

# **NATIONAL MARINE MAMMAL TISSUE BANK**

## **CY 2002 REPORT**

**Rebecca S. Pugh, John R. Kucklick, Steven J. Christopher, Stacy S. Vander  
Pol, and Paul R. Becker, NIST, Charleston, SC**

**Barbara J. Porter, Elizabeth A. Mackey, Michele M. Schantz, Rabia  
Demiralp, and Stephen A. Wise, NIST, Gaithersburg, MD**

**U.S. DEPARTMENT OF COMMERCE  
Technology Administration  
National Institute of Standards and Technology  
Gaithersburg, MD 20899**

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Donald Evans, Secretary**

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Arden L. Bement, Jr., Director**

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## **DISCLAIMER**

Certain commercial equipment or instruments are identified in this paper to specify adequately the experimental procedures. Such identification does not imply recommendations or endorsement by the National Institute of Standards and Technology nor does it imply that the equipment or instruments are the best available for the purpose.

# **NATIONAL MARINE MAMMAL TISSUE BANK**

## **CY 2002 Report**

### **INTRODUCTION**

#### **BACKGROUND**

The National Institute of Standards and Technology (NIST) provides for the cryogenic banking of marine mammal tissues in the National Marine Mammal Tissue Bank (NMMTB). The purpose of the NMMTB is to maintain quality controlled marine mammal tissues to permit retrospective analyses for the purpose of determining environmental trends and conducting analyses using new and innovative analytical techniques. The NMMTB was formally established in 1992 by the Marine Mammal Health and Stranding Response Act (Public Law 102-587), which gives lead responsibility to National Oceanic and Atmospheric Administration (NOAA) and designates the Department of the Interior (DOI) as cooperator in establishing and managing this specimen bank. Through an agreement between NOAA and the National Institute of Standards and Technology (NIST), the NMMTB is maintained at NIST's National Biomonitoring Specimen Bank (NBSB) in Gaithersburg, Maryland, and Charleston, South Carolina. This facility provides for the cryogenic long-term storage of well documented and preserved environmental specimens (Wise and Koster, 1995).

Collecting and banking marine mammal tissues in the NMMTB at NIST's NBSB is conducted as a collaboration among NIST, NOAA's National Marine Fisheries Service (NMFS), and the U.S. Geological Service Biological Resources Division (USGS/BRD) through two programs: the Alaska Marine Mammal Tissue Archival Project (AMMTAP) and the Marine Mammal Health and Stranding Response Program (MMHSRP). Detailed descriptions of these two programs have been published (Becker et al., 1988; 1993; 1994).

The MMHSRP includes stranding networks, response to unusual mortality events, information management, and biomonitoring. The biomonitoring component consists of real-time measurement of tissue contaminants, the NMMTB, and quality assurance. In addition to the NMMTB, NIST administers and coordinates the quality assurance (QA) program for chemical analysis of marine mammal tissues for the MMHSRP. This analytical QA program, described by Becker et al. (1999), consists of (1) preparation, analysis, and distribution of marine mammal tissue control materials; (2) interlaboratory comparison exercises among laboratories involved in marine mammal tissue analyses; and (3) development of Standard Reference Materials (SRMs) for use in the analysis of marine mammal tissues. A separate report describes NIST activities in CY 2002 in support of the MMHSRP analytical QA program.

#### **GOAL OF THE NMMTB**

The goal of the NMMTB is to establish and maintain a quality controlled resource of selected marine mammal tissues for the purposes of:

1. Providing samples for future retrospective analyses for new analytes of interest;
2. Providing samples for future analyses using improved analytical techniques; and
3. Providing a resource of samples that have been collected and stored in a systematic and well-documented manner for comparing results over time to identify whether environmental trends exist.

## METHODS

### COLLECTING AND BANKING SPECIMENS

Samples of blubber, fat, liver, and kidney were collected from marine mammals using standardized protocols (Becker et al., 1988; 1991; 1994; 1999). All specimens from Alaska were collected by AMMTAP from Alaska Native subsistence hunts. All specimens from outside Alaska were collected from either stranded animals or animals caught incidentally during commercial fishing operations. Samples were frozen in the field and transported to the NBSB facility at NIST where they were assigned a NBSB number and were permanently archived in the liquid nitrogen storage space.

During the reporting period a mass stranding event of long-finned pilot whales (*Globicephala melas*) occurred at Dennis Beach, MA on July 29, 2002. In cooperation with the New England Aquarium, Woods Hole Oceanographic Institute and the Cape Cod Stranding Network, Barbara Porter and Rebecca Pugh were able to respond to the event and sampled 11 adult pilot whales and 3 fetuses for the NMMTB as well as collect liver and blubber QA material. Details about the tissue collection are in *ROA 839.02-02-092*, "Collection of Pilot Whale Tissues for the NIST NBSB from a Mass Stranding Event in Dennis, MA" and is located in the appendix of this report.

Samples selected for analysis were divided into 5 to 6 g aliquots using a cryogenic grinding and homogenization procedure specifically designed to maintain cryogenic conditions during the operation (Zeisler et al., 1983). This reduces the potential loss of volatile compounds and avoids degradation of the sample due to thawing and re-freezing.

