porpoise, marine debris, and Antarctic marine living resources research programs being planned, conducted, or supported by the National Marine Fisheries Service; the West Indian manatee and California sea otter research programs being conducted by the Fish and Wildlife Service; and the marine mammal components of the Minerals Management Service's Outer Continental Shelf Environmental Studies Program. In addition, representatives of the Commission convened, co-sponsored, or participated in meetings and workshops to: review operation of the Convention for the Conservation of Antarctic Seals; determine research needs and priorities with regard to implementation of the Convention on the Conservation of Antarctic Marine Living Resources; begin developing recovery plans for populations of right and humpback whales that occur in U.S. waters; identify possible alternatives to the practice of setting purse seines around porpoise schools to catch the yellowfin tuna that associate with porpoise; and describe research, education, and other programs necessary to protect manatees and their habitat in Florida.

#### Commission-Sponsored Research and Study Projects

The Departments of Commerce and the Interior have primary responsibility under the Marine Mammal Protection Act for acquiring the biological and ecological data needed to protect and conserve marine mammals and the ecosystems of which they are a part. This responsibility has been delegated to the National Marine Fisheries Service and the Fish and Wildlife Service, respectively.

As noted earlier, the Commission convenes workshops and contracts for research and studies to identify and evaluate threats to marine mammal populations. It also supports other research necessary to further the purposes and policies of the Act. Since it was established, the Commission has contracted for more than 625 projects, ranging in amounts from several hundred dollars to \$150,000. The average contract amount has been about \$6,900. The total amounts of contracts awarded have been: \$258,787 in FY 1974; \$446,628 in FY 75; \$497,449 in FY 76; \$132,068 in the FY 76-77 three-month transition period; \$523,504 in FY 77; \$407,678 in FY 78; \$219,897 in FY 79; \$396,640 in FY 80; \$173,652 in FY 81; \$107,117 in FY 82; \$211,982 in FY 83; \$327,854 in FY 84; \$226,160 in FY 85; \$132,611 in FY 86; \$134,975 in FY 87; and \$124,603 in FY 88.

From time to time, the Commission's investment in research activities is in the form of transfers of funds to other Federal agencies, particularly the National Marine Fisheries Service and the Fish and Wildlife Service. When such funds are transferred, the Commission provides detailed scopes of work which describe precisely what the agency is to do or to have done and the requirements for reporting on progress to the Commission. In many instances, this approach has made it possible for agencies to start needed research sooner than might otherwise have been possible and then to subsequently support the projects on their own for as long as necessary. The Commission believes that it is valuable to maintain agency involvement to the greatest extent possible and that such transfers provide a useful means of doing so.

Projects undertaken by the Marine Mammal Commission in 1988 are summarized below. In those cases in which the Commission has jointly supported the work with other agencies, it is so noted in the project summary.

Final reports from Commission-sponsored studies completed in 1988 and earlier are available from the National Technical Information Service; they are listed in Appendix B of this Report. Papers resulting from Commission-sponsored activities and published elsewhere are listed in Appendix C.

### West Indian Manatee

West Indian manatee populations in Florida and elsewhere are in danger of extinction because of human-caused mortality, injury, and habitat destruction and degradation. For this reason, the Commission, in recent years, has recommended that the Fish and Wildlife Service take a variety of steps to protect and encourage recovery of the species in Florida and elsewhere (see Chapter III and previous Annual Reports).

As noted in Chapter III, the Commission devoted a substantial portion of its Annual Meeting on 11-12 December 1987 in Miami, Florida, to manatee-related discussions. Representatives of the Fish and Wildlife Service, the Florida Department of Natural Resources, and other agencies and organizations involved in the West Indian manatee recovery program participated in the meeting. The participants agreed, among other things, on the need for: identifying and undertaking priority manatee research; coordinating and expanding public information and education programs; and developing a plan for protecting manatee habitat along the east coast of Florida and Georgia. To help meet these objectives, the Commission contracted for the activities described below.

Assessment of the Effects of Manatee Grazing on Seagrasses in Hobe and Jupiter Sounds, Florida  
(J.A. Powell, Gainesville, Florida)

Manatees affect and are affected by the habitat in which they live. The distribution, abundance, and productivity of seagrasses eaten by manatees may be affected, for example, by the nature and extent of manatee grazing as well as by human activities. The objective of this study is to determine the possible effects of West Indian manatees on seagrass beds in the vicinity of power plants where large groups of manatees spend the winter. To meet the study objective, the contractor is: conducting aerial and boat surveys to determine when and where manatees feed in Hobe and Jupiter Sounds during the winter months; observing feeding manatees and establishing underwater study plots in feeding areas to determine how manatee foraging patterns affect the species composition, density, and productivity of seagrasses in the study areas; and establishing a protocol for quarterly monitoring of selected seagrass beds impacted by feeding manatees. The report, expected in June 1989, will help in evaluating the cumulative effects of manatee feeding and human activities, including increased sedimentation resulting from boat traffic in critical manatee feeding areas, on seagrass production and maintenance.

Pilot Study on "DNA Fingerprinting" of Manatees  
(O. Ryder, Ph.D., The Zoological Society of San Diego, San Diego, California)

Techniques used in molecular biology, especially analysis of hypervariable mini-satellite DNA ("DNA fingerprinting"), may be useful for determining genetic variability, identifying kinship relationships, and assessing reproductive success of manatees and other marine mammals. Such information is necessary to understand population biology and to effectively

conserve West Indian manatees. The contractor is conducting a pilot study to determine whether DNA fingerprinting may provide a useful tool for determining the familial relationships of individual manatees and the relative discreteness of manatee populations in different geographic areas. If study results are promising, the Commission will recommend that the Fish and Wildlife Service conduct or support follow-on studies to further evaluate and utilize the technique.

Workshop on Possible Cooperative Efforts To Develop a Geographic Information System To Assist in Managing Manatee Habitat  
(J.E. Reynolds, III, Ph.D., Eckerd College, St. Petersburg, Florida)

A broad range of population, habitat, and other data must be assessed to identify and resolve conservation problems regarding marine mammals and the ecosystems of which they are a part. The compilation, storage, integration, and accessing of such data can be facilitated by the use of a Geographic Information System, a computerized system for organizing, storing, and accessing data with geographic attributes. A Geographic Information System for manatee-related information could incorporate data on such things as: manatee abundance and mortality; seagrass beds; warm-water refugia; marinas; and boat speed zones. To help evaluate the possible costs and benefits of developing a Geographic Information System for manatees, the Commission provided funds for a workshop to: review the state of the art and identify Geographic Information Systems currently being used by Federal and State agencies and private organizations involved in manatee conservation; determine how existing systems might be improved or integrated to make existing data more accessible and useful; and identify possible cost-effective alternatives to systems currently being used. The workshop, to be held in March 1989, will include experts on the development and use of Geographic Information Systems and representatives of State, Federal, and private organizations with responsibilities bearing on the conservation of manatees in Florida. The workshop report will be provided to Federal and State agencies to assist in determining how cooperative development or integration of Geographic Information Systems could be used to help them meet their manatee-related responsibilities.

Assessment of Techniques for Estimating the Age of Manatees  
(S.R. Humphrey, Florida Museum of Natural History, Gainesville, Florida)

There are many unresolved questions concerning the population biology and dynamics of manatees. One question, that of the relationship between age and survival/reproductive

rates, is unanswered because a reliable method for determining the age of manatees has not been found. The contractor is sectioning and analyzing bones from manatees whose age at death is known. The objective is to determine if the bones have detectable variations in growth rates or other variables that reflect age. The work is being done in consultation with scientists from the Southwest Fisheries Center of the National Marine Fisheries Service who have developed techniques for aging porpoises from thin sections of teeth. The report, which is expected in June 1989, will describe the basic structure of manatee bones and indicate the potential applicability of this technique for population-related studies.

#### Assessment of Manatee Habitat along the East Coast of Florida and Georgia

(D.P. Domning, Ph.D., Howard University, Washington, D.C.; C.J. Gluckman, Esq., Tallahassee, Florida; and J.A. Valade, Jacksonville, Florida)

The long-term viability of the West Indian manatee in Florida will depend in part upon identification and protection of essential habitat. In 1984, the Commission, in consultation with its Committee of Scientific Advisors, prepared a report on the habitat protection needs for the subpopulation of manatees in the Crystal River area of northwest Florida. As described in Chapter III, a review of the West Indian manatee recovery program in Florida during the Commission's Annual Meeting in December 1987 identified an urgent need for assessing habitat protection needs for manatees along the east coast of Florida and Georgia. The Commission therefore undertook a review of information on habitat use patterns and a study to identify areas along the east coast of Florida and Georgia requiring special protection. To assist the assessment, the Commission contracted for a series of overflights to survey manatee habitat over the entire area. It also contracted with individuals familiar with information on the east coast manatees to help identify, review, and analyze key data sources. The results of the assessment were presented in the Commission's report entitled "Preliminary Assessment of Habitat Protection Needs for West Indian Manatees on the East Coast of Florida and Georgia" (see Appendix C, Marine Mammal Commission, 1988). The report has been widely distributed and is now being used as a planning reference document.

#### Publication of Educational Information on Manatees

(Florida Department of Natural Resources, Tallahassee, Florida; D.P. Domning, Howard University, Washington, D.C.)

One of the needs identified during the previously mentioned 1987 review of the West Indian manatee recovery program was

for development, production, and dissemination of educational material bearing on the protection of manatees and their habitat in Florida. In 1980, the Commission contracted with the Florida Department of Natural Resources to develop a bilingual information brochure on manatees. In 1988, the Commission provided additional funds to secure the services of an education consultant to prepare recommended curricula for public schools on matters pertaining to manatee and marine ecosystem protection. Also, the Commission provided funds to print and distribute several issues of an international newsletter on Sirenia and to prepare a paper on the importance from a scientist's viewpoint of protecting manatees. All of these materials either have been or will be used to increase public awareness of the need for ongoing efforts to protect manatees and their habitat in Florida.

#### Manatee Technical Advisory Council

(Florida Department of Natural Resources, Tallahassee, Florida)

In 1980, the Commission provided funds to the Florida Department of Natural Resources to convene a group of experts to advise it and other agencies on measures needed to protect manatees and their habitat. In 1988, the Commission again provided support for the Manatee Technical Advisory Council to provide the Executive Director of the Florida Department of Natural Resources with advice on: (1) revisions appropriate for inclusion in any updating of the Manatee Recovery Plan and/or Comprehensive Work Plan; (2) the coordination of various State, Federal, and private programs related to manatee recovery; (3) the development of rules for State Aquatic Preserves which overlap designated areas of manatee critical habitat; (4) lands which should be acquired for management and maintenance of important manatee habitat; and (5) the most effective ways to use available statutory and programmatic mechanisms to further the protection and recovery of the manatee in Florida.

#### Preliminary Studies in Support of Long-Term Conservation of the West Indian Manatee in Puerto Rico

(The Puerto Rico Conservation Foundation, Rio Piedras, Puerto Rico)

Effective long-term conservation of endangered West Indian manatees in Puerto Rico requires better information on the species' distribution, abundance, productivity, levels and causes of mortality, and critical habitats. Because the population is small and may be declining, any increases in mortality could threaten the viability of the population. The Commission, therefore, provided funds to conduct preliminary aerial surveys to obtain more accurate information on the

distribution, abundance, and local concentrations of manatees along the southern coast of Puerto Rico and to review past sighting records, develop a questionnaire, and interview knowledgeable persons to determine, as possible, the historic distribution and abundance of manatees in Puerto Rico. The report, due in March 1989, is expected to recommend a program for assessing, monitoring, and conserving manatees and their habitat in Puerto Rico.

#### Die-off of Bottlenose Dolphins

As noted in Chapter IV, unusual numbers of bottlenose dolphins died and washed up on Atlantic coast beaches between June 1987 and January 1988. The Commission initiated and coordinated a comprehensive investigation of the die-off, elements of which continued throughout 1988. In 1988, the Commission, the National Marine Fisheries Service, and the Navy provided funds in support of the investigation. The following projects were supported by the Commission.

#### Analysis of Bacteria and Fungi Isolated from Tissues of Dead Bottlenose Dolphins

(D.J. St. Aubin, Ontario Veterinary College, University of Guelph, Guelph, Ontario, Canada)

To assist in identifying the possible cause or causes of the die-off of bottlenose dolphins along the U.S. east coast in 1987 and 1988, the Commission provided funds to the University of Guelph to undertake detailed histopathologic studies of tissue samples from 60 dead bottlenose dolphins to determine the species or types of bacteria and fungi present in the tissues. Preliminary evidence from these studies, combined with the pattern of dolphin mortality, suggest that the bacterial and fungal organisms present were not primarily responsible for the death of the infected animals and more likely were opportunists, able to infect an animal once it had been weakened by stress or other circumstances which suppress the immune system.

#### Virological Analysis of Tissue Samples from Dead Bottlenose Dolphins

(K.D. Somers, Ph.D., Eastern Virginia Medical School, Norfolk, Virginia)

Isolation and characterization of viruses present in tissues and lesions from affected dolphins was necessary to determine whether viral infection caused the unusual mortality of bottlenose dolphins off the mid-Atlantic coast in 1987-1988. To initiate and support the needed analyses, the Commission

provided funds to the contractor to examine tissues and lesions from a subset of stranded dolphins, using electron microscopy, immunofluorescence, and cell culture techniques, to detect viruses. A papovavirus was detected by cytopathic effects in primary monkey kidney cell cultures inoculated with tissue extracts from four of 12 dolphins stranded in Virginia, Herpes-like virus particles as well as papovaviruses were detected in cell cultures inoculated with extracts of mouth lesions from one dolphin. The lack of a consistent pattern of viral infections suggests that those viruses which have been detected probably have not been the cause of the observed dolphin deaths.

#### Analysis of Certain Bottlenose Dolphin Prey Species for the Presence of Biotoxins

(D.G. Baden, Ph.D., University of Miami, Miami, Florida)

The presence of a red tide bloom off North Carolina between late October 1987 and early March 1988 raised concern about the possible involvement of brevetoxin, produced by the dinoflagellate Ptychodiscus brevis, in the unusual mortality of bottlenose dolphins which occurred off the east coast during the same period. To determine whether fish species contained types and quantities of red tide biotoxins that could kill or seriously debilitate bottlenose dolphins, other marine mammals, or humans who might eat the fish, the Commission provided funds to analyze samples of three fish species preyed on by bottlenose dolphins. The report indicates that, of the species tested (Spanish mackerel, silver trout, and menhaden), biotoxins were found only in menhaden and only in the viscera, not the flesh. These results indicate that there is little potential for intoxicating humans but some potential for intoxicating dolphins, which eat the whole fish, including the viscera.

#### Additional Commission-sponsored Research and Study Projects

During 1988, the Commission also provided support for other marine mammal-related research and study projects, discussed below.

#### Survey of Federally-Funded Marine Mammal Research (G.H. Waring, Ph.D., Southern Illinois University)

As noted earlier, each year the Commission identifies and publishes a report on the marine mammal research conducted or supported by Federal agencies in the preceding Fiscal Year and that which is expected to be conducted or supported by those agencies in the current Fiscal Year. At the end of

1988, most agencies had responded to the Commission's request for information on their Fiscal Year 1988 and Fiscal Year 1989 marine mammal research programs. In early 1989, the Contractor will prepare a report summarizing the information provided by the agencies. A copy of the report will be sent to the agencies to verify the accuracy of reported data. After verification, the Commission, in consultation with its Committee of Scientific Advisors, will review the report and, as appropriate, recommend actions to agencies for better developing, focusing, and coordinating their research programs. Copies of the final report will be provided to agencies conducting or supporting marine mammal research and will be available to other interested persons and organizations through the National Technical Information Service.

Distribution of Humpback Whales off the West Coast of Makalawena, Hawaii

(M. Smultea, Moss Landing Marine Laboratories, Moss Landing, California)

Increasing vessel traffic and other human activities could affect the recovery of the endangered North Pacific stock of humpback whales that breed and calve in nearshore coastal waters off Hawaii by disrupting breeding and nursing activities and thereby reducing reproductive success. Determining cause-effect relationships between human activities and changes in breeding and nursing activities requires baseline data on the behavior and distribution of whales in undeveloped nearshore areas to compare with data acquired after the areas are developed. Such pre-development information is not available for currently developed areas in Hawaii. The contractor is observing whales in the undeveloped area off the west coast of Makalawena to establish a baseline on patterns of habitat use by humpback whales and distribution of social groupings. The report, which is expected in June 1989, will provide information that can be used as the basis for detecting possible future changes in distribution of whales resulting from development of human activities in or near the study area.

Biology and Ecology of the Endangered Chinese River Dolphin  
(B. Wuersig, Ph.D., Moss Landing Marine Laboratories, Moss Landing, California)

The Chinese river dolphin (Lipotes vexillifer), or baiji, is one of only five species of river dolphins. Its survival is in doubt because of human activities. In 1987, the Commission provided support for the contractor to visit and assist researchers from several Chinese universities in developing a research plan to assess the movements and social

structure of the baiji in the lower Yangtze River. In 1988, the Commission provided additional funds to enable the contractor to collaborate with scientists from the Institute of Hydrobiology, Wuhan, China, to initiate needed studies. The project report, expected in mid-1989, will describe programs being conducted and planned by Chinese scientists, discuss the results of studies done in 1988 and early 1989, and describe additional measures judged necessary to develop and implement an effective conservation program for the endangered baiji.

Persistent Marine Debris in the North Sea, Northwest Atlantic Ocean, Wider Caribbean Area, and the West Coast of Baja California

(B. Heneman, Bolinas, California)

Since the early 1980s, the Commission has played a major role in focusing domestic and international attention on marine mammal and other conservation problems being caused by lost and discarded fishing gear and other persistent marine debris. In 1985, the Commission, in cooperation with the National Marine Pollution Program Office of the National Oceanic and Atmospheric Administration, provided funds to compile information on the sources, fates, and effects of marine debris in the North Sea, the northwest Atlantic Ocean, the wider Caribbean area, and the west coast of Baja California. The report from this study provides the only comprehensive overview of the nature and extent of the marine debris problem in these areas. In 1988, the Commission provided additional funds to support reproduction and dissemination of the report to appropriate Federal agencies, organizations, interested individuals, and possible participants in the Second International Conference on Marine Debris to be held in Honolulu, Hawaii, 2-7 April 1989. The report has been distributed in 30 countries. It is being used by the Commission and others to help determine what further actions should be taken to document and determine how to prevent problems caused by persistent marine debris.

The Second International Conference on Marine Debris  
(Salt Water Productions, Anchorage, Alaska)

The first workshop on marine debris was held in 1984 to assess the nature and significance of the problem of marine debris, particularly in the North Pacific Ocean. The Second International Conference on Marine Debris, to be held 2-7 April 1989 in Honolulu, Hawaii, will enable evaluation of progress in understanding and solving the marine debris problem. To assist in advertising and organizing the Conference, the Commission provided funds to prepare two announcements providing substantive and registration information about the Conference.

The announcements have been distributed to interested scientists, resource managers, organizations, and concerned individuals throughout the world to solicit international participation in the Conference and to ensure a comprehensive, global perspective on marine debris issues.

Curation and Analysis of Specimen Material and Data Acquired from Stranded Marine Mammals

(J.E. Heyning, Ph.D., Natural History Museum of Los Angeles County, Los Angeles, California)

Much of the available information about marine mammal anatomy, morphology, and rates and causes of mortality has been obtained through recovery and examination of beached and stranded animals. The contractor is organizing and analyzing data and specimen material collected from stranded cetaceans over the past ten years along the coast of southern California. The contract reports, which are expected in 1989, will describe: (1) the histopathology of cetaceans stranded along the California coast; (2) evidence of cetacean strandings possibly caused by interactions with fisheries; and (3) the apparent relationships between two stocks of dolphins occurring offshore Los Angeles and Orange Counties, California. Among other things, the reports will help identify and illustrate the value of organizing stranding networks.

Key Words for Constructing and Searching Computer Files of Marine Mammal Publications

(D. Wartzok, Ph.D., The Society for Marine Mammalogy, Purdue University, Fort Wayne, Indiana)

The Marine Mammal Commission, the National Marine Fisheries Service, the Fish and Wildlife Service, the Minerals Management Service, and professional organizations, such as the Society for Marine Mammalogy, publish hundreds of reports and papers each year bearing on the conservation and protection of marine mammals. The value of these documents depends, in part, on their accessibility. The purpose of this project is to develop a standard list of key words or subject headings that can be used to create and search computerized files of marine mammal publications. The list will be provided to agencies, organizations, and individuals maintaining computerized bibliographies so that they can key their files to the standard list.

Conference on Shared Living Resources of the Bering Sea  
(The Center for Marine Conservation, Washington, D.C.)

In the joint statement issued at the conclusion of the 1987 summit meeting between President Reagan and General Secretary Gorbachev, the two leaders reaffirmed, among other things, their support for cooperation in the Arctic and noted plans and opportunities for increased scientific and environmental cooperation under a number of bilateral agreements. Subsequently, participants in the Legal and Administrative Measures Area (Annex IX) of the U.S.-U.S.S.R. Environmental Agreement (see Chapter V) agreed to co-sponsor a Conference on the Shared Living Resources of the Bering Sea. The Conference is being organized by the Council on Environmental Quality (the U.S. agency responsible for activities under Annex IX) and the Center for Environmental Education (now the Center for Marine Conservation). The purpose of the Conference is to examine the domestic and international laws and treaties applicable to U.S. and Soviet activities bearing on the protection and management of living resources, including marine mammals, in the Bering Sea. The Conference and proceedings will help identify problems and opportunities for enhancing protection of marine mammals and other aspects of the Bering Sea ecosystem.

Workshop To Describe the Biological Research Program and the Measures Needed to Protect Key Research Sites in the Vicinity of Palmer Station, Antarctica

(L. Quetin and R. Ross, University of California, Santa Barbara, California)

In 1987, the Scientific Committee on Antarctic Research recommended that the Antarctic Treaty Consultative Parties establish an additional category of Antarctic protected area that would permit regulation of activities to avoid or minimize possible multiple-use conflicts in designated areas. To assist in evaluating this proposal, the Consultative Parties called upon their Governments to prepare and submit for consideration at the 1989 Consultative Meeting draft plans for managing activities in a number of Antarctic areas where multiple-use conflicts exist or may develop. The area around the U.S. Palmer Station on Anvers Island was identified as one of the areas where maintenance of scientific values and environmental protection might be improved by development of a multiple-use management plan. To assist the National Science Foundation's U.S. Antarctic Program in providing the scientific justification for an Antarctic Protected Area in the vicinity of Palmer Station, the Commission provided support for a workshop to identify: ongoing and planned biological research in the vicinity of Palmer Station that might be impacted adversely by increasing human activities in the area; geographic

sites and features that may be particularly valuable as sites for long-term ecological research or other studies; and activities that should be prohibited or regulated to ensure that they do not adversely affect the ongoing or planned science programs or the important environmental features of the area. The Workshop was held in Santa Barbara, California, on 3-4 November 1988. The workshop report will be provided to the National Science Foundation to serve as a basis for developing a draft management plan which can be presented for consideration at the 1989 meeting of the Antarctic Treaty Consultative Parties.

Training Session in the Care and Maintenance of Captive Marine Mammals

(W. Medway, Ph.D., D.V.M., University of Pennsylvania, Philadelphia)

The Animal Welfare Act requires periodic inspection of facilities holding marine mammals for research or public display. To inform inspectors of aspects of marine mammal biology, basic husbandry practices, food and water quality standards, and other standards required under the Animal Welfare Act, the Commission provided funds to convene and support a faculty of distinguished scientists to conduct a short course on captive marine mammal husbandry for selected Animal Plant and Health Inspection Service inspectors. The Commission also paid for and distributed extensive texts for purpose of pre-course study and preparation. The sessions were held 14-19 November 1988 in Orlando, Florida. As a result, inspectors now have a better understanding of both the purposes and content of applicable standards and regulations and are better able to ensure that public display and research facilities comply with them.

## CHAPTER XII

### MARINE MAMMALS IN CAPTIVITY

On 20 September 1979, the Department of Agriculture's Standards and Regulations for the Humane Handling, Care, Treatment, and Transportation of Marine Mammals went into effect. These Standards were promulgated by the Department of Agriculture under the Animal Welfare Act in response to the Commission's recommendations of 20 October 1974. As discussed in the Commission's past Annual Reports, they were the subject of lengthy and extensive correspondence, consultation, and rulemaking.

The Standards require dealers, exhibitors, operators of auction sales, carriers, and intermediate handlers to comply with minimum standards relating to maintenance and transportation of marine mammals in captivity. These Standards apply to research facilities as well. All persons or facilities maintaining marine mammals in captivity in the United States, be it for purposes of public display or scientific research, must obtain a license from the Department of Agriculture's Animal and Plant Health Inspection Service and must maintain those marine mammals in compliance with the Standards unless a variance has been obtained to allow a limited time for modification of existing facilities, construction of new facilities, or other actions necessary to achieve full compliance.

During succeeding years, representatives of the Animal and Plant Health Inspection Service consulted with representatives of the Commission, the National Marine Fisheries Service, the Fish and Wildlife Service, the American Association of Zoological Parks and Aquaria, and others concerning the practical effects of applying the Standards and needed changes.

On 28 June 1984, the Animal and Plant Health Inspection Service published amendments to the Standards in the Federal Register. Significant areas covered by the amendments included space requirements for primary enclosures for certain marine mammals, new procedures for the granting of variances, construction requirements for housing marine mammals, requirements for accompanying pinnipeds during transport, and specifications for holding areas for marine mammals maintained in transportation facilities.

The Commission works on an ongoing basis with the Animal and Plant Health Inspection Service, the Fish and Wildlife Service, and the National Marine Fisheries Service to assist in implementing the care and maintenance standards. In 1988,

the Commission, in cooperation with the two Services, sponsored a training seminar for Animal and Plant Health Inspection Service inspectors. The seminar was held 14-19 November 1988 in Orlando, Florida. The agenda of the seminar included a survey of the biology and physiology of marine mammals, a review of the requirements for maintenance of captive marine mammals, and discussions of how best to carry out the duties and responsibilities of inspectors.

The Commission also occasionally becomes involved in on-site inspections of marine mammal facilities. During 1988, representatives of the Commission's Committee of Scientific Advisors and the National Marine Fisheries Service assisted the Animal and Plant Health Inspection Service in conducting two on-site reviews of a public display facility holding a marine mammal under a Letter of Authorization to determine whether the rehabilitated animal could be returned to the wild and whether the facility was in compliance with the Standards for the Humane Handling, Care, Treatment, and Transportation of Marine Mammals. The Commission also participated in an interagency inspection of the U.S. Navy's marine mammal facilities to investigate allegations of inadequate facilities and improper husbandry programs. In addition, during 1988, the Commission recommended that the National Marine Fisheries Service reinspect a public display facility with a history of problems in complying with the Animal and Plant Health Inspection Service standards and which had been the subject of an interagency inspection in 1985.

In 1987, the Commission's staff, utilizing data obtained from the National Marine Fisheries Service, completed an analysis of survival patterns of three species of cetaceans in captivity (bottlenose dolphins, white or beluga whales, and killer whales). The purpose of the study was to estimate the average annual survival rate for each species to determine whether survival rates are significantly different in different institutions and to compare findings with the literature on the survival of captive and free-ranging cetaceans. The results of the study show, among other things, that: an annual survival rate in captivity of 0.93 for bottlenose dolphins and killer whales and 0.94 for white whales; differences in survival rates between institutions are statistically significant for bottlenose dolphins only; calf survival for bottlenose dolphins is lower than juvenile and adult survival; and survival of male killer whales is significantly less than that of female killer whales. At this time, available data are not sufficient to compare the survivability of animals in captivity with that of animals in the wild. The analysis of survival patterns was published in 1988 (see DeMaster and Drevanak 1988, Appendix C).

On 4 December 1985, the Fish and Wildlife Service published in the Federal Register proposed regulations governing the humane and healthful transport of wild animals and birds. These regulations were intended to satisfy the requirements of the 1981 amendments to the Lacey Act, which governs the importation and shipment of wild animals and birds in interstate commerce. The 1981 amendments required, among other things, the implementation of transportation standards for all wild animals and birds. Separate regulatory requirements have been proposed for the transport of marine mammals. The Commission commented on the proposed regulations by letter of 4 February 1986. Several proposed changes to the standards involving marine mammals were set forth in the Commission's letter, including the recommendation that the standards be at least as stringent as the corresponding provisions of the Standards for the Humane Handling, Care, Treatment, and Transportation of Marine Mammals promulgated under the Animal Welfare Act. Final regulations were published by the Service on 10 November 1987 and were to take effect 90 days later.

On 8 February 1988, however, the date the regulations were to become effective, the Service postponed their effective date until 1 August 1988. The Service explained that postponement was necessary because possible confusion or misinterpretation of the rule by persons involved in the shipment of wildlife could lead to the adoption of shipping practices that might harm the wildlife being transported or might unduly impose economic hardship on the industry. On 1 March 1988, animal welfare groups brought suit against the Service, seeking to have the regulations take effect immediately. On 18 April 1988, the District Court for the District of Columbia found that the delay of the effective date was without good cause and issued a preliminary injunction ordering that the rules were effective as of 8 February 1988. With the exception of the Commission's recommendation that marine mammals not be delivered to a carrier more than four hours prior to the scheduled departure, all the Commission's recommendations were adopted in the final rule.

#### Animal Welfare Act Amendments

The Food Security Act of 1985 (P.L. 99-188), enacted on 23 December 1985, included amendments to the Animal Welfare Act. The main thrust of these amendments was to enhance the humane treatment of animals used in research by minimizing pain and distress. Congress directed that the Secretary of Agriculture promulgate standards with respect to animals in research facilities requiring that: (a) animal pain and distress be minimized; (b) principal investigators consider possible alternatives to any procedure likely to produce pain or distress; (c) veterinarians be consulted in planning poten-

tially painful procedures; (d) appropriate pain-killers be used, and (e) except when scientifically necessary, no animal be used in more than one experiment involving major surgery. The amendments also call for the establishment of Institutional Animal Committees at research facilities to inspect periodically all animal study areas and to review research procedures and the condition of research animals.

On 21 March 1987, the Department of Agriculture's Animal and Plant Health Inspection Service published proposed regulations to implement the 1985 amendments and to update the existing Animal Welfare Act regulations. On 10 August 1987, the Commission, in consultation with its Committee of Scientific Advisors, provided detailed comments to the Service on the proposed regulations. Among its primary concerns, the Commission noted that the definition of "research facility" contained in the statute and the proposed regulations created some ambiguity with respect to what facilities and what activities come within the scope of the regulations. The Commission recommended that the Service clarify the definition and suggested that the substantive requirements of the regulations should apply to all "federally funded research on marine mammals and other animals or any research which involves the purchase or transport of live animals in commerce." The Commission further recommended that field research, not of a biomedical nature and involving little or no pain or distress in the subject animals, should be exempted from the regulatory provisions. At the close of 1988, final regulations had not been issued.

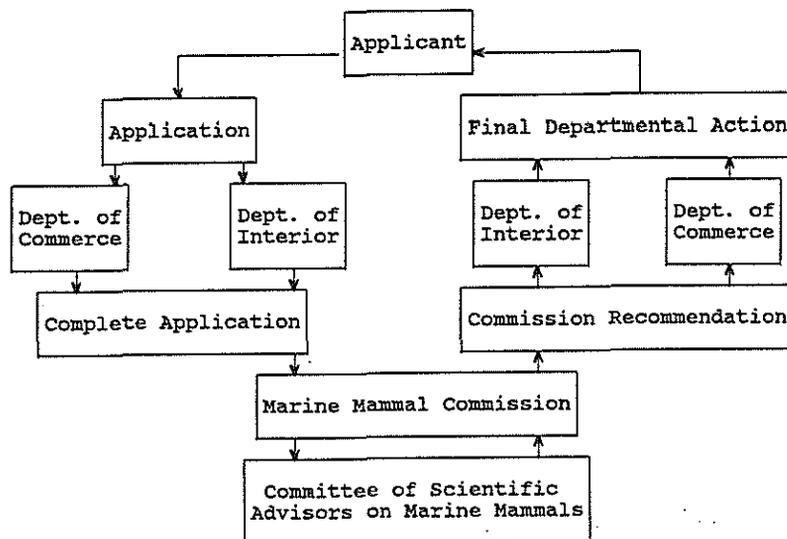
## CHAPTER XIII

### PERMIT PROCESS

The Marine Mammal Protection Act placed a moratorium, with certain exceptions, on the taking and importing of marine mammals and marine mammal products. Exceptions are provided for the issuance of permits by either the Secretary of Commerce or the Secretary of the Interior, depending upon the species of animal involved, for the taking of marine mammals for purposes of scientific research or public display. The 1988 amendments, discussed in Chapter II, added a new permitting authority, enabling the Secretaries to issue permits for activities designed to enhance the survival or recovery of marine mammal species and stocks. Before acting on a permit application, the responsible regulatory agency is required to have the application reviewed by the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors.

#### Application Review

The permit application and review process involves three stages: (1) receipt and initial review of the application at the Department of Commerce or the Interior, publication of a notice of receipt of the application in the Federal Register, and transmittal to the Commission; (2) review of the application by the Commission, in consultation with its Committee of Scientific Advisors, and transmittal of its recommendation to the Department; and (3) final processing by the Department, including consideration of all comments and recommendations of the Commission and the public, resulting in the approval or denial of the application. The following is a schematic representation of this process.



The total review time (initial receipt of application until final Departmental action) depends on many factors, including: the sufficiency of the information provided by the applicant; special requirements, such as inspection of an applicant's marine mammal holding facilities, that may be warranted before a decision can be reached; and the efficiency and thoroughness of those responsible for the agency review.

During 1988, the Commission made recommendations on 29 applications submitted to the Department of Commerce, including 14 applications that were received in 1987 but which did not receive final action until 1988, and two applications submitted to the Department of the Interior. The Commission's average review time for complete applications was 43 days (median, 36.5 days). Not included in the preceding statistics are recommendations on 11 applications that were awaiting final action by the Department of Commerce and one application awaiting final action by the Department of the Interior at year's end and one application that was under Commission review at year's end. Also not included are three applications from the Department of Commerce on which review was suspended at year's end pending receipt of additional information. The Commission, in consultation with its Committee of Scientific Advisors, also made recommendations on 27 requests to modify permits and other related permit actions during 1988. The average time required for Commission review of these matters was 26 days.

Processing of the 29 applications by the Department of Commerce during 1988 took an average of 148 days (median, 132 days) from the date the application was received by the Department until final action was taken. The two permit applications submitted to the Department of the Interior were processed in an average of 114 days (median, 34.5 days). If calculated from the date of receipt of a complete application by the Departments, the average processing times for the Departments of Commerce and the Interior were 116 and 87 days, respectively, compared to 112 and 72 days in 1987.

#### Working Group on the Permit System

In July 1985, the Commission established a Working Group composed of members of the Commission staff and the Committee of Scientific Advisors on Marine Mammals for purposes of preparing a report on how the Marine Mammal Protection Act permit system could be improved. The Working Group was asked to identify problems that have arisen with regard to the review of applications and the issuance, modification, and enforcement of marine mammal permits, and to recommend such statutory, regulatory, and administrative changes as might be appropriate to address the problems.

A draft of the Working Group's report was reviewed by the Committee of Scientific Advisors and considered during the October 1985 meeting of the Commission and Committee in San Diego. Informal comments on the draft report were received from the Animal and Plant Health Inspection Service, the National Marine Fisheries Service, the Fish and Wildlife Service, and several non-governmental parties. Based on those comments, the draft report was revised during 1986 and issued to interested parties for formal review.

The Working Group report formed the basis for the permit-related legislative proposals put forward by the Commission during the 1988 reauthorization of the Marine Mammal Protection Act. Other concerns addressed in the report have been brought to the attention of the appropriate regulatory agencies. It is expected that the comprehensive review of the permit program being conducted by the National Marine Fisheries Service will address the other issues identified by the Working Group.