### ANALYTICAL METHODS

Measurements for determining chlorinated hydrocarbons and trace elements are commonly performed in the Analytical Chemistry Division at NIST in Gaithersburg, MD, and Charleston, SC. Although trace element concentrations have been periodically determined for liver, kidney, and muscle, liver is the tissue that is routinely analyzed because it is the principle organ that can provide the best measurement for the largest number of elements. For heavy metals and other element analysis, NIST relies on several analytical approaches, including:

- Instrumental neutron activation analysis (INAA) as described by Becker et al. (1999) and Mackey et al. (1995; 1996).
- Cold vapor atomic absorption spectrometry (CVAAS) for mercury analysis using the FIAS-200 flow injection system, Perkin-Elmer 5000 AAS as described by Epstein and Buehler (1998), and electrothermal atomic absorption spectrometry (ETAAS) as described by Epstein (2000).
- Inductive coupled plasma mass spectrometry (ICP/MS) as described by Epstein (2000) and Christopher (2001).
- Isotope dilution cold vapor ICP/MS for mercury analysis as described by Christopher et al. (2001).
- Solid phase micro-extraction (SPME) followed by gas chromatography with atomic emission detection (GC-AED) for methylmercury as described by Tutschku et al. (2001).



Blubber is routinely analyzed for lipophilic compounds because it is the tissue that commonly has the highest concentration levels of these substances. The NIST methodology, which includes gas chromatography with electron capture detection (GC-ECD) and gas chromatography-mass spectrometry (GC-MS) has been described by Becker et al. (1999), Schantz et al. (1993; 1995), Struntz and Kucklick (2000), and Struntz et al. (2000).

## RESULTS AND DISCUSSION

### SPECIMENS ARCHIVED IN THE NMMTB

During the reporting period (January 1 to December 31, 2002), 220 specimens were collected from 75 animals (Table 1). Species sampling by region and collection rates are shown in Fig. 1. The inventory of marine mammal specimens in the NMMTB (as of December 31, 2002) collected by both the AMMTAP and the MMHSRP includes 2,073 specimens collected from 741 animals representing 33 species (Table 2). Summary inventories of the MMHSRP and AMMTAP animals are provided in this volume (Tables 3-9). Detailed inventories are provided in the CY02 Report - NMMTB Inventory.

Of the 2,073 marine mammal tissue specimens archived in the NMMTB, 917 were collected by the MMHSRP from 313 animals (24 species) outside of Alaska. These include tissue specimens from 226 individuals representing eighteen species of cetaceans, 86 individuals representing six species of pinnipeds and one individual representing one species of marine reptile. Cetaceans include: fin whale (*Balaenoptera physalus*), pilot whale (*Globicephala melas* or *melaena*), short finned pilot whale (*Globicephala macrorhynchus*), harbor porpoise (*Phocoena phocoena*), common dolphin (*Delphinus delphis*), white-sided dolphin (*Lagenorhynchus acutus*), rough-toothed dolphin (*Steno bredanensis*), pygmy sperm whale (*Kogia breviceps*), dwarf sperm whale (*Kogia simus*), Gervais' beaked whale (*Mesoplodon europaeus*), striped dolphin (*Stenella coeruleoalba*), Risso's dolphin (*Grampus griseus*), bottlenose dolphin (*Tursiops truncatus*), Atlantic spotted dolphin (*Stenella frontalis*), Eastern spinner dolphin (*Stenella longirostris orientalis*), Pantropical spotted dolphin (*Stenella attenuata*), an unidentified species of dolphin (*Stenella* spp.), and Cuvier's beaked whale (*Ziphius cavirostris*). Pinniped species include: ringed seal (*Phoca hispida*), harbor seal (*P. vitulina*), harp seal (*P. groenlandica*), grey seal (*Halichoerus grypus*), hooded seal (*Cystophora cristata*), and California sea lion (*Zalophus californianus*). The sea turtle species includes: leatherback turtle (*Dermochelys coriacea*).

There are 1,156 marine mammal tissue specimens archived in the NMMTB collected by the AMMTAP from 428 animals (13 species) in Alaska. These include tissue specimens from 228 individuals representing eight species of pinnipeds, 135 individuals representing three species of cetaceans and 65 individuals representing two species of fissipeds. Pinnipeds include: ringed seal (*Phoca hispida*), harbor seal (*Phoca vitulina*), spotted seal (*Phoca largha*), bearded seal (*Erignathus barbatus*), elephant seal (*Mirounga angustirostris*), stellar sea lion (*Eumetopias jubatus*), northern fur seal (*Callorhinus ursinus*), and Pacific walrus (*Odobenus rosmarus divergens*). Cetaceans include: beluga whale (*Delphinapterus leucas*), bowhead whale (*Balaena mysticetus*) and harbor porpoise (*Phocoena phocoena*). Fissiped species include: polar bear (*Ursus maritimus*) and sea otter (*Enhydra lutris*).