#### Issues Concerning Lethal Take for Public Display

During 1987, the Fish and Wildlife Service requested Commission comments on a permit application seeking authority to kill a walrus for purposes of museum display. By letter of 28 October 1987, the Commission advised the Service that, in its view, lethal taking of marine mammals from the wild for this use is not warranted if satisfactory specimens can be obtained from alternative sources, such as an animal that dies in captivity, is killed intentionally or unintentionally during scientific research, or is taken incidental to commercial fishing. In this regard, the Commission noted that, if a specimen is not immediately available, one is likely to become available within a reasonable time and it therefore recommended that the applicant be required to explore alternative sources of animals.

In a related letter, also sent to the Service on 28 October, the Commission recommended that the Service prepare a general policy statement concerning such requests and provide a draft to the Commission and the National Marine Fisheries Service for review. Specifically, the Commission suggested development of a policy requiring that, whenever possible, applications requesting specimens for mounted displays be met by sources that do not require a direct lethal take and that permits authorizing lethal takes for such purposes be issued only when specimens cannot possibly be obtained from other sources. On 24 November 1987, the Service replied to the Commission's letter, noting that it agreed that lethal take for public display is inappropriate if specimens are available from other sources and that it intended to adopt a formal policy on the matter. Late in 1987, the Service prepared a

draft policy statement and provided it to the Commission and the National Marine Fisheries Service.

In August 1988, the Commission learned that effective identification of possible alternative sources of suitable specimens to satisfy the request noted above was not taking place, possibly because of poor communication and coordination between the Service's Permit Office in Washington, D.C., and its Alaska Regional Office. A formal policy statement concerning such requests had not yet been adopted by the Service and, by letter of 18 August 1988, the Commission recommended that the Permit Office immediately request that its Alaska Regional Office inform individuals involved in walrus research and management of appropriate steps to report the existence of possible specimens that could be used to satisfy the applicant's request without sacrificing an animal. By memorandum of 20 September 1988, the Alaska Regional Office informed the Service's Permit Office of its intention to meet requests for museum specimens of marine mammals from salvaged carcasses or other appropriate sources whenever opportunities permitted doing so.

At the end of 1988, the Commission was in the process of developing a letter to the Service on implementation of the newly enacted amendments to the Marine Mammal Protection Act. Among other things, the amendments set forth a principle that lethal research on marine mammals not be authorized if non-lethal alternatives are available. The Commission expects to suggest in its letter that this principle be extended to public display permits. Under such an extension, directed killing to obtain display specimens could not be authorized unless it could be shown that all non-lethal, alternative sources of specimens had been exhausted. In this regard, the Commission believes that the Service's draft policy statement on lethal taking for public display, developed late in 1987, was consistent with the recent amendments and it intends to suggest that the Service take steps to adopt a formal policy as soon as possible.

## APPENDIX A

### COMMISSION RECOMMENDATIONS: CALENDAR YEAR 1988

- 11 January Interior, modification of scientific research permit, U.S. Fish and Wildlife Service.
- 11 January Commerce, scientific research permit application, U.S. Navy.
- 12 January Commerce, commenting to the National Marine Fisheries Service Marine Entanglement Research Program Plan; noting that it found the Service's proposed plan of activities to be well done and to address high priority actions needed to better define and resolve critical problems; concurring with the Service's proposed tasks and funding allocations; and, with the exception of the proposed studies to monitor and assess entanglement rates of North Pacific fur seals, recommending that the Service take steps immediately to implement the proposed program.
- 12 January Commerce, modification of scientific research permit, Center for Coastal Marine Studies.
- 13 January Commerce, modification of scientific research permit, Aquarium of Niagara Falls.
- 13 January Commerce, scientific research permit application, Washington Department of Wildlife.
- 26 January Commerce, public display permit application, New England Aquarium.
- 26 January Commerce, scientific research permit application, Susan H. Shane.
- 29 January Commerce, recommending to the National Marine Fisheries Service that it take steps to develop a definition of what constitutes a public display facility for purposes of issuing permits under the Marine Mammal Protection Act.
- 29 January Commerce, public display permit application, Hyatt Regency Waikoloa Resort.
- 29 January Commerce, commenting to the National Marine Fisheries Service on the recent on-site examination of the Clearwater (Florida) Marine Science Center and recommending, among other things, that the Service resolve certain questions regarding the permanent maintenance of rehabilitated stranded animals for purposes of public display.
- 29 January Agriculture, commenting to the Animal and Plant Health Inspection Service on a recent inspection of the Clearwater (Florida) Marine Science Center and recommending that the Service reconsider its interpretation of regulations with respect to isolation of captive marine mammals.
- 4 February Interior, modification of scientific research permit, Donald B. Siniff.
- 4 February Commerce, modification of public display permit, Ocean World, Inc.
- 4 February Commerce, modification of scientific research permit, Jay C. Sweeney.
- 5 February Commerce, scientific research permit application, Northwest and Alaska Fisheries Center.
- 8 February Commerce, public display permit application, Sea Life Park, Inc.
- 12 February Commerce, modification of scientific research permit, Southwest Fisheries Center.
- 18 February Commerce, public display permit application, Horizons West, Ltd.
- 18 February Commerce, public display permit application, Indianapolis Zoological Society.
- 19 February Commerce, scientific research permit application, National Zoological Park.
- 19 February Commerce, modification of scientific research permit, Brent S. Stewart.
- 24 February Commerce, commenting to the National Oceanic and Atmospheric Administration on the draft report of the Marine Debris Task Force and proposing, among other things, that the report be expanded to include recommendations for: (1) establishing a marine debris monitoring system to collect and analyze data on the nature and magnitude of the problem; (2) evaluating beach clean-ups carried out by local communities to assess their effectiveness as a mitigation measure; (3) cleaning up

potentially hazardous debris that threatens endangered species in critical habitats located on Federal lands; and (4) encouraging and cooperating with international efforts to improve understanding and resolve problems created by marine debris.

- 29 February Commerce, modification of public display permit, Miami Seaquarium.
- 1 March Commerce, modification of scientific research permit, North Wind Undersea Institute.
- 1 March Commerce, modification of scientific research permit, Oregon Department of Fish and Wildlife.
- 7 March Interior, scientific research permit application, Charles Monnett.
- 7 March Commerce, modification of scientific research permit, Gerald L. Kooyman.
- 11 March Interior, commenting to the Minerals Management Service on the Draft Environmental Impact Statement (DEIS) on the Northern California Proposed Oil and Gas Lease Sale 91; noting that the DEIS did not fully assess the extent to which certain species and populations of marine mammals could be affected by the proposed action; recommending that the EIS be revised or expanded to: (1) identify and consider the possible effects of the proposed action on important marine mammal prey species and feeding areas; (2) provide more thorough assessments of both the possible direct and indirect effects on humpback whales, blue whales, North Pacific fur seals, Steller sea lions, harbor porpoise, and harbor seals; and (3) clearly identify assumptions that are made in the EIS and provide data or references to support conclusions concerning the possible effects of the proposed action on marine mammals and their habitat; and further recommending that the Minerals Management Service consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to identify the types and levels of monitoring programs that would be necessary to verify predicted effects and to detect the possible unforeseen effects of the proposed action on marine mammals in time to take meaningful mitigation measures.
- 11 March Interior, commenting to the Fish and Wildlife Service on its Calendar Year 1986 annual report on administration of the Marine Mammal Protection Act and recommending that future annual reports list all recommendations made by the Marine Mammal Commission and actions taken by the Fish and Wildlife Service in response to those recommendations.
- 16 March Commerce, public display permit application, Kyushu African Lion Safari Co., Ltd.
- 16 March Commerce, scientific research permit application, Bernd G. Wursig.
- 16 March Commerce, public display permit application, Sea Life Park, Inc.
- 16 March Commerce, commenting to the National Marine Fisheries Service on the continuing unexplained die-off of bottlenose dolphins along the Atlantic coast and recommending, among other things, that: (a) the Service appoint a senior scientist to administer the program investigating the die-off; (b) all elements of the program be reviewed, particularly the medicine and environmental correlates elements; and (c) steps be taken to secure adequate funding for the program.
- 21 March Interior, commenting to the Fish and Wildlife Service on threats to manatees in the Hobe Sound National Wildlife Refuge and recommending that steps be taken to enforce existing regulations related to recreational boating and jet ski activities and, as necessary, to strengthen regulations to protect manatees in the area.
- 21 March National Science Foundation, commenting on ways to update and strengthen the June 1980 Environmental Impact Statement on the U.S. Antarctic Program; suggesting, among other things, that the Foundation: (1) institute a system to routinely examine research proposals, new program initiatives, *etc.*, to determine effects on the environment and existing and planned activities; (2) in cases where adverse effects are possible, prepare environmental impact assessments or supplementary statements to ensure that possible harmful effects are identified and addressed during the planning process; and (3) implement programs to monitor environmental contaminants and key environmental indicators to (a) verify predicted sources and effects of environmental contaminants, (b) detect possible unforeseen sources and

effects of contaminants, and (c) detect other possible impacts resulting from existing and new facilities and programs in Antarctica; and recommending that the Foundation: (1) consult with the Council on Environmental Quality on developing and implementing procedures for preparing environmental impact assessments and statements and; (2) either constitute a group of experts or contract with a qualified individual or organization to develop a plan for choosing and gathering necessary baseline data and for monitoring selected "indicator" species and variables at specific sites in Antarctica and the Southern Ocean.

- 23 March Interior, scientific research permit application, California Department of Fish and Game.
- 28 March State, commenting on the discussion draft of the Protocol on Specially Protected Areas and Wildlife in the Wider Caribbean Region and forwarding a possible alternative draft text.
- 30 March Commerce, scientific research permit application, Ronald J. Schusterman.
- 31 March Commerce, extension of scientific research permit, William A. Watkins.
- 7 April Commerce, public display permit applications, Marine World Foundation.
- 7 April Commerce, scientific research permit application, National Ocean Survey.
- 8 April Interior, modification of scientific research permit, Charles Monnett.
- 14 April Interior, modification of scientific research permit, Alaska Fish and Wildlife Research Center.
- 15 April Agriculture, recommending that the Animal and Plant Health Inspection Service undertake an investigation to identify facilities currently maintaining marine mammals in isolation and that the Service advise the Commission of its findings.
- 19 April Interior, commenting to the Minerals Management Service on the Draft Environmental Impact Statement (DEIS) on the North Atlantic Proposed Oil and Gas Lease Sale 96; noting that the DEIS did not fully assess the extent to which species and populations of marine mammals likely would be affected by the proposed action; recommending that the Statement be revised and expanded to: (1) provide more information on the natural history of marine mammals, particularly right and humpback whales, pilot whales, bottlenose dolphins, and harbor seals, that could be affected by the proposed action; (2) identify and consider possible effects of the proposed action on important marine mammal prey species, feeding areas, breeding areas, and migratory paths; and (3) more clearly indicate the data, analyses, and assumptions on which conclusions stated in the DEIS were based; and further recommending that the Minerals Management Service consult with the National Marine Fisheries Service to: (a) develop and implement monitoring programs aimed at detecting unforeseen impacts before they reach unacceptable levels; and (b) determine measures it should take to help develop and implement recovery plans for humpback and right whales, and undertake needed studies.
- 2 May Commerce, commenting to the National Marine Fisheries Service on its proposal to extend designated critical habitat for the Hawaiian monk seal and recommending that the proposal be adopted.
- 3 May Commerce, scientific research permit application, Howard E. Winn.
- 3 May Commerce, scientific research permit application, California Department of Fish and Game.
- 5 May Commerce, public display permit applications (two), John G. Shedd Aquarium.
- 5 May Commerce, scientific research permit application, Randall S. Wells.
- 6 May Commerce, commenting to the National Marine Fisheries Service on its Hawaiian monk seal research program; noting that substantial progress had been made on priority research and that there are encouraging signs that the species may be starting to recover; further noting the need to continue certain high priority research efforts, specifically, the Kure Atoll Head Start Project and research at Laysan Island

on adult “mobbing” behavior; urging that the Service fund the monk seal program at levels sufficient to continue all recovery research; and asking that the Service advise the Commission of steps being taken or planned to ensure that critical research activities are continued.

- 9 May Commerce, scientific research permit application, Douglas Wartzok.
- 9 May Commerce, scientific research permit application, Cetacean Research Unit.
- 9 May Commerce, public display permit application, Theater of the Sea.
- 10 May Office of the President, commenting to the Domestic Policy Council on the draft report of the Marine Debris Task Force, noting that the report provides a useful overview of the problem and sound recommendations for cooperative Federal, state and private actions, and endorsing the recommendations contained in the Task Force report.
- 11 May Commerce, commenting to the National Marine Fisheries Service on the report, “Administrator’s Initial Views on Bowhead Whale Information” proposed for submission to the 1988 meeting of the International Whaling Commission (IWC); noting that available information and analyses completed to date may be insufficient to justify the increase in the Native take of bowhead whales as proposed in the report and that there was not adequate time prior to the IWC meeting to review and revise the report; and therefore suggesting that the Service not submit the draft report as an IWC working document.
- 17 May Commerce, commenting to the National Marine Fisheries Service on the interim draft rule for yellowfin tuna importation and recommending that the draft rule be adopted, with certain modifications, as a final rule.
- 20 May Commerce, scientific research permit application, North Gulf Oceanic Society.
- 24 May Commerce, commenting to the National Marine Fisheries Service on its Biological Opinion concerning Proposed Oil and Gas Lease Sale #91; inquiring as to whether the Service had considered the possible indirect, as well as direct, effects of the proposed action on endangered cetaceans, particularly humpback whales; and recommending that, if it had not, consideration of indirect effects be undertaken immediately and that the Service advise the Minerals Management Service of its actions.
- 24 May Commerce, scientific research permit application, John M. Francis.
- 24 May Interior, scientific research permit application, Anthony R. DeGange.
- 24 May Commerce, public display permit application, Gulf World, Inc.
- 24 May Commerce, public display permit application, Maritime Center of Norwalk.
- 26 May Commerce, commenting to the National Oceanic and Atmospheric Administration on its proposed draft international agreement on North Pacific fur seals; noting, among other things, that it was not clear how the Service expected the United States to meet the objectives and obligations of the proposed text and that it was therefore not possible to determine whether the proposed agreement would effectively protect fur seals; and recommending that the Service suspend efforts to draft and negotiate a new fur seal agreement until: (1) a comprehensive fur seal conservation plan had been completed and (2) the Service had assessed the relative merits of a new agreement within the context of that plan.
- 27 May Commerce, commenting to the National Marine Fisheries Service on a planned workshop covering tuna import regulations and reiterating the Commission’s concerns that certain points be addressed regarding requirements to be placed on foreign nations wishing to import tuna into the United States.
- 27 May Interior, commenting to the Minerals Management Service on the Draft Environmental Impact Statement (DEIS) on Gulf of Mexico sales 118 and 122, Central and Western Planning Areas; noting that the DEIS did not fully assess: marine mammal habitats and food resources that could be affected; the number of animals of the various species that could be affected; what proportion of the potentially affected

species and populations are at risk; and the extent to which the potentially affected species and populations have been and are being affected by other human activities; further noting that the bottlenose dolphin is the species most likely to be affected by the proposed action; and recommending that: (1) the Statement be expanded to provide more complete descriptions of the natural history and possible direct and indirect effects of offshore oil- and gas-related activities on marine mammals, particularly local populations of bottlenose dolphins; and (2) the Service consult with the National Marine Fisheries Service to determine what additional measures may be necessary to more reliably assess both direct and indirect effects, and to detect and monitor the possible unforeseen effects of the proposed action on bottlenose dolphins.

- 8 June Commerce, scientific research permit application, Douglas Wartzok.
- 15 June Commerce, scientific research permit application, Kenneth S. Norris and William T. Doyle.
- 17 June Florida Lands Selection Committee, commenting on efforts to rank desired land acquisition projects; noting the importance of three Crystal River area projects to protection of manatees; and urging that: (a) these projects be retained on the 1988 recommended land acquisition priority list; and (b) the Committee continue to pursue acquisitions described in these projects.
- 17 June Interior, modification of scientific research permit, Carle Foundation Hospital.
- 17 June Interior, commenting to the Fish and Wildlife Service on plans to reestablish the Southern Sea Otter Recovery Team and suggesting that, in light of events that have taken place over the past few years, efforts to update the Sea Otter Recovery plan might better and more promptly be accomplished by other means.
- 17 June Commerce, commenting to the National Marine Fisheries Service on reports questioning the accuracy of porpoise mortality estimates derived from the Service's observer program, the treatment of observers on board tuna purse seiners, and other issues; and recommending among other things, that, if the Service had not already done so, it investigate points raised in reports.
- 20 June Commerce, commenting to the Secretary on the failure of the Government of Iceland to comply with the recommendations of the International Whaling Commission's Scientific Committee, and recommending that, unless there is an immediate and substantive change in approach by the Government of Iceland, that it be certified under the Pelly Amendment to the Fishermen's Protective Act.
- 21 June Interior, public display permit application, University of Oregon Visual Arts Resources Center.
- 22 June State, commenting to the Office of Oceans and Polar Affairs on the Convention for the Conservation of Antarctic Seals and suggesting that certain U.S. objectives be pursued at the scheduled meeting to review operations of the Convention.
- 23 June Commerce, public display permit application, Marine Animal Productions.
- 23 June Commerce, modification of scientific research permit, Northwest and Alaska Fisheries Center.
- 29 June Interior, commenting to the Minerals Management Service on the Call for Information and Nominations and Notice of Intent to Prepare an Environmental Impact Statement for the proposed 1990 oil and gas lease sales in the Central (Sale 123) and Western (Sale 125) Gulf of Mexico; noting that the Statement should include, among other things: (a) detailed information on marine mammal species and populations found in the proposed lease sale area; (b) analyses of the number of animals that could be affected directly and indirectly; and (c) assessment of possible cumulative effects of planned or ongoing oil and gas activities that potentially could affect these species or their habitats.
- 7 July Commerce, scientific research permit application, Duke University Marine Laboratory.

- 7 July Commerce, commenting to the National Marine Fisheries Service on Sea Land of Cape Cod and recommending that the Service reinspect the facility before considering further requests for marine mammal permits.
- 8 July Commerce, modification of scientific research permit, Jay Sweeney.
- 13 July Commerce, commenting to the National Marine Fisheries Service on a request by six oil and gas exploration companies to take small numbers of bowhead and gray whales incidental to activities off the coast of Alaska; concurring that some of the assumptions put forth in the petition were reasonable; noting that some of the assumptions concerning possible effects on endangered whales were questionable; and recommending, among other things, that the Service: (1) clearly indicate assumptions and uncertainties concerning possible direct, indirect, and cumulative effects of offshore oil and gas exploration activities on the survival and productivity of gray and bowhead whales; (2) specify the additional baseline research and monitoring programs that would be required to verify predicted effects and detect unforeseen effects; and (3) provide a system for issuing letters of authorization to each oil company and making continued authorization after the first year contingent on submission of a report on possible effects of activities during the first year.
- 20 July Commerce, scientific research permit application, Northwest and Alaska Fisheries Center.
- 21 July Commerce, modification of scientific research permit, Steven L. Swartz and Randall S. Wells.
- 21 July Commerce, commenting to the National Marine Fisheries Service on the "Draft Supplemental Environmental Impact Statement and Regulatory Impact Review/Initial Regulatory Flexibility Analysis for a Proposal to Increase the Optimum Yield Range in the Fishery Management Plan for the Groundfish Fishery of the Bering Sea and Aleutian Islands"; noting that the Statement appear to have numerous shortcomings, particularly regarding calculations of allowable catch levels; recommending that the Final Statement be expanded to: (1) clarify uncertainties concerning the effects of past and proposed catches on the affected fish stocks, marine mammal populations, and their ecosystems; (2) describe and assess the adequacy of ongoing and planned research and monitoring programs to verify predicted effects and detect unforeseen effects of plan provisions; and (3) limit the optimum yield level to current levels unless information becomes available to clearly indicate that the groundfish fishery is not a cause of the decline of marine mammals species in the Bering Sea and Aleutian Islands area or, alternatively, an effective system is in place to: (a) verify assumptions concerning impacts of the fishery on marine mammal food supplies; and (b) ensure that all direct and indirect effects of groundfish fishing on marine mammals will be detected in time for corrective action to be taken.
- 22 July Commerce, suggesting to the National Oceanic and Atmospheric Administration that steps be taken to indicate the presence of boat speed regulatory zones and sanctuaries designated to protect West Indian manatees in Florida on nautical charts covering that State's coastal waters.
- 25 July Transportation, commenting to the U.S. Coast Guard on plans to develop proposed rules to implement the pollution prevention provisions of Annex V of the International Convention for the Prevention of Pollution from Ships; noting that implementation of those rules is important for reducing death and injury of marine mammals due to entanglement in marine debris; and recommending that the Coast Guard: (a) define the term "disposal" to include the loss of garbage into the sea due to improper handling and storage aboard ship; (b) cite examples of plastic wastes that are particularly hazardous to marine life; (c) consider measures taken or planned by ports to inform ship operators of the availability, location, and proper use of port reception facilities for ship-generated garbage when considering the adequacy of such facilities; (d) require large ports and marinas that service commercial vessels and recreational craft using internal waters only to obtain Certificates of Adequacy; and (e) consider developing optional guidelines for handling, processing, and storing garbage aboard ship.

- 28 July Interior, scientific research permit application, U.S. Fish and Wildlife Service.
- 1 August Commerce, commenting to the National Marine Fisheries Service on the scope of work for a research project on entanglement of northern fur seals and concurring with the Service's determination that it would be appropriate to fund the project as part of the Fiscal Year 1988 Marine Entanglement Research Program.
- 5 August Commerce, commenting to the National Marine Fisheries Service on a Norwegian proposal to take 30 minke whales as part of a 1988 scientific research project; agreeing with the Service that the documents represent a good effort to explain the rationale for the proposed research program but questioning whether results of the research would contribute useful information for managing the Barents Sea ecosystem; and expressing the view that the proposed studies would not diminish the effectiveness of the International Whaling Commission's conservation program.
- 9 August Commerce, commenting to the National Marine Fisheries Service on the "Status Report on Marine Mammals Involved in Commercial Fisheries"; noting that the document adequately assesses the status of marine mammal species and population stocks that interact with commercial fisheries in U.S. waters and provides useful descriptions of research needs, but that descriptions should provide additional information on: (1) the age and sex as well as the number of animals being killed and seriously injured during commercial fishing operations; (2) when, where, and how marine mammals are being killed and seriously injured; and (3) long-term monitoring programs needed to determine the effectiveness of measures taken to prevent or reduce incidental take and injury.
- 18 August Interior, scientific research permit application, Chicago Zoological Society.
- 18 August Interior, commenting to the Fish and Wildlife Service on a request from the Paul Jensen Arctic Museum to kill a walrus for purposes of public display; concluding that such needs should be met, whenever feasible, by animals that die from natural causes or during the course of other authorized activities; recommending that the Service take immediate steps to ensure that the walrus specimen sought by the Museum is provided without sacrificing an animal for that purpose; and requesting that the Service advise the Commission of action taken on this matter.
- 23 August Commerce, scientific research permit application, J. Ward Testa.
- 2 September Interior, scientific research permit application, Chicago Zoological Society.
- 2 September Commerce, scientific research permit application, Southwest Fisheries Center.
- 2 September Commerce, public display permit application, Sea Life Park, Inc.
- 13 September Commerce, modification of scientific research permit, Sea Life Park, Inc.
- 13 September Commerce, recommending to the National Marine Fisheries Service that all existing and pending permits authorizing the capture of false killer whales be modified to include the requirement that no animal less than 3.40 meters in length be taken.
- 20 October Commerce, scientific research permit application, Point Reyes Bird Observatory.
- 25 October Commerce, public display permit application, Ringling Brothers-Barnum and Bailey Circus.
- 26 October Office of Management and Budget, commenting on Enrolled Bill H.R. 4189 (a bill to amend the Marine Mammal Protection Act), addressing concerns put forth by the Department of Commerce about certain provisions of the bill, and recommending that the President approve the measure.
- 8 November Commerce, commenting to the National Marine Fisheries Service on a petition by the Government of Vanuatu for a finding of comparability with the U.S. tuna/porpoise program; noting that additional information on Vanuatu's enforcement program and other matters was required before a positive finding of comparability could be made; and requesting that the Service advise the Commission of efforts to obtain additional information.

- 9 November Commerce, commenting to the National Marine Fisheries Service on a petition by the Government of Ecuador for a finding of comparability with the U.S. tuna/porpoise program; noting that certain additional information was required before a positive finding of comparability could be made; and requesting that the Service advise the Commission of efforts to obtain additional information.
- 14 November Commerce, public display permit application, Clearwater Marine Science Center.
- 16 November Commerce, commenting to the National Marine Fisheries Service on petitions by the Governments of Venezuela and Panama for findings of comparability with the U.S. tuna/porpoise program; noting that certain additional information, particularly with respect to the nations' enforcement programs, was required before a positive finding of comparability could be made; and requesting that the Service advise the Commission of efforts to obtain additional information.
- 22 November Commerce, public display permit application, National Aquarium.
- 23 November Interior, public display permit application, New York Zoological Society.
- 23 November Commerce, scientific research permit application, Randall S. Wells.
- 23 November Commerce, scientific research permit application, C. Rachael Howell.
- 23 November Commerce, modification of scientific research permit, Brent S. Stewart.
- 2 December Commerce, commenting to the National Marine Fisheries Service on implementation of the 1988 amendments to the Marine Mammal Protection Act regarding the tuna/porpoise program; raising certain questions about plans to proceed on specific aspects of the provisions; and recommending, among other things, that: (1) if the Service had not already done so, it inform foreign nations taking tuna in the eastern tropical Pacific Ocean of new requirements under the 1988 amendments regarding importation of tuna into the United States; (2) establish a system to inform intermediary nations of prospective or actual import bans on tuna or tuna products by the United States; and (3) undertake negotiations with the Inter-American Tropical Tuna Commission to ensure that information collected by its observers is made available to party governments in a useful form.
- 6 December Commerce, commenting to the National Marine Fisheries Service on implementation of the 1988 amendments to the Marine Mammal Protection Act regarding the commercial fisheries exemption, marine mammal population status reviews and conservation plans, new permit provisions, and the study on the mortality of Atlantic bottlenose dolphins, and forwarding suggestions and recommendations.
- 9 December Interior, commenting to the U.S. Fish and Wildlife Service on the "Technical Agency Review Draft of the West Indian Manatee (*Trichechus manatus latirostris*) Revised Recovery Plan"; noting that the revised Draft Plan does an excellent job of identifying manatee research and manatee activities, priorities, and responsibilities over the next five years; and recommending that the Draft Plan be expanded to: (1) identify measures to ensure that complementary efforts of various Federal, State, and private organizations responsible for implementing portions of the Revised Plan are properly coordinated and carried out; and (2) identify additional habitats of particular importance to manatees.
- 14 December Interior, commenting to the Minerals Management Service on the "Pacific Outer Continental Shelf (OCS) Regional Draft Environmental Studies Plan for Fiscal Year 1990"; and questioning whether all the proposed marine mammal-related studies are necessary and whether all necessary studies have been identified.
- 16 December Commerce, scientific research permit application, Southwest Fisheries Center.
- 16 December Commerce, scientific research permit application, Bernd Wursig and Salvatore Cerchio.
- 16 December Commerce, public display permit application, Micke Grove Zoo.
- 20 December Commerce, commenting to the U.S. Commissioner to the International Whaling Commission on Japan's revised proposal to take up to 330 Southern Hemisphere minke whales for purposes of scientific research; noting that the proposal appears to be substantially unchanged from Japan's research proposal for the previous whaling

season; further noting that the Japanese whaling fleet had already sailed for the Antarctic; and recommending that the Secretary of Commerce recommend to the President that he impose sanctions pursuant to the Pelly Amendment to the Fishermen's Protective Act.

- 22 December Interior, forwarding to the U.S. Fish and Wildlife Service a Commission report on habitat protection needs for West Indian manatees on the east coast of Florida and Georgia; noting that the population clearly is at risk and that action must be taken promptly to better protect manatees and their habitat on the east coast; and requesting that the Service advise the Commission of its views on the report's recommendations and steps it would take to implement them.
- 22 December Army Corps of Engineers, forwarding a Commission report on habitat protection needs for West Indian manatees on the east coast of Florida and Georgia; noting that the population clearly is at risk and that action must be taken promptly to better protect manatees and their habitat on the east coast; and requesting that the Corps advise the Commission of its views on the report's recommendations and steps it would take to implement them.
- 22 December Florida Department of Natural Resources, forwarding a Commission report on habitat protection needs for West Indian manatees on the east coast of Florida and Georgia; noting that the population clearly is at risk and that action must be taken promptly to better protect manatees and their habitat on the east coast; and requesting that the Department advise the Commission of its views on the report's recommendations and steps it would take to implement them.
- 23 December Commerce, commenting to the National Marine Fisheries Service on the Fiscal Year 1989 Marine Entanglement Research Program Plan; noting that the Commission concurs with the Plan's proposed activities and studies, with one exception; requesting additional information concerning proposed research to place observers on foreign squid vessels in the North Pacific Ocean; and urging immediate implementation of other portions of the Plan.

## APPENDIX B

### REPORTS OF COMMISSION-SPONSORED ACTIVITIES AVAILABLE FROM THE NATIONAL TECHNICAL INFORMATION SERVICE (NTIS)<sup>1</sup>

- Ainley, D.G., H.R. Huber, R.P. Henderson, and T.J. Lewis. 1977. Studies of marine mammals at the Farallon Islands, California, 1970-1975. Final report for MMC contract MM4AC002. NTIS PB-274 046. 42 pp. (A03)
- Ainley, D.G., H.R. Huber, R.P. Henderson, T.J. Lewis, and S.H. Morrell. 1977. Studies of marine mammals at the Farallon Islands, California, 1975-1976. Final report for MMC contract MM5AC020. NTIS PB-266 249. 32 pp. (A03)
- Ainley, D.G., H.R. Huber, S.H. Morrell, and R.R. LeValley. 1978. Studies of marine mammals at the Farallon Islands, California, 1976-1977. Final report for MMC contract MM6AC027. NTIS PB-286 603. 44 pp. (A03)
- Allen, S.G., D.G. Ainley, and G.W. Page. 1980. Haul out patterns of harbor seals in Bolinas Lagoon, California. Final report for MMC contract MM8AC012. NTIS PB80-176 910. 31 pp. (A03)
- Balcomb, K.C., J.R. Boran, R.W. Osborne, and N.J. Haenel. 1980. Observations of killer whales (*Orcinus orca*) in greater Puget Sound, State of Washington. Final report for MMC contract MM1300731-7. NTIS PB80-224 728. 42 pp. (A03)
- Bean, M.J. 1985. United States and international authorities applicable to entanglement of marine mammals and other organisms in lost or discarded fishing gear and other debris. Final report for MMC contract MM2629994-7. NTIS PB85-160471. 65 pp. (A04)
- Beddington, J.R., and H.A. Williams. 1980. The status and management of the harp seal in the north-west Atlantic. A review and evaluation. Final report for MMC contract MM1301062-1. NTIS PB80-206 105. 127 pp. (A07)
- Bengtson, J.L. 1978. Review of information regarding the conservation of living resources of the Antarctic marine ecosystem. Final report for MMC contract MM8AD055. NTIS PB-289 496. 148 pp. (A08)
- Bishop, J.B. 1985. Summary report of gill and trammel net (set-net) observations in the vicinity of Morro Bay, California, 1 November 1983 - 31 August 1984. Final report for MMC contract MM2629900-2. NTIS PB85-150076. 18 pp. (A02)
- Bockstoce, J. 1978. A preliminary estimate of the reduction of the western Arctic bowhead whale (*Balaena mysticetus*) population by the pelagic whaling industry: 1848-1915. Final report for MMC contract MM7AD111. NTIS PB-286 797. 32 pp. (A08)
- Brownell, R.L., Jr., C. Schoenwald, and R.R. Reeves. 1978. Preliminary report on world catches of marine mammals 1966-1975. Final report for MMC contract MM6AC002. NTIS PB-290 713. 353 pp. (A16)
- Chapman, D.G., L.L. Eberhardt, and J.R. Gilbert. 1977. A review of marine mammal census methods. Final report for MMC contract MM4AC014. NTIS PB-265 547. 55 pp. (A04)
- Contos, S.M. 1982. Workshop on marine mammal-fisheries interactions. Final report for MMC contract MM2079341-0. NTIS PB82-189 507. 64 pp. (A04)
- Cornell, L.H., E.D. Asper, K.N. Osborn, and M.J. White, Jr. 1979. Investigations on cryogenic marking procedures for marine mammals. Final report for MMC contract MM6AC003. NTIS PB 291 570. 24 pp. (A03)
- Dayton, P.K., B.D. Keller, and D.A. Ven Tresca. 1980. Studies of a nearshore community inhabited by sea otters. Final report for MMC contracts MM6AC026 and MM1300702-9. NTIS PB81-109 860. 91 pp. (A06)
- DeBeer, J. 1980. Cooperative dedicated vessel research program on the tuna-porpoise problem: Overview and final report. Final report for MMC contract MM8AC006. NTIS PB80-150 097. 43 pp. (A03)
- Dohl, T.P. 1981. Remote laser branding of marine mammals. Final report for MMC contract MM4AC011. NTIS PB81-213 449. 34 pp. (A03)
- Erickson, A.W. 1978. Population studies of killer whales (*Orcinus orca*) in the Pacific Northwest: A radio-marking and tracking study of killer whales. Final report for MMC contract MM5AC012. NTIS PB-285 615. 34 pp. (A03)
- Fay, F.H., H.M. Feder, and S.W. Stoker. 1977. An estimation of the impact of the Pacific walrus population on its food resources in the Bering Sea. Final report for MMC contracts MM4AC006 and MM5AC024. NTIS PB-273 505. 38 pp. (A03)
- Foster, M.A. 1981. Identification of ongoing and planned fisheries in the Northwestern Hawaiian Islands. Final report for MMC contract MM1801069-7. NTIS PB81-207 516. 90 pp. (A05)
- Foster, M.S., C.R. Agegian, R.K. Cowen, R.F. Van Wagenen, D.K. Rose, and A.C. Hurley. 1979. Toward an understanding of the effects of sea otter foraging on kelp forest communities in central California. Final report for MMC contract MM7AC023. NTIS PB-293 891. 60 pp. (A04)

<sup>1</sup> Price codes for printed reports (including postage) are shown in parentheses at the end of each citation. Microfiche copies of the reports are also available (price code A01). The key to the codes and ordering information can be found on the last page of this Appendix.

- Fowler, C.W., W.T. Bunderson, M.B. Cherry, R.J. Ryel, and B.B. Steele. 1980. Comparative population dynamics of large mammals: A search for management criteria. Final report for MMC contract MM7AC013. NTIS PB80-178 627. 330 pp. (A15)
- Fowler, C.W., R.J. Ryel, and L.J. Nelson. 1982. Sperm whale population analysis. Final report for MMC contract MM8AC009. NTIS PB82-174 335. 35 pp. (A03)
- Gaines, S.E., and D. Schmidt. 1978. Laws and treaties of the United States relevant to marine mammal protection policy. Final report for MMC contract MM5AC029. NTIS PB-281 024. 668 pp. (A99)
- Gard, R. 1978. Aerial census, behavior, and population dynamics study of gray whales in Mexico during the 1974-75 calving and mating season. Final report for MMC contract MM5AC006. NTIS PB-274 295. 18 pp. (A02)
- Gard, R. 1978. Aerial census and population dynamics study of gray whales in Baja California during the 1976 calving and mating season. Final report for MMC contract MM6AC014. NTIS PB-275 297. 20 pp. (A03)
- Geraci, J.R., and D.J. St. Aubin. 1979. Biology of marine mammals: Insights through strandings. Final report for MMC contract MM7AC020. NTIS PB-293 890. 343 pp. (A16)
- Geraci, J.R., S.A. Testaverde, D.J. St. Aubin, and T.H. Loop. 1978. A mass stranding of the Atlantic white sided dolphin, *Lagenorhynchus acutus*: A study into pathobiology and life history. Final report for MMC contract MM5AC008. NTIS PB-289 361. 141 pp. (A08)
- Gerrodette, T. 1983. Review of the California sea otter salvage program. Final report for MMC contract MM2629677-5. NTIS PB83-262 949. 23 pp. (A03)
- Gilbert, J.R., V.R. Schurman, and D.T. Richardson. 1979. Gray seals in New England: Present status and management alternatives. Final report for MMC contract MM7AC002. NTIS PB-295 599. 40 pp. (A03)
- Glockner-Ferrari, D.A., and M.J. Ferrari. 1985. Individual identification, behavior, reproduction, and distribution of humpback whales, *Megaptera novaeangliae*, in Hawaii. Final report for MMC contract MM262975-5. NTIS PB85-200772. 41 pp. (A03)
- Gold, J. 1981. Marine mammals: A selected bibliography. Final report for MMC contract MM1801254-3. NTIS PB 82-104 282. 91 pp. (A05)
- Gonsalves, J.T. 1977. Improved method and device to prevent porpoise mortality: Application of polyvinyl panels to purse seine nets. Final report for MMC contract MM6AC007. NTIS PB-274 088. 28 pp. (A03)
- Goodman, D. 1978. Management implications of the mathematical demography of long lived animals. Final report for MMC contract MM8AD008. NTIS PB-289 678. 80 pp. (A05)
- Green, K.A. 1977. Antarctic marine ecosystem modeling revised Ross Sea model, general Southern Ocean budget, and seal model. Final report for MMC contract MM6AC032. NTIS PB-270 375. 111 pp. (A06)
- Green-Hammond, K.A. 1980. Fisheries management under the Fishery Conservation and Management Act, the Marine Mammal Protection Act, and the Endangered Species Act. Final report for MMC contract MM1300885-3. NTIS PB80-180 599. 186 pp. (A09)
- Green-Hammond, K.A. 1981. Requirements for effective implementation of the Convention on the Conservation of Antarctic Marine Living Resources. Final report for MMC contract MM2079173-9. NTIS PB82-123 571. 36 pp. (A03)
- Green-Hammond, K.A. 1982. Environmental aspects of potential petroleum exploration and exploitation in Antarctica: Forecasting and evaluating risks. Final report for MMC contract MM2079173-9. NTIS PB82-169 772. 28 pp. (A03)
- Green-Hammond, K.A., D.G. Ainley, D.B. Siniff, and N.S. Urquhart. 1983. Selection criteria and monitoring requirements for indirect indicators of changes in the availability of Antarctic krill applied to some pinniped and seabird information. Final report for MMC contract MM2324753-6. NTIS PB83-263 293. 37 pp. (A03)
- Heneman, B., and Center for Environmental Education. 1988. Persistent marine debris in the North Sea, northwest Atlantic Ocean, wider Caribbean area, and the west coast of Baja California. Final report for MMC contract MM3309598-5. NTIS PB89-109938. 161 pp. (A08)
- Henry, M.E. 1987. Observations of gill and trammel net fishing activity between Pt. Buchon and Pt. Sur, California, June - October 1985. Final report for MMC contract MM3309511-8. NTIS PB87-184024. 32 pp. (A03)
- Herman, L.M., P.H. Forestell, and R.C. Antinoya. 1980. The 1976/77 migration of humpback whales into Hawaiian waters: Composite description. Final report for MMC contracts MM7AC014 and MM1300907-2. NTIS PB80-162 332. 55 pp. (A04)
- Hofman, R.J. (Editor). 1979. A workshop to identify new research that might contribute to the solution of the tuna-porpoise problem. Proceedings of a Marine Mammal Commission-sponsored workshop held on 8-9 December 1975 at the University of California, Santa Cruz. NTIS PB-290 158. 17 pp. (A02)
- Hofman, R.J. 1982. Identification and assessment of possible alternative methods for catching yellowfin tuna. NTIS PB83-138 993. 243 pp. (A11)
- Hofman, R.J. (Editor). 1985. Workshop to assess methods for regulating the distribution and movements of sea otters. Report of a Marine Mammal Commission-sponsored workshop held 25-26 October 1984 in San Francisco, California. NTIS PB85-229250. 39 pp. (A03)

- Huber, H.R., D.G. Ainley, S.H. Morrell, R.R. LeValley, and C.S. Strong. 1979. Studies of marine mammals at the Farallon Islands, California, 1977-1978. Final report for MMC contract MM7AC025. NTIS PB-111 602. 50 pp. (A04)
- Huber, H.R., D.G. Ainley, S.H. Morrell, R.J. Boekelheide, and R.P. Henderson. 1980. Studies of marine mammals at the Farallon Islands, California, 1978-1979. Final report for MMC contract MM1300888-2. NTIS PB80-178 197. 46 pp. (A04)
- Huber, H.R., D.G. Ainley, R.J. Boekelheide, R.P. Henderson, and B. Bainbridge. 1981. Studies of marine mammals at the Farallon Islands, California, 1979-1980. Final report for MMC contract MM1533599-3. NTIS PB81-167 082. 51 pp. (A04)
- Hui, C.A. 1978. Reliability of using dentin layers for age determination in *Tursiops truncatus*. Final report for MMC contract MM7AC021. NTIS PB-288 444. 25 pp. (A03)
- Irvine, A.B., M.D. Scott, R.S. Wells, J.H. Kaufmann, and W.E. Evans. 1979. A study of the activities and movements of the Atlantic bottlenosed dolphin, *Tursiops truncatus*, including an evaluation of tagging techniques. Final report for MMC contracts MM4AC004 and MM5AC018. NTIS PB-298 042. 54 pp. (A04)
- Jameson, G.L. 1986. Trial systematic salvage of beach-cast sea otter, *Enhydra lutris*, carcasses in the central and southern portion of the sea otter range in California: One year summary of results: October 1983 - September 1984. Final report for MMC contract MM2629849-8. NTIS PB87-108288. 60 pp. (A04)
- Jeffries, S.J. 1986. Seasonal movement and population trends of harbor seals in the Columbia River and adjacent waters of Washington and Oregon, 1976-1982. Final report for MMC contract MM2079357-5. NTIS PB86-200 243. 41 pp. (A03)
- Johnson, B.W., and P.A. Johnson. 1978. The Hawaiian monk seal on Laysan Island: 1977. Final report for MMC contract MM7AC009. NTIS PB-285 428. 38 pp. (A03)
- Johnson, B.W., and P.A. Johnson. 1981. Estimating the Hawaiian monk seal population on Laysan Island. Final report for MMC contract MM1533701-4. NTIS PB82-106 113. 29 pp. (A05)
- Johnson, B.W., and P.A. Johnson. 1981. The Hawaiian monk seal on Laysan Island: 1978. Final report for MMC contract MM8AC008. NTIS PB82-109 661. 17 pp. (A02)
- Johnson, M.L., and S.J. Jeffries. 1977. Population evaluation of the harbor seal (*Phoca vitulina richardsi*) in the waters of the State of Washington. Final report for MMC contract MM5AC019. NTIS PB-270 376. 27 pp. (A03)
- Johnson, M.L., and S.J. Jeffries. 1983. Population biology of the harbor seal (*Phoca vitulina richardi*) in the waters of the State of Washington: 1976-1977. Final report for MMC contract MM6AC025. NTIS PB83-159 715. 53 pp. (A04)
- Kasuya, T., and Y. Izumizawa. 1981. The fishery-dolphin conflict in the Iki Island area of Japan. Final report for MMC contract MM1533791-7. NTIS PB81-171 357. 31 pp. (A03)
- Katona, S.K. 1983. The Gulf of Maine whale sighting network: 1976. Final report for MMC contract MM6AC018. NTIS PB83-151290. 32 pp. (A03)
- Katona, S.K., and S. Kraus. 1979. Photographic identification of individual humpback whales (*Megaptera novaeangliae*): Evaluation and analysis of the technique. Final report for MMC contract MM7AC015. NTIS PB-298 740. 29 pp. (A03)
- Kraus, S.D. 1986. A review of the status of right whales (*Eubalaena glacialis*) in the western North Atlantic with a summary of research and management needs. Final report for MMC contract MM2910905-0. NTIS PB86-154 143. 61 pp. (A04)
- Kooyman, G.L. 1982. Development and testing of a time-depth recorder for marine mammals. Final report for MMC contract MM6AC019. NTIS PB82-257 932. 10 pp. (A02)
- Lentfer, J.W. (Editor). 1988. Selected marine mammals of Alaska: Species accounts with research and management recommendations. Final report for MMC contract MM2910798-4. NTIS PB88-178462. 275 pp. (A013).
- Loughlin, T. 1978. A telemetric and tagging study of sea otter activities near Monterey, California. Final report for MMC contract MM6AC024. NTIS PB-289 682. 64 pp. (A04)
- Marine Mammal Commission. 1974. Annual report of the Marine Mammal Commission, calendar year 1973. Report to Congress. NTIS PB-269 708. 14 pp. (A03)
- Marine Mammal Commission. 1975. Annual report of the Marine Mammal Commission, calendar year 1974. Report to Congress. NTIS PB-269 710. 27 pp. (A04)
- Marine Mammal Commission. 1976. Annual report of the Marine Mammal Commission, calendar year 1975. Report to Congress. NTIS PB 269-711. 50 pp. (A04)
- Marine Mammal Commission. 1977. Annual report of the Marine Mammal Commission, calendar year 1976. Report to Congress. NTIS PB-269 713. 71 pp. (A06)
- Marine Mammal Commission. 1978. Annual report of the Marine Mammal Commission, calendar year 1977. Report to Congress. NTIS PB-281 564. 101 pp. (A06)
- Marine Mammal Commission. 1979. Annual report of the Marine Mammal Commission, calendar year 1978. Report to Congress. NTIS PB-106 784. 108 pp. (A06)
- Marine Mammal Commission. 1980. Humpback whales in Glacier Bay National Monument, Alaska. Final report for an interagency review meeting. NTIS PB80-141 449. 44 pp. (A03)
- Marine Mammal Commission. 1981. Annual report of the Marine Mammal Commission, calendar year 1979. Report to Congress. NTIS PB81-247 892. 100 pp. (A06)

- Marine Mammal Commission. 1981. Annual report of the Marine Mammal Commission, calendar year 1980. Report to Congress. NTIS PB81-247 884. 114 pp. (A06)
- Marine Mammal Commission. 1982. Annual report of the Marine Mammal Commission, calendar year 1981. Report to Congress. NTIS PB82-221 425. 102 pp. (A06)
- Marine Mammal Commission. 1982. Report of a meeting to review on-going and planned research concerning humpback whales in Glacier Bay and surrounding waters in southeast Alaska. Final report of an inter-agency meeting. NTIS PB82-201 039. 20 pp. (A02)
- Marine Mammal Commission. 1983. Annual report of the Marine Mammal Commission, calendar year 1982. Report to Congress. NTIS PB84-132 216. 106 pp. (A06)
- Marine Mammal Commission. 1984. Annual report of the Marine Mammal Commission, calendar year 1983. Report to Congress. NTIS PB84-199 389. 118 pp. (A06)
- Marine Mammal Commission. 1986. Habitat protection needs for the subpopulation of West Indian manatees in the Crystal River area of northwest Florida. NTIS PB86-200 250. 46 pp. (A04)
- Marine Mammal Commission. 1986. Annual report of the Marine Mammal Commission, calendar year 1985. Report to Congress. NTIS PB86-216 249. 180 pp. (A09)
- Marine Mammal Commission. 1987. Annual report of the Marine Mammal Commission, calendar year 1984. Report to Congress. NTIS PB87-209573. 173 pp. (A09)
- Marine Mammal Commission. 1987. Annual report of the Marine Mammal Commission, calendar year 1986. Report to Congress. NTIS PB87-154092. 193 pp. (A09)
- Marine Mammal Commission. 1988. Annual report of the Marine Mammal Commission, calendar year 1987. Report to Congress. NTIS PB88-168984. 209 pp. (A10)
- Mate, B.R. 1977. Aerial censusing of pinnipeds in the eastern Pacific for assessment of population numbers, migratory distributions, rookery stability, breeding effort, and recruitment. Final report for MMC contract MM5AC001. NTIS PB-265 859. 67 pp. (A04)
- Mate, B.R. 1980. Workshop on marine mammal-fisheries interactions in the northeastern Pacific. Final report for MMC contract MM8AC003. NTIS PB80-175 144. 48 pp. (A04)
- Mathiesen, O.A. 1980. Methods for the estimation of krill abundance in the Antarctic. Final report for MMC contract MM7AC032. NTIS PB80-175 151. 26 pp. (A03)
- Matkin, C.O., and F.H. Fay. 1980. Marine mammal-fishery interactions on the Copper River and in Prince William Sound, Alaska, 1978. Final report for MMC contract MM8AC013. NTIS PB80-159 536. 71 pp. (A05)
- Mayo, C.A. 1982. Observations of cetaceans: Cape Cod Bay and southern Stellwagen Bank, Massachusetts 1975-1979. Final report for MMC contract MM1800925-5. NTIS PB82-186 263. 68 pp. (A05)
- Medway, W. 1983. Evaluation of the safety and usefulness of techniques and equipment used to obtain biopsies from free-swimming cetaceans. Final report for MMC contract MM2324809-8. NTIS PB83-263 269. 14 pp. (A02)
- Miller, L.K. 1978. Energetics of the northern fur seal in relation to climate and food resources of the Bering Sea. Final report for MMC contract MM5AC025. NTIS PB-275 296. 27 pp. (A03)
- Montgomery, S. 1986. Workshop on measures to address marine mammal/fisheries interactions in California. Final report for MMC contract MM3309746-2. NTIS PB86-219 060. 123 pp. (A07)
- Montgomery, S. 1987. Report on the 24-27 February 1987 workshop to assess possible systems for tracking large cetaceans. Final report for MMC contract MM4465764-2. NTIS PB87-182135. 61 pp. (A04)
- Nolan, R.S. 1981. Shark control and the Hawaiian monk seal. Final report for MMC contract MM1801065-5. NTIS PB81-201808. 45 pp. (A03)
- Norris, K.S., and J.D. Hall. 1979. Development of techniques for estimating trophic impact of marine mammals. Final report for MMC contract MM4AC013. NTIS PB-290 399. 16 pp. (A02)
- Norris, K.S., and R.R. Reeves. (Editors). 1978. Report on a workshop on problems related to humpback whales (*Megaptera novaeangliae*) in Hawaii. Final report for MMC contract MM7AC018. NTIS PB-280 794. 90 pp. (A05)
- Norris, K.S., W.E. Stuntz, and W. Rogers. 1978. The behavior of porpoises in the eastern tropical Pacific yellowfin tuna fishery: Preliminary studies. Final report for MMC contract MM6AC022. NTIS PB-283 970. 86 pp. (A05)
- Odell, D.K. 1979. A preliminary study of the ecology and population biology of the bottlenose dolphin in southeast Florida. Final report for MMC contract MM4AC003. NTIS PB-294 336. 26 pp. (A03)
- Odell, D.K., and J.E. Reynolds, III. 1980. Abundance of the bottlenose dolphin, *Tursiops truncatus*, on the west coast of Florida. Final report for MMC contract MM5AC026. NTIS PB-80-197 650. 47 pp. (A04)
- Odell, D.K., D.B. Siniff, and G.H. Waring. 1979. *Tursiops truncatus* assessment workshop. Final report for MMC contract MM5AC021. NTIS PB-291 161. 141 pp. (A04)
- Packard, J.M. 1982. Potential methods for influencing the movements and distribution of sea otters: Assessment of research needs. Final report for MMC contract MM2079342-3. NTIS PB83-109 926. 51 pp. (A04)

- Payne, R., O. Brazier, E. Dorsey, J. Perkins, V. Rowntree, and A. Titus. 1981. External features in southern right whales (*Eubalaena australis*) and their use in identifying individuals. Final report for MMC contract MM6AC017. NTIS PB81-161 093. 77 pp. (A05)
- Pitcher, K.W. 1977. Population productivity and food habits of harbor seals in the Prince William Sound-Copper River Delta area, Alaska. Final report for MMC contract MM5AC011. NTIS PB-266 935. 36 pp. (A03)
- Prescott, J.H., and P.M. Fiorelli. 1980. Review of the harbor porpoise (*Phocoena phocoena*) in the U.S. northwest Atlantic. Final report for MMC contract MM8AC016. NTIS PB80-176 928. 64 pp. (A04)
- Prescott, J.H., S.D. Kraus, and J.R. Gilbert. 1980. East Coast/Gulf Coast cetacean and pinniped workshop. Final report for MMC contract MM1533558-2. NTIS PB80-160 104. 142 pp. (A07)
- Ray, G.C., R.V. Salm, and J.A. Dobbin. 1979. Systems analysis mapping: An approach towards identifying critical habitats of marine mammals. Final report for MMC contract MM6AC011. NTIS PB80-111 594. 27 pp. (A03)
- Reeves, R.R. 1977. Exploitation of harp and hooded seals in the western North Atlantic. Final report for MMC contract MM6AD055. NTIS PB-270 186. 57 pp. (A04)
- Reeves, R.R. 1977. The problem of gray whale (*Eschrichtius robustus*) harassment: At the breeding lagoons and during migration. Final report for MMC contract MM6AC021. NTIS PB-272 506 (Spanish translation PB-291 763). 60 pp. (A04)
- Reynolds, J.E., III. 1986. Evaluation of the nature and magnitude of interactions between bottlenose dolphins, *Tursiops truncatus*, and fisheries and other human activities in the coastal areas of the southeastern United States. Final report for MMC contract MM2910892-5. NTIS PB86-162203. 38 pp. (A03)
- Reynolds, J.E., III, and C.J. Gluckman. 1988. Protection of West Indian manatees (*Trichechus manatus*) in Florida. Final report for MMC contract MM4465868-3 and MM3309741-7. NTIS PB88-222922. 103 pp. (A06)
- Ridgway, S.H., and K. Benirschke. (Editors). 1977. Breeding dolphins: Present status, suggestions for the future. Final report for MMC contract MM6AC009. NTIS PB-273 673. 308 pp. (A14)
- Ridgway, S.H., and W.F. Flanigan, Jr. 1981. An investigation of a potential method for the humane taking of certain whales and seals used for food. Final report for MMC contract MM6AC030. NTIS PB81-161 101. 12 pp. (A02)
- Risebrough, R.W. 1978. Pollutants in marine mammals: A literature review and recommendations for research. Final report for MMC contract MM7AD035. NTIS PB-290 728. 64 pp. (A04)
- Risebrough, R.W., D. Alcorn, S.G. Allen, V.C. Anderlini, L. Booren, R.L. DeLong, L.E. Fancher, R.E. Jones, S.M. McGinnis, and T.T. Schmidt. 1980. Population biology of harbor seals in San Francisco Bay, California. Final report for MMC contract MM6AC006. NTIS PB81-107 963. 67 pp. (A04)
- Sawyer-Steffan, J.E., and V.L. Kirby. 1980. A study of serum steroid hormone levels in captive female bottlenose dolphins, their correlation with reproductive status, and their application to ovulation induction in captivity. Final report for MMC contract MM7AC016. NTIS PB80-177 199. 21 pp. (A03)
- Schmidly, D.J., and S.H. Shane. 1978. A biological assessment of the cetacean fauna of the Texas coast. Final report for MMC contract MM4AC008. NTIS PB-281 763. 38 pp. (A03)
- Scott, G.P., and H.E. Winn. 1980. Comparative evaluation of aerial and shipboard sampling techniques for estimating the abundance of humpback whales (*Megaptera novaeangliae*). Final report for MMC contract MM7AC029. NTIS PB81-109 852. 96 pp. (A06)
- Shallenberger, E. 1981. The status of Hawaiian cetaceans. Final report for MMC contract MM7AC028. NTIS PB82-109 398. 79 pp. (A05)
- Shane, S.H., and D.J. Schmidly. 1978. The population biology of the Atlantic bottlenose dolphin, *Tursiops truncatus*, in the Aransas Pass area of Texas. Final report for MMC contract MM6AC028. NTIS PB-283 393. 130 pp. (A07)
- Smith, T.D., and T. Polacheck. 1979. Uncertainty in estimating historical abundance of porpoise populations. Final report for MMC contract MM7AC006. NTIS PB-296 476. 59 pp. (A04)
- Stoker, S.W. 1977. Report on a subtidal commercial clam fishery proposed for the Bering Sea. Final report for MMC contract MM7AD076. NTIS PB-269 712. 33 pp. (A03)
- Stuntz, W.E. 1980. Preliminary investigations of the possible relationship between passive behavior by spotted dolphins, *Stenella attenuata*, and capture stress. Final report for MMC contract MM7AC027. NTIS PB81-111 569. 13 pp. (A02)
- Swartz, S.L. 1987. A review of the status of gray whales (*Eschrichtius robustus*) with a summary of research and management needs. Final report for MMC contract MM2911098-4. NTIS PB87-125035. 30 pp. (A03)
- Swartz, S.L., and W.C. Cummings. 1978. Gray whales, *Eschrichtius robustus*, in Laguna San Ignacio, Baja California, Mexico. Final report for MMC contract MM7AC008. NTIS PB-276 319 (Spanish translation PB-288 636). 38 pp. (A03) (A04 Spanish)
- Swartz, S.L., and M.L. Jones. 1978. The evaluation of human activities on gray whales, *Eschrichtius robustus*, in Laguna San Ignacio, Baja California, Mexico. Final report for MMC contract MM8AC005. NTIS PB-289 737 (Spanish translation PB-299 598). 34 pp. (A03)

- Swartz, S.L., and M.L. Jones. 1980. Gray whales, *Eschrichtius robustus*, during the 1977-1978 and 1978-1979 winter seasons in Laguna San Ignacio, Baja California Sur, Mexico. Final report for MMC contract MM1533497-8. NTIS PB80-202 989. 35pp. (A03)
- Swartz, S.L., and M.L. Jones. 1981. Demographic studies and habitat assessment of gray whales, *Eschrichtius robustus*, in Laguna San Ignacio, Baja California Sur, Mexico. Final report for MMC contract MM2079219-4. NTIS PB82-123 373. 56 pp. (A04)
- Swartz, S.L., and M.L. Jones. 1986. Demography and phenology of gray whales and evaluation of human activities in Laguna San Ignacio, Baja California Sur, Mexico, 1978-1982. Final report for MMC contract MM2324713-8. NTIS PB86-219 078. 69 pp. (A05)
- Swartzman, G. 1984. Factors bearing on the present status and future of the eastern Bering Sea fur seal population with special emphasis on the effect of terminating the subadult male harvest on St. Paul Island. Final report for MMC contract MM2629737-6. NTIS PB84-172 329. 77 pp. (A05)
- Swartzman, G., and R. Haar. 1980. Exploring interactions between fur seal populations and fisheries in the Bering Sea. Final report for MMC contract MM1800969-5. NTIS PB81-133688. 60 pp. (A04)
- Taylor, L.R. and G. Naftel. 1978. Preliminary investigations of shark predation on the Hawaiian monk seal at Pearl and Hermes Reef and French Frigate Shoals. Final report for MMC contract MM7AC011. NTIS PB-285 626. 34 pp. (A03)
- Tinney, R.T., Jr. 1983. Assessment of past, present, and future risks of oil spills in and near the present sea otter range in California. Final report for MMC contract MM2324944-0. NTIS PB83-216 069. 208 pp. (A10)
- Tinney, R.T., Jr. 1984. Some factors affecting the oil spill risk to sea otters in California. Final report for MMC contract MM2910765-4. NTIS PB85-174035. 74 pp. (A04)
- Tinney, R.T., Jr. 1988. Review of information bearing upon the conservation and protection of humpback whales in Hawaii. Final report for MMC contract MM3309689-0. NTIS PB88-195359. 65 pp. (A04)
- Treacy, S.D. 1986. Ingestion of salmonids and gastrointestinal passage in captive harbor seals (*Phoca vitulina*). Final report for MMC contract MM2079357-5. NTIS PB86-200 235. 35 pp. (A03)
- Waring, G.H. 1981. Survey of federally-funded marine mammal research and studies FY70-FY79. Final report for MMC contract MM1533588-3. NTIS PB81-174 336. 235 pp. (A11)
- Waring, G.H. 1981. Survey of federally-funded marine mammal research and studies FY70-FY80. Final report for MMC contract MM1801196-8. NTIS PB81-242 059. 43 pp. (A03)
- Waring, G.H. 1982. Survey of federally-funded marine mammal research and studies FY70-FY81. Final report for MMC contract MM2079243-6. NTIS PB82-227 570. 65 pp. (A04)
- Waring, G.H. 1983. Survey of federally-funded marine mammal research and studies FY70-FY82. Final report for MMC contract MM2324754-9. NTIS PB83-262 998. 83 pp. (A05)
- Waring, G.H. 1984. Survey of federally-funded marine mammal research and studies FY70-FY83. Final report for MMC contract MM2629857-9. NTIS PB84-215 086. 84 pp. (A05)
- Waring, G.H. 1985. Survey of federally-funded marine mammal research and studies FY70-FY84. Final report for MMC contract MM2910918-6. NTIS PB85-225613. 106 pp. (A06)
- Waring, G.H. 1986. Survey of federally-funded marine mammal research and studies FY70-FY85. Final report for MMC contract MM3309688-7. NTIS PB86-235 637. 108 pp. (A06)
- Waring, G.H. 1987. Survey of federally-funded marine mammal research and studies FY70-FY86. Final report for MMC contract MM4465754-5. NTIS PB87-217386. 127 pp. (A07)
- Waring, G.H. 1988. Survey of federally-funded marine mammal research and studies FY70-FY87. Final report for MMC contract MM4465836-6. NTIS PB88-212782. 140 pp. (A07)
- Wartzok, D., and G.C. Ray. 1980. The hauling-out behavior of the Pacific walrus. Final report for MMC contract MM5AC028. NTIS PB80-192 578. 46 pp. (A04)
- Wells, R.S., B.G. Wursig, and K.S. Norris. 1981. A survey of the marine mammals of the upper Gulf of California, Mexico, with an assessment of the status of *Phocoena sinus*. Final report for MMC contract MM1300958-0. NTIS PB81-168 791. 51 pp. (A04)
- Whitehead, H., and R. Payne. 1981. New techniques for measuring whales from the air. Final report for MMC contract MM6AC017. NTIS PB81-161 143. 36 pp. (A03)
- Whitehead, H., K. Chu, P. Harcourt, and A. Alling. 1982. The humpback whales off west Greenland: Summer 1981, with notes on other marine mammals and seabirds sighted. Final report MMC contract MM2079259-2. NTIS PB82-243 924. 25 pp. (A03)
- Williams, T.D. 1978. Chemical immobilization, baseline hematological parameters and oil contamination in the sea otter. Final report for MMC contract MM7AD094. NTIS PB-283969. 27 pp. (A03)
- Wilson, S.C. 1978. Social organization and behavior of harbor seals, *Phoca vitulina concolor*, in Maine. Final report for MMC contract MM6AC013. NTIS PB-280 188. 103 pp. (A06)

Winn, H.E. 1984. Development of a right whale sighting network in the southeastern U.S. Final report for MMC contract MM2324805-6. NTIS PB84-240 548. 12 pp. (A01)

Winn, H.E., E.A. Scott, and R.D. Kenney. 1985. Aerial surveys for right whales in the Great South Channel, Spring 1984. Final report for MMC contract MM2910792-6. NTIS PB85-207 926. 18 pp. (A02)

Woodhouse, C.D., Jr., R.K. Cowen, and L.R. Wilcoxon. 1977. A summary of knowledge of the sea otter *Enhydra lutris*, L., in California and an appraisal of the completeness of the biological understanding of the species. Final report for MMC contract MM6AC008. NTIS PB-270 374. 71 pp. (A04)

Woods, C.A. 1987. An investigation of possible sightings of Caribbean monk seals, (*Monachus tropicalis*), along the north coast of Haiti. Final report for MMC contract MM3309519-2. NTIS PB87-164307. 14 pp. (A02)

Wray, P. 1978. The West Indian manatee (*Trichechus manatus*) in Florida: A summary and analysis of biological, ecological, and administrative problems affecting preservation and restoration of the population. Final report for MMC contract MM8AD054. NTIS PB-285 410. 89 pp. (A05)

Yellin, M.B., C.R. Agegian, and J.S. Pearse. 1977. Ecological benchmarks in the Santa Cruz County kelp forests before the re-establishment of sea otters. Final report for MMC contract MM6AC029. NTIS PB-272 813. 125 pp. (A07)

## NATIONAL TECHNICAL INFORMATION SERVICE CURRENT PRICE LIST

Price List	U.S., Canada and Mexico	All Other Countries
A01	\$6.95	\$13.90
A02	10.95	19.90
A03	13.95	25.90
A04	15.95	29.90
A05	15.95	29.90
A06	21.95	39.90
A07	21.95	39.90
A08	21.95	39.90
A09	21.95	39.90
A10	28.95	51.90
A11	28.95	51.90
A12	28.95	51.90
A13	28.95	51.90
A14	36.95	65.90
A15	36.95	65.90
A16	36.95	65.90
A17	36.95	65.90
A18	42.95	77.90
A19	42.95	77.90
A20	42.95	77.90
A21	42.95	77.90
A22	49.95	89.90
A23	49.95	89.90
A24	49.95	89.90
A25	49.95	89.90
A99	Write to NTIS for price quotation.	

Each report, regardless of length, is available in microfiche at the base prices listed for code A01. All prices include postage and are given in U.S. currency. In addition, there is a \$3.00 handling charge on domestic (\$4.00 on foreign) orders. When ordering, include the NTIS accession number (e.g., PB-265 547). Make checks and money orders payable to the National Technical Information Service. Address: 5285 Port Royal Road, Springfield, Virginia 22161, U.S.A.

## APPENDIX C

### SELECTED LITERATURE PUBLISHED ELSEWHERE RESULTING FROM COMMISSION-SPONSORED ACTIVITIES

- Ainley, D.G., H.R. Huber, and K.M. Bailey. 1982. Population Fluctuations of California Sea Lions and the Pacific Whiting off Central California. *Fishery Bulletin* (NOAA) 80:253-258. (MMC Contracts MM4AC002, MM5AC027, MM6AC007, MM7AC025, and MM1300888-2).
- Ainley, D.G., R.P. Henderson, H.R. Huber, R.J. Boekheide, S.G. Allen, and T.L. McElroy. 1985. Dynamics of White Shark/Pinniped Interactions in the Gulf of the Farallones 1970 to 1983. *Memoirs, Southern California Academy of Sciences*, 9:109-122. (MMC Contracts MM4AC002, MM5AC027, MM6AC007, MM7AC025, and MM1300888-2).
- Ainley, D.G., C.S. Strong, H.R. Huber, T.J. Lewis, and S.H. Morrell. 1980. Shark Predation of Pinnipeds at the Farallon Islands, California. *Fishery Bulletin* (NOAA) 78(4):941-945. (MMC Contracts MM4AC002, MM5AC027, MM6AC007, MM7AC025, and MM1300888-2).
- Alexander, L.M., and L.C. Hanson. (Editors). 1985. Antarctic Politics and Marine Resources: Critical Choices for the 1980s. *Proceedings from the Eighth Annual Conference, 17-20 June 1984, Center for Ocean Management Studies, University of Rhode Island, Kingston, Rhode Island*. 262 pp. (MMC Contract MM2910791-3).
- Allen, S.G., D.G. Ainley, G.W. Page, and C.A. Ribic. 1984. The Effects of Disturbance on Harbor Seal Haul-Out Behavior Patterns at Bolinas Lagoon, California. *Fishery Bulletin* (NOAA) 82(3):433-500. (MMC Contract MM8AC012).
- Bailey, K.M., and D.G. Ainley. 1982. Dynamics of California Sea Lion Predation on Pacific Hake. *Fish. Res.* 1:163-176. (MMC Contracts MM4AC002, MM5AC027, MM6AC007, MM7AC025, and MM1300888-2).
- Baker, C.S., and L.M. Herman. 1981. Migration and Local Movements of Humpback Whales (*Megaptera novaeangliae*) through Hawaiian Waters. *Canadian Journal of Zoology* 59(3):460-469. (MMC Contract MM7AC014).
- Balcomb, K.C., III, and M.A. Bigg. 1986. Population Biology of the Three Resident Killer Whale Pods in Puget Sound and off Southern Vancouver Island. *In* B.C. Kirkevoid and J.S. Lockard (Editors). *Behavioral Biology of Killer Whales*. *Zoo Biology Monographs*, Vol. 1. (MMC Contract MM1300731-7).
- Balcomb, K.C., III, J.R. Boran, and S.L. Heimlich. 1982. Killer Whales in Greater Puget Sound. *Report to the International Whaling Commission* 32:681-685. (MMC Contract MM1300731-7).
- Barham, E.G., J.C. Sweeney, S. Leatherwood, R.K. Beggs, and C.L. Barham. 1980. Aerial Census of the Bottlenose Dolphin, *Tursiops truncatus*, in a Region of the Texas Coast. *Fishery Bulletin* (NOAA) 77(3):585-595. (MMC Contract MM8AC011).
- Beach, R.J., A.C. Geiger, S.J. Jeffries, S.D. Treacy, and B.L. Troutman. 1985. Marine Mammals and Their Interactions with Fisheries of the Columbia River and Adjacent Waters, 1980-1982. NOAA, NMFS, NWAFC Processed Report 85-04, 316 pp. (MMC Contracts MM2079221-7 and MM2324788-2).
- Bean, M.J. 1987. Legal Strategies for Reducing Persistent Plastics in the Marine Environment. *Marine Pollution Bulletin* 18:357-360. (MMC Contract MM2629994-7).
- Bengtson, J.L. 1985. Monitoring Indicators of Possible Ecological Changes in the Antarctic Marine Ecosystem. *In* *Selected Papers, 1982-1984 (Part II)*, Commission for the Conservation of Antarctic Marine Living Resources, Hobart, Australia. (MMC Contract 2629914-1).
- Bengtson, J.L. 1985. Review of Antarctic Marine Fauna. *In* *Selected Papers, 1982-1984 (Part I)*, Commission for the Conservation of Antarctic Marine Living Resources, Hobart, Australia. (MMC Contract 2629914-1).
- Blix, A.S., and L.K. Miller. 1979. Newborn Fur Seals (*Callorhinus ursinus*) - Do They Suffer from the Cold? *American Journal of Physiology*, 236:R322-327. (MMC Contract MM5AC025).
- Bockstoce, J. 1980. A Preliminary Estimate of the Reduction of the Western Arctic Bowhead Whale Population by the Pelagic Whaling Industry: 1848-1915. *Marine Fisheries Review* 42(9-10):20-27. (MMC Contract MM7AD111).
- Bockstoce, J.R. 1986. Whales, Ice and Men. *The History of Whaling in the Western Arctic*. University of Washington Press, Seattle. (MMC Contract MM7AD111).
- Breiwick, J.M. 1978. Reanalysis of Antarctic Sei Whale Stocks. *Report to the International Whaling Commission*, 28:345-368. (MMC Contract MM7AC012).
- Breiwick, J.M., E.D. Mitchell, and D.G. Chapman. 1980. Estimated Initial Population Size of the Bering Sea Stock of Bowhead Whale, *Balaena mysticetus*: An Iterative Method. *Fishery Bulletin* (NOAA) 78(4):843-853. (MMC Contract MM8AC007).
- Brown, R.F., and B.R. Mate. 1983. Abundance, Movements and Feeding Habits of Harbor Seals, *Phoca vitulina*, at Netarts and Tillamook Bays, Oregon. *Fishery Bulletin* (NOAA) 91(2):291-301. (MMC Contract MM8AC003).

- Brownell, R.L., P.B. Best, and J.H. Prescott. (Editors). 1986. Right Whales: Past and Present Status. Proceedings of the Workshop on the Status of Right Whales, Boston, Massachusetts, 15-23 June 1983. International Whaling Commission, Special Issue 10. (MMC Contract MM2911051-5).
- Brownell, R.L., Jr. 1987. External Morphology and Pigmentation of the Vaquita, *Phocoena sinus* (Cetacea: Mammalia). Marine Mammal Science 3(1):22-30. (MMC Contract MM3309558-7).
- Burns, J.J., and F.H. Fay. 1974. New Data on Taxonomic Relationships Among North Pacific Harbor Seals, genus *Phoca* (*sensu stricto*). Trans. 1st Internat. Theriol. Cong. (Moscow) 1:99. (MMC Contract MM4AC005).
- Burns, J.J., F.H. Fay, and G.A. Fedoseev. 1984. Craniological Analysis of Harbor and Spotted Seals of the North Pacific Region. Pp. 5-16. In F.H. Fay and G.A. Fedoseev (Editors). Soviet-American Cooperative Research on Marine Mammals. Vol. I-Pinnipeds. NOAA Tech. Report NMFS-12. (MMC Contract MM4AC005).
- Clapham, P.J., and C.A. Mayo. 1987. The Attainment of Sexual Maturity in Two Female Humpback Whales. Marine Mammal Science 3(3):279-283. (MMC Contract MM1800925-5).
- Clark, W.G. 1981. Restricted Least-squares Estimates of Age Composition from Length Composition. Canadian Journal of Fisheries and Aquatic Science 38:297-307. (MMC Contracts MM1533439-2 and MM1801114-6).
- Clark, W.G. 1982. Early Changes in the Recruitment Rates of Antarctic Minke Whales Inferred from Recent Age Distributions. Report to the International Whaling Commission, 32:889-895. (MMC Contracts MM1533439-2 and MM1801114-6).
- Clark, W.G. 1982. Historical Rates of Recruitment to Southern Hemisphere Fin Whale Stocks. Report to the International Whaling Commission, 32. SC/33/Ba3:305-324. (MMC Contracts MM1533439-2 and MM1801114-6).
- Clark, W.G. 1983. Apparent Inconsistencies among Countries in Measurements of Fin Whale Lengths. Report to the International Whaling Commission, 33:431-434. (MMC Contracts MM1533439-2 and MM1801114-6).
- Clark, W.G. 1984. Analysis of Variance of Photographic and Visual Estimates of Dolphin School Size. Southwest Fisheries Center Admin. Report LJ-84-11C. Southwest Fisheries Center, National Marine Fisheries Service, La Jolla, California. 36 pp. (MMC Contract MM2324792-1).
- Clark, W.G. 1984. Recruitment Rates of Antarctic Fin Whales, *Balaenoptera physalus*, Inferred from Cohort Analysis. In W.F. Perrin, R.L. Brownell, Jr., and D.P. DeMaster (Editors). Reproduction in Whales, Dolphins, and Porpoises. Special Issue 6. International Whaling Commission. Cambridge, U.K. (MMC Contract MM1533439-2).
- Coe, J.M., and W.E. Stuntz. 1980. Passive Behavior by the Spotted Dolphin, *Stenella attenuata*, in Tuna Purse Seine Nets. Fishery Bulletin (NOAA) 78(2):535-537. (MMC Contract MM6AC022).
- Costa, D.P. 1978. The Sea Otter: Its Interaction with Man. Oceanus 21(2):24-30. (MMC Contract MM6AA053).
- Costa, D.P. 1982. Energy, Nitrogen, and Electrolyte Flux and Sea Water Drinking in the Sea Otter, *Enhydra lutris*. Physiological Zoology 55(1):35-44. (MMC Contract MM6AA053).
- Cowen, R.K., C.R. Agegian, and M.S. Foster. 1982. The Maintenance of Community Structure in a Central California Giant Kelp Forest. Journal of Experimental Marine Biology and Ecology, 64:189-201. (MMC Contract MM7AC023).
- Dayton, P.K. 1984. Processes Structuring Some Marine Communities: Are They General? Pp. 181-197. In D.R. Strong, et al. (Editors). Ecological Communities: Conceptual Issues and the Evidence. Princeton University Press. Princeton, N.J. (MMC Contract MM1300702-9).
- Dayton, P.K., V. Currie, T. Gerrodette, B.D. Keller, R. Rosenthal, and D. Van Tresca. 1984. Patch Dynamics and Stability of Some California Kelp Communities. Ecological Monographs 54(3):253-289. (MMC Contract MM1300702-9).
- Dayton, P.K., and M.J. Tegner. 1984. The Importance of Scale in Community Ecology: A Kelp Forest Example with Terrestrial Analogs. Pp. 457-481. In P.W. Price, et al. (Editors). A New Ecology: Novel Approaches to Interactive Systems. John Wiley & Sons, Inc. New York. (MMC Contract MM1300702-9).
- Dieter, R.L. 1988. In press. Recovery and Necropsy of Marine Mammal Carcasses in and near the Point Reyes National Seashore, May 1972-1987. Fishery Bulletin (NOAA). (MMC Contract MM2911030-8).
- DeMaster, D.P., and J.K. Drevenak. 1988. Survivorship Patterns in Three Species of Captive Cetaceans. Marine Mammal Science (4):297-311.
- Eberhardt, L.L., D.G. Chapman, and J.R. Gilbert. 1979. A Review of Marine Mammal Census Methods. Wildlife Monographs, No. 63. 46 pp. (MMC Contract MM4AC014).
- Everitt, R.D., and R.J. Beach. 1982. Marine Mammal-Fisheries Interactions in Oregon and Washington: An Overview. Pp. 265-277. In Transactions of the 47th North American Wildlife and Natural Resources Conference. Wildlife Management Institute. Washington, D.C. (MMC Contracts MM2079345-2 and MM2079357-5).
- Fay, F.H. 1982. Ecology and Biology of the Pacific Walrus, *Odobenus rosmarus divergens* Illigen. U.S. Fish and Wildlife Service. North American Fauna, No. 74. 279 pp. (Partial support under MMC Contract MM1533576-0).
- Fay, F.H. 1984. Walrus. Pp. 264-269. In D. Macdonald (Editor). Encyclopedia of Mammals. Equinox Ltd., Oxford, England. (MMC Contract MM1533576-0).

- Fay, F.H. 1985. *Odobenus rosmarus*. Mammalian Species 238:1-7. (MMC Contract MM1533576-0).
- Foster, M. 1982. The Regulation of Macroalgal Associations in Kelp Forests. Pp. 185-205. In L. Srivastava (Editor). Synthetic and Degradative Processes in Marine Macrophytes. W. de Gruyter & Company, Berlin. (MMC Contract MM7AC023).
- Fowler, C.W. 1980. A Rationale for Modifying Effort by Catch, Using the Sperm Whale of the North Pacific as an Example. Pp. 99-102. In Report to the International Whaling Commission, Special Issue 2. (MMC Contract MM8AC009).
- Fowler, C.W. 1981. Comparative Population Dynamics in Large Mammals. Pp. 437-455. In C.W. Fowler and T.D. Smith (Editors). Dynamics of Large Mammal Populations. John Wiley & Sons, Inc., New York. (MMC Contract MM1300730-4).
- Fowler, C.W. 1981. Density Dependence as Related to Life History Strategy. Ecology 62:602-610. (MMC Contract MM7AC013).
- Fowler, C.W. 1987. A Review of Density Dependence in Populations of Large Mammals. Rep. Current Mammalogy, 1:401-441. (MMC Contract MM7AC013).
- Gaines, S.E., and D. Schmidt. 1976. Wildlife Management under the Marine Mammal Protection Act of 1972. Pp. 50096-50114. In Environmental Law Reporter. (MMC Contract MM5AC029).
- Gentry, R.L., and G.L. Kooyman. 1986. Fur Seals: Maternal Strategies on Land and at Sea. Princeton University Press, Princeton, New Jersey. 291 pp. (MMC Contract MM6A019).
- Georgia Conservancy, The. 1986. Report of the Southeastern U.S. Right Whale Workshop, 18-20 February 1986, Jekyll Island, Georgia. 41 pp. (MMC Contract MM633095950).
- Geraci, J.R., and D.J. St. Aubin. 1980. Offshore Petroleum Resource Development and Marine Mammals: A Review and Research Recommendations. Marine Fisheries Review 42(11):1-12. (Requested by the Marine Mammal Commission).
- Glockner-Ferrari, D.A., and M.J. Ferrari. 1987. Identification, Reproduction, and Distribution of Humpback Whales in Hawaiian Waters, 1984 and 1985. Report to National Marine Fisheries Service, National Marine Mammal Laboratory, Seattle. 33 pp. (MMC Contract MM2629752-5).
- Goodman, D. 1981. Life History Analysis of Large Mammals. In C.W. Fowler and T.D. Smith (Editors). Dynamics of Large Mammal Populations. John Wiley & Sons, Inc., New York. (MMC Contract MM8AD-008).
- Goodman, D. 1980. Demographic Intervention for Closely Managed Populations. In M.E. Soule and B.A. Wilcox (Editors). Conservation Biology: An Evolutionary Perspective. Sinaves. (MMC Contract MM8AD-008).
- Haenel, N.J. 1986. General Notes on the Behavioral Ontogeny of Puget Sound Killer Whales and the Occurrence of Allomaternal Behavior. In B.C. Kirkevoid and J.S. Lockard (Editors). Behavioral Biology of Killer Whales. Zoo Biology Monographs. Vol. 1. (MMC Contract MM1300731-7).
- Hain, J.H.W., G.R. Carter, S.D. Kraus, C.A. Mayo, and H.E. Winn. 1982. Feeding Behavior of the Humpback Whale, *Megaptera novaeangliae*, in the Western North Atlantic. Fishery Bulletin (NOAA) 80(2):259-268. (MMC Contract MM1800925-5).
- Hall, J.D. 1977. A Non-Lethal Lavage Device for Sampling Stomach Contents of Small Marine Mammals. Fishery Bulletin (NOAA) 75(3):653-656. (MMC Contract MM4AC013).
- Harvey, J.T., and B.R. Mate. 1984. Dive Characteristics and Movements of Radio-Tagged Gray Whales in San Ignacio Lagoon, Baja California Sur, Mexico. In The Gray Whale. M.L. Jones, S. Swartz, and S. Leatherwood (Editors). Academic Press, pp. 561-575. (MMC Contract MM1533416-9).
- Heimlich-Boran, J.R. 1986. Photogrammetric Analysis of Growth in Puget Sound *Orcinus orca*. In B.C. Kirkevoid and J.S. Lockard (Editors). Behavioral Biology of Killer Whales. Zoo Biology Monographs. Vol. 1. (MMC Contract MM1300731-7).
- Heimlich-Boran, J.R. 1986. Fishery Correlations with the Occurrence of Killer Whales in Greater Puget Sound. In B.C. Kirkevoid and J.S. Lockard (Editors). Behavioral Biology of Killer Whales. Zoo Biology Monographs. Vol. 1. (MMC Contract MM1300731-7).
- Heimlich-Boran, S.L. 1986. Cohesive Relationships Among Puget Sound Killer Whales. In B.C. Kirkevoid and J.S. Lockard (Editors). Behavioral Biology of Killer Whales. Zoo Biology Monographs. Vol. 1. (MMC Contract MM1300731-7).
- Herman, L.M. 1979. Humpback Whales in Hawaiian Waters: A Study in Historical Ecology. Pacific Science 33(1):1-16. (MMC Contract MM7AC014).
- Herman, L.M., and R.C. Antinaja. 1977. Humpback Whales in the Hawaiian Breeding Waters: Population and Pod Characteristics. Scientific Report of the Whales Research Institute, No. 29:59-85. (MMC Contract MM7AC014).
- Hoelzel, A.R., and R.W. Osborne. 1986. Killer Whale Call Characteristics: Implications for Cooperative Foraging Strategies. In B.C. Kirkevoid and J.S. Lockard (Editors). Behavioral Biology of Killer Whales. Zoo Biology Monographs. Vol. 1. (MMC Contract MM1300731-7).
- Hofman, R.J. 1985. The Convention on the Conservation of Antarctic Marine Living Resources. Pp. 113-122. In L.M. Alexander and L.C. Hanson (Editors). Antarctic Politics and Marine Resources: Critical Choices for the 1980s. Center for Ocean Management Studies, University of Rhode Island, Kingston, Rhode Island.
- Hofman, R.J., and W.N. Bonner. 1985. Conservation and Protection of Marine Mammals: Past, Present and Future. Marine Mammal Science 1(2):109.

- Huber, H.R. 1987. Natalty and Weaning Success in Relation to Age of First Reproduction in Northern Elephant Seals. *Canadian Journal of Zoology* 65(6):1311-1316. (MMC Contracts MM4AC002, MM5AC027, MM6AC007, MMAC025, MM130088-3, MM1535599-3).
- Huber, H.R., D.G. Ainley, and S.H. Morrell. 1982. Sightings of Cetaceans in the Gulf of the Farallones, California, 1971-1979. *California Fish and Game* 68(3):183-189. (MMC Contract MM1300888-2).
- Hui, C.A. 1980. Variability of Dentin Deposits in *Tursiops truncatus*. *Canadian Journal of Fisheries and Aquatic Science* 37(4):712-716. (MMC Contract MM7AC021).
- Irvine, A.B., M.D. Scott, R.S. Wells, and J.H. Kaufman. 1981. Movements and Activities of the Atlantic Bottlenose Dolphin, *Tursiops truncatus*, Near Sarasota, Florida. *Fishery Bulletin* (NOAA) 79(4):671-688. (MMC Contracts MM4AC004 and MM5AC018).
- Irvine, A.B., R.S. Wells, and M.D. Scott. 1982. An Evaluation of Techniques for Tagging Small Odontocete Cetaceans. *Fishery Bulletin* (NOAA) 80(1):135-143. (MMC Contracts MM4AC004 and MM5AC018).
- Johnson, P.A., B.W. Johnson, and L.R. Taylor. 1981. Interisland Movement of a Young Hawaiian Monk Seal between Laysan Island and Maro Reef. 'Elepaio, 41(11):113-114. (MMC Contracts MM7AC009 and MM8AC008).
- Jones, M.L., and S.L. Swartz. 1984. Demography and Phenology of Whale-Watching Activities in Laguna San Ignacio, Baja California Sur, Mexico. Pp. 309-374. In M.L. Jones and S.L. Swartz (Editors). *The Gray Whale, Eschrichtius robustus*. Academic Press, New York. (MMC Contract MM8AC005).
- Jones, M.L., S.L. Swartz, and J.S. Leatherwood. (Editors.) 1984. *The Gray Whale*. Academic Press, Inc., New York. 602 pp. (MMC Contracts MM7AC008, MM8AC005, MM1533497-8, MM2079219-4, MM2324715-8, MM2324713-8, and MM2911098-4).
- Kirby, V. 1983. Progesterone and Estrogens in Pregnant and Nonpregnant Dolphins (*Tursiops truncatus*) and the Effects of Induced Ovulation. *Biology of Reproduction* 28:897-901. (MMC Contract MM7AC016).
- Kooyman, G.L., J.O. Billups, and W.D. Farwell. 1983. Two Recently Developed Recorders for Monitoring Diving Activity of Marine Birds and Mammals. Pp. 197-214. In: A.G. MacDonald and I.G. Priede (Editors). *Experimental Biology at Sea*. Academic Press, New York. (MMC Contract MM6AC019).
- Kooyman, G.L., and L.H. Cornell. 1981. Flow Properties of Expiration and Inspiration in a Trained Bottlenosed Porpoise. *Physiological Zoology* 54(1):55-61. (MMC Contract MM4AC012).
- Kooyman, G.L., R.L. Gentry, and D.L. Urquhart. 1976. Northern Fur Seal Diving Behavior: A New Approach to its Study. *Science* 193:411-412. (MMC Contract MM6AC019).
- Kooyman, G.L., K.S. Norris, and R.L. Gentry. 1975. Spout of the Gray Whale: Its Physical Characteristics. *Science* 190:908-910. (MMC Contract MM4AC012).
- Kooyman, G.L., and E.E. Sinnett. 1979. Mechanical Properties of the Harbor Porpoise Lung. *Respiratory Physiology*, 36:287-300. (MMC Contract MM4AC012).
- Kraus, S.D., J.R. Gilbert, and J.H. Prescott. 1983. A Comparison of Aerial, Shipboard and Land-Based Survey Methodology for the Harbor Porpoise, *Phocoena phocoena*. *Fishery Bulletin* (NOAA) 81:910-912, (MMC Contract MM1801023-1).
- Kraus, S.D., K.E. Moore, C.A. Price, M.J. Crone, W.A. Watkins, H.E. Winn, and J.H. Prescott. 1986. The Use of Photographs to Identify Individual North Atlantic Right Whales (*Eubalaena glacialis*). Report to the International Whaling Commission. Special Issue 10. Pp. 139-144. (MMC Contracts MM2079355-9 and MM3309800-5).
- Kraus, S.D., J.H. Prescott, A.R. Knowlton, and G.S. Stone. 1986. Migration and Calving of Right Whales (*Eubalaena glacialis*) in the Western North Atlantic. Report to the International Whaling Commission. Special Issue 10. Pp. 145-151. (MMC Contracts MM2079355-9 and MM3309800-5).
- Kraus, S.D., J.H. Prescott, and A.R. Knowlton. 1988. Wintering Right Whales along the Southeastern United States: A Primary Calving Ground. Proceedings of the Third Southeastern Non-Game and Endangered Wildlife Symposium. Georgia Department of Natural Resources, pp. 148-157. (MMC Contract MM3309800-5).
- Laist, D.W. 1987. An Overview of the Biological Effects of Lost and Discarded Plastic Debris in the Marine Environment. *Marine Pollution Bulletin* 18:319-326.
- Leatherwood, S. 1975. Some Observations of Feeding Behavior of Bottlenosed Dolphins (*Tursiops truncatus*) in the Northern Gulf of Mexico and (*Tursiops cf. T. gilli*) off Southern California, Baja California, and Nayarit, Mexico. *Marine Fisheries Review* 37(9):10-16. (MMC Contract MM6AC001).
- Leatherwood, S., J.R. Gilbert, and D.G. Chapman. 1978. An Evaluation of Some Techniques for Aerial Censuses of Bottlenosed Dolphins. *Journal of Wildlife Management* 42(2):239-250. (MMC Contract MM8AC001).
- Leatherwood, J.S., R.A. Johnson, D.K. Ljungblad, and W.E. Evans. 1977. Broadband Measurements of Underwater Acoustic Target Strengths of Panels of Tuna Nets. Tech. Report 126. Naval Ocean Systems Center, San Diego, California. 19 pp. (MMC contract MM6AC020).
- Loughlin, T.R. 1979. Radio Telemetric Determination of the 24-Hour Feeding Activities of Sea Otters, *Enhydra lutris*. Pp. 717-724. In C.J. Amlaner, Jr., and D.W. McDonald (Editors). *A Handbook on Biotelemetry and Radio-Tracking*. Pergamon Press, Oxford and New York. (MMC Contracts MM6AC004 and MM6AC024).

- Loughlin, T.R. 1980. Home Range and Territoriality of Sea Otters near Monterey, California. *Journal of Wildlife Management* 44(3):576-582. (MMC Contracts MM6AC004 and MM6AC024).
- Lowry, L.F. 1982. Documentation and Assessment of Marine Mammal-Fishery Interactions in the Bering Sea. Pp. 300-311. *In* Transactions of the 47th North American Wildlife and Natural Resources Conference Wildlife Management Institute. Washington, D.C. (MMC Contract MM1533596-4).
- Lowry, L.F., and F.H. Fay. 1984. Seal Eating by Walruses in the Bering and Chukchi Seas. *Polar Biology* 3:11-18. (MMC Contracts MM5AC006 and MMC5AC024).
- Marine Mammal Commission. 1988. Preliminary Assessment of Habitat Protection Needs for West Indian Manatees on the East Coast of Florida and Georgia. 107 pp. (MMC Contract 62239505)
- Mate, B.R., J. Harvey, R. Maiefski, and L. Hobbs. 1983. A New Radio Tag for Large Whales. *Journal of Wildlife Management* 47(3):869-872. (MMC Contract MM1533416-9).
- Mate, B.R., and J.T. Harvey. 1984. Ocean Movements of Radio-Tagged Gray Whales. *In* M.L. Jones and S.L. Swartz (Editors). *The Gray Whale, Eschrichtius robustus*. Academic Press, New York. (MMC Contract 1533416-0).
- Mayo, C.A., C.A. Carlson, P.J. Clapham, and D.K. Mattila. 1985. Humpback Whales of the Southern Gulf of Maine. Shankpainter Press, Provincetown, Massachusetts. (MMC Contract MM1800925-5).
- Mead, J.G. 1977. Records of Sei and Bryde's Whales from the Atlantic Coast of the United States, the Gulf of Mexico and the Caribbean. Pp. 113-116. *In* International Whaling Commission, Special Issue No. 1. Report of the Special Meeting of the Scientific Committee on Sei and Bryde's Whales, La Jolla, California. December 1974. (MMC Contract MM7AC007).
- Melteff, B.R., and D.H. Rosenberg. (Editors). 1984. Proceedings of the Workshop on Biological Interactions among Marine Mammals and Commercial Fisheries in the Southeastern Bering Sea, October 18-21, 1983, Anchorage, Alaska. Alaska Sea Grant College Program, University of Alaska, Fairbanks, Alaska. 300 pp. (MMC Contract MM2324802-7).
- Merrell, T.R. 1985. Fish Nets and Other Plastic Litter on Alaska Beaches. *In* R.S. Shomura and H.O. Yoshida (Editors). Proceedings of the Workshop on the Fate and Impact of Marine Debris, 26-29 November 1984, Honolulu, Hawaii. U.S. Dept. Commerce, NOAA Tech. Memo. (MMC Contract MM2910786-1).
- Miller, L.K. 1977. Energetics of the Northern Fur Seal in Relation to Climate and Food Resources of the Bering Sea. Proc. 2nd Conf. Biol. Marine Mammals, San Diego, California. (MMC Contract MM5AC025).
- Mizroch, S.A., D.W. Rice, J.L. Bengtson, and S.W. Larson. 1985. Preliminary Atlas of *Balaenopterid* Whale Distribution in the Southern Ocean based on Pelagic Catch Data. SC-CAMLR-IV/BG/21. Pp. 113-193. *In* Selected papers presented to the Scientific Committee of CCAMLR, 1985. (MMC Contract MM3309521-5).
- Nafziger, J.A.R. 1978. The Management of Marine Mammals After the Fishery Conservation and Management Act. *Willamette Law Journal* 14:153-215. (MMC Contract MM7AC001).
- National Research Council. 1981. An Evaluation of Antarctic Marine Ecosystem Research. Committee to Evaluate Antarctic Marine Ecosystem Research, Polar Research Board. National Academy Press, Washington, D.C. 99 pp. (MMC Contract MM1800913-2).
- National Research Council. 1988. Priorities in Arctic Marine Science. 73 pp. (MMC Contracts MM2911050-6, MM3309999821-2).
- Norris, K.S., R. Goodman, B. Villa-Ramirez, and L. Hobbs. 1977. Behavior of California Gray Whales (*Eschrichtius robustus*) in Southern Baja California, Mexico. *Fishery Bulletin* (NOAA) 75(1):159-172. (MMC Contract MM5AC007).
- Odell, D.K. 1975. Status and Aspects of the Life History of the Bottlenose Dolphin, *Tursiops truncatus*, in Florida. *Journal of the Fisheries Research Board of Canada* 32(7):1055-1058. (MMC Contract MM4AC003).
- Odell, D.K. 1976. Distribution and Abundance of Marine Mammals in South Florida: Preliminary Results. *In* A. Thorhaug (Editor). 1976. Biscayne Bay: Past/Present/Future. Biscayne Bay Symposium I, 2-3 April 1976. University of Miami Sea Grant Special Report No. 5. 315p. (MMC Contract MM4AC003).
- Odell, D.K. 1979. Distribution and Abundance of Marine Mammals in the Waters of the Everglades National Park. Proceedings of the First Conference on Research in National Parks. USDI, NPS, Transactions Proceedings Series No. 5:673-678. (MMC Contract MM4C003).
- Packard, J.M. 1984. Impact of Manatees, *Trichechus manatus*, on Seagrass Communities in Eastern Florida. *In* Acta Zool. Fennica. 172:21-22. (MMC Contract MM1801025-7).
- Packard, J.M. 1984. Proposed Research/Management Plan for Crystal River Manatees. Vols. 1-3. Tech. Report 7. Florida Cooperative Fish and Wildlife Research Unit, University of Florida, Gainesville, Florida. Prepared for Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C. 31 pp. 235 pp. 346 pp. (MMC Contract MM1801024-4).
- Packard, J.M., R.K. Frohlich, J.E. Reynolds, III, and J.R. Wilcox. 1985. Manatee Response to Interrupted Operation of the Fort Myers Power Plant, Winter 1984/85. Manatee Population Research Report No. 8. Technical Report No. 8-8. Florida Cooperative Fish and Wildlife Research Unit. University of Florida, Gainesville, Florida. 20 pp. (MMC Contract MM3309522-8).

- Packard, J.M., and O.F. Wetterquist. 1985. Evaluation of Manatee Habitat on the Northwestern Coast of Florida. *Coastal Zone Management Journal* 14(4):279-310. (MMC Contract MM1801025-7).
- Payne, R., O. Brazier, E.M. Dorsey, J.S. Perkins, V.J. Rowntree, and A. Titus. 1983. External Features in Southern Right Whales (*Eubalaena australis*) and Their Use in Identifying Individuals. pp. 371-445. In R. Payne (Editor). *Communication and Behavior of Whales*. AAAS Selected Symposium 76. Westview Press, Inc. Boulder, Colorado. (MMC Contract MM6AC017).
- Pearse, J.S., D.P. Costa, M.B. Yellin, and C.R. Agegian. 1977. Localized Mass Mortality of Red Sea Urchin, *Strongylocentrotus franciscanus*, near Santa Cruz, California. *Fishery Bulletin* (NOAA) 75(3):645-648. (MMC Contract MM6AC029).
- Perrin, W.F., and A.C. Myrick, Jr. (Editors). 1980. Age Determination of Toothed Whales and Sirenians. *International Whaling Commission, Special Issue No. 3*. 229 pp. (MMC Contract MM8AC004).
- Perrin, W.F., R.L. Brownell, Jr., and D.P. DeMaster (Editors). 1984. Reproduction in Whales, Dolphins, and Porpoises. *International Whaling Commission, Special Issue 6*. 490 pp. (MMC Contract MM2079356-2).
- Pierotti, R.J., D.G. Ainley, T.S. Lewis, and M.C. Coulter. 1977. Birth of a California Sea Lion on Southeast Farallon Island. *California Fish and Game* 63(1):64-65. (MMC Contract MM4AC002).
- Pitcher, K.W. 1980. Food of the Harbor Seal, *Phoca vitulina*, in the Gulf of Alaska. *Fishery Bulletin* (NOAA) 78(2):544-549. (MMC Contract MM5AC011).
- Pitcher, K.W. 1980. Stomach Contents and Feces as Indicators of Harbor Seal, *Phoca vitulina*, Foods in the Gulf of Alaska. *Fishery Bulletin* (NOAA) 78(3):797-798. (MMC Contract MM5AC011).
- Pitcher, K.W. 1986. Variation in Blubber Thickness of Harbor Seals in Southern Alaska. *Journal of Wildlife Management* 50(3):463-466. (MMC Contract MM5AC011).
- Ralston, F. (Editor). 1977. A Workshop to Assess Research Related to the Porpoise/Tuna Problem, February 28, March 1-2. Southwest Fisheries Center Admin. Report LJ-77-15. Southwest Fisheries Service, National Marine Fisheries Service, La Jolla, California. 119 pp. 6 appendices. (MMC Contract MM7AC022).
- Ray, G.C., J.A. Dobbin, and R.V. Salm. 1978. Strategies for Protecting Marine Mammal Habitats. *Oceanus* 21(2):55-67. (MMC Contract MM6AC011).
- Reeves, R.R., D. Tuboku-Metzger, and R.A. Kapindi. 1988. Distribution and exploitation of manatees in Sierra Leone. *Oryz* 22(2):75-84. (MMC Contract MM2411037-9).
- Roffe, T.J., and B.R. Mate. 1984. Abundances and Feeding Habits of Pinnipeds in the Rogue River, Oregon. *Journal of Wildlife Management* 48(4):1262-1274. (MMC Contract MM8AC003).
- Scott, G.P., and H.E. Winn. 1978. Assessment of Humpback Whale (*Megaptera novaeangliae*) Stocks Using Vertical Photographs. *Proceedings PECORA IV Symposium, National Wildlife Science and Technology Series* 3:235-243. (MMC Contract MM7AC029).
- Sergeant, D.E., D.J. St. Aubin, and J.R. Geraci. 1980. Life History and Status of the Northwest Atlantic White-Sided Dolphin, *Lagenorhynchus acutus*. *Cetology* 37:1-12. (MMC Contract MM5AC008).
- Shallenberger, E.W. 1977. Humpback Whales in Hawaii: Population and Distribution. *Oceans '77*, Marine Technology Society, Institute of Electrical and Electronics Engineers, p. Hawaii C1-7. (MMC Contract MM7AC014).
- Shane, S.H. 1980. Occurrence, Movements, and Distribution of Bottlenose Dolphin, *Tursiops truncatus*, in Southern Texas. *Fishery Bulletin* (NOAA) 78(3):593-601. (MMC Contract MM6AC028).
- Shaughnessy, P.D., and F.H. Fay. 1977. A Review of the Taxonomy and Nomenclature of North Pacific Harbour Seals. *Journal of Zoology, London*, 182:385-419. (MMC Contract MM4AC005).
- Shomura, R.S., and H.O. Yoshida. 1985. (Editors). *Proceedings of the Workshop on the Fate and Impact of Marine Debris, 27-29 November 1984, Honolulu, Hawaii*. NOAA-TM-NMFS-SWFC-54. 580 pp. (MMC Contract MM2629949-7).
- Siniff, D.B., T.D. Williams, A.M. Johnson, and D.L. Garselis. 1982. Experiments on the Response of Sea Otters (*Enhydra lutris*) to Oil Contamination. *Biological Conservation* 23(4):261-272. (MMC Contract MM7AD-094).
- Smith, T.D. 1981. The Adequacy of the Scientific Basis for the Management of Sperm Whales. Pp. 333-343. In *Mammals in the Seas*. FAO Fisheries Series No. 5, Vol. III. 504 pp. (MMC Contract MM6AD047).
- Smith, T., and T. Polacheck. 1979. Analysis of a Simple Model for Estimating Historical Population Sizes. *Fishery Bulletin* (NOAA) 76(4):771-779. (MMC Contract MM7AC006).
- Southern, S.O., P.J. Southern, and A.E. Dizon. 1988. Molecular Characterization of a Cloned Dolphin Mitochondrial Genome. *Journal of Molecular Evolution* 28:32-42. (MMC Contract MM29100998-2).
- Swartz, S.L. 1981. Cleaning Symbiosis between Topsmelt, *Atherinops affinis*, and Gray Whales, *Eschrichtius robustus*, in Laguna San Ignacio, Baja California Sur, Mexico. *Fishery Bulletin* (NOAA) 79(2):360. (MMC Contracts MM8AC005 and MM1533497-8).
- Swartz, S.L., 1986. Gray Whale Migratory, Social and Breeding Behavior. Pp. 207-229. In Donovan, G.P. (Editor). *Cetacean Behavior Relative to Management Issues*. Rep. International Whaling Commission, Special Issue 8. Cambridge, United Kingdom. (MMC Contracts MM7AC008, MM8AC005, MM1533497-8, MM2079219-4 and MM2324713-8).

- Swartz, S.L., and M.K. Bursk. 1979. The Gray Whales of Laguna San Ignacio after Two Years. *Whalewatcher* 13(1):709. (MMC Contracts MM7AC008 and MM8AC005).
- Swartz, S.L., and M.L. Jones. 1983. Gray Whale (*Eschrichtius robustus*) Calf Production and Mortality in the Winter Range. International Whaling Commission Report, 33:503-508. (MMC Contracts MM7AC009, MM1533497-8 and MM2079219-4).
- Swartz, S.L. and M.L. Jones. 1984. Gray Whale Mothers and Their Calves. *Oceans* 17(2):47-55. (MMC Contracts MM7AC009, MM1533497-8 and MM2079219-4).
- Swartz, S.L., and M.L. Jones. 1987. Gray Whales at Play in San Ignacio Lagoon. *National Geographic Magazine* (76):755-771. (MMC Contract MM7AC008, MM8AC005, MM1533497-8, MM2079219-4 and MM2324713-8).
- Swartzman, G.L. 1984. Present and Future Potential Models for Examining the Effect of Fisheries on Marine Mammal Populations in the Eastern Bering Sea. In B. Melteff (Editor). *Proceedings of the Workshop on Biological Interactions Among Marine Mammals and Commercial Fisheries in the South-eastern Bering Sea*. Alaska Sea Grant Report 84-1. (MMC Contract MM1800969-5).
- Swartzman, G.L., and R.T. Haar. 1983. Interactions Between Fur Seal Populations and Fisheries in the Bering Sea. *Fishery Bulletin* (NOAA) 8(1):121-132. (MMC Contracts MM1800969-5 and MM2629737-6).
- Swartzman, G.L., and R.T. Haar. 1985. Interactions Between Fur Seal Populations and Fisheries in the Bering Sea. Pp. 62-93. In J.R. Beddington, R. Beverton, and D.M. Lavigne (Editors). *Marine Mammals and Fisheries*. George Allen and Unwin. London. 354 pp. (MMC Contracts MM1800969-5 and MM2629737-6).
- Tillman, M.F., and G.P. Donovan (Editors). 1983. Special Issue on Historical Whaling Records. International Whaling Commission, Special Issue 5. 269 pp. (MMC Contract MM7AC017).
- Tricas, T.C., L.R. Taylor, and G. Naftel. 1981. Diel Behavior of the Tiger Shark, *Galeocerdo cuvier*, at French Frigate Shoals, Hawaiian Islands. *Copeia* 1981:904-908. (MMC Contract MM7AC011).
- Van Wagenen, R.F., M.S. Foster, and F. Burns. 1981. Sea Otter Predation on Birds near Monterey, California. *Journal of Mammalogy*, 62(2):433-434. (MMC Contract MM7AC023).
- Villa-R., B. 1976. Report on the Status of *Phocoena sinus*, Norris and McFarland 1958, in the Gulf of California. Universidad Nacional Instituto De Biologia Anales: Serie Zoologia 47(2):203-208. (MMC Contract MM6AD052).
- Wells, R.S., A.B. Irvine, and M.D. Scott. 1980. The Social Ecology of Inshore Odontocetes. In L.M. Herman (Editor). *Cetacean Behavior: Mechanisms and Processes*. John Wiley & Sons, Inc., New York. (MMC Contracts MM4AC004 and MM5AC0018).
- Whitehead, H., K. Chu, J. Perkins, P. Bryant, and G. Nichols. 1983. Population Size, Stock Identity, and Distribution of the Humpback Whales off West Greenland—Summer 1981. Report to the International Whaling Commission, 33:497-501. (MMC Contract MM2079259-2).
- Williams, T.D., and F.H. Kocher. 1978. Comparison of Anaesthetic Agents in the Sea Otter. *Journal of American Veterinary Medical Association* 173:1127-1130. (MMC Contract MM7AD-094).
- Williams, T.D., A.L. Williams, and D.B. Siniff. 1981. Fentanyl and Azaperone Produced Neuroleptanalgesia in the Sea Otter. *Journal of Wildlife Diseases* 17(3) July 1981. (MMC Contract MM7AD-094).
- Williams, T.D., and L.T. Pulley. 1983. Blood Collection, Hematology and Blood Chemistry in the Sea Otter. *Journal of Wildlife Diseases* 19(1):44-47. (MMC Contract MM7AD-094).
- Williams, T.D., and D.B. Siniff. 1983. Surgery Implantation of Radiotelemetry Devices in the Sea Otter. *Journal of the American Veterinary Medical Association* 193(11). (MMC Contract MM7AD-094).