**Table 1.** Marine Mammals Sampled in CY 2002

<b>AMMTAP</b>	1987-2001	CY 2002	Total
Ringed Seal ( <i>Phoca hispida</i> )	89	12	101
Harbor Seal ( <i>Phoca vitulina</i> )	12	2	14
Spotted Seal ( <i>Phoca largha</i> )	3		3
Bearded Seal ( <i>Erignathus barbatus</i> )	30	5	35
Elephant Seal ( <i>Mirounga angustirostris</i> )	1		1
Stellar Sea Lion ( <i>Eumetopias jubatus</i> )	4		4
Northern Fur Seal ( <i>Callorhinus ursinus</i> )	36		36
Pacific Walrus ( <i>Odobenus rosmarus divergens</i> )	34		34
Beluga Whale ( <i>Delphinapterus leucas</i> )	72	2	74
Bowhead Whale ( <i>Balaena mysticetus</i> )	60		60
Polar Bear ( <i>Ursus maritimus</i> )	53	4	57
Sea Otter ( <i>Enhydra lutris</i> )	4	4	8
Harbor Porpoise ( <i>Phocoena phocoena</i> )	1		1
Total Animals	399	29	428

<b>MMHSRP</b>	1987-2001	CY 2002	Total
Harbor Porpoise ( <i>Phocoena phocoena</i> )	24	6	30
Pilot Whale ( <i>Globicephala melas</i> )	19	16	35
Short Finned Pilot Whale ( <i>G. macrorhynchus</i> )	1		1
Pygmy Sperm Whale ( <i>Kogia breviceps</i> )	8		8
Gervais' Beaked Whale ( <i>Mesoplodon europaeus</i> )	1		1
Bottlenose Dolphin ( <i>Tursiops truncatus</i> )	25	5	30
Striped Dolphin ( <i>Stenella coeruleoalba</i> )	4		4
Dolphin ( <i>Stenella sp.</i> )	1		1
Risso's Dolphin ( <i>Grampus griseus</i> )	1	1	2
White Sided Dolphin ( <i>Lagenorhynchus acutus</i> )	53	13	66
California Sea Lion ( <i>Zalophus californianus</i> )	32		32
Common Dolphin ( <i>Delphinus delphis</i> )	14		14
Hooded Seal ( <i>Cystophora cristata</i> )	22	2	24
Harbor Seal ( <i>Phoca vitulina</i> )	9	2	11
Ringed Seal ( <i>Phoca hispida</i> )	1		1
Harp Seal ( <i>Phoca groenlandica</i> )	14	1	15
Grey Seal ( <i>Halichoerus grypus</i> )	3		3
Rough-Toothed Dolphin ( <i>Steno bredanensis</i> )	24		24
Fin Whale ( <i>Balaenoptera physalus</i> )	1		1
Dwarf Sperm Whale ( <i>Kogia simus</i> )	5		5
Atlantic Spotted Dolphin ( <i>Stenella frontalis</i> )	1		1
Cuvier's Beaked Whale ( <i>Ziphius cavirostris</i> )	1		1
Eastern Spinner Dolphin ( <i>Stenella l. orientalis</i> )	1		1
Pantropical Spotted Dolphin ( <i>Stenella attenuata</i> )	1		1
Leatherback Turtle ( <i>Dermochelys coriacea</i> )	1		1
Total Animals	267	46	313

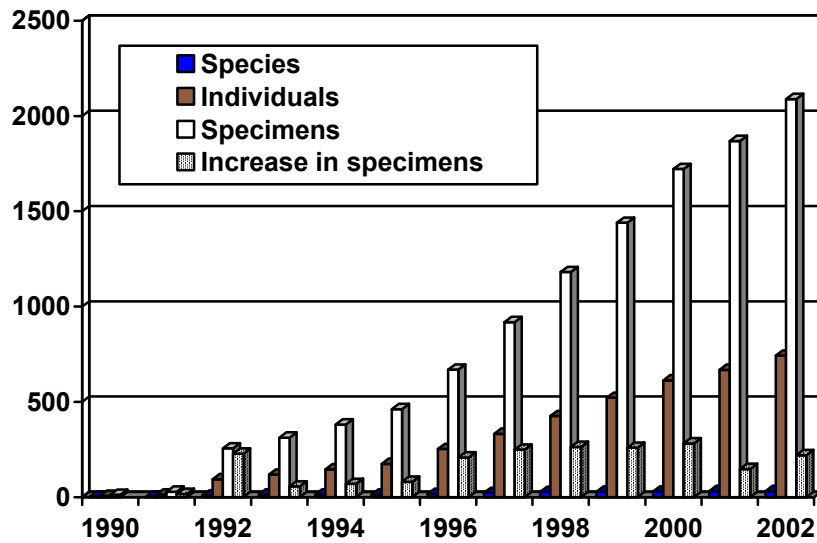
During the reporting period (January 1 to December 31, 2002), tissue specimens were received from Geoff York, USGS Alaska Biological Science Center (ABSC); Greg Early, Belinda Rubenstein and PJ Gibson, New England Aquarium (NEA), William McLellan and Heather Koopman, University of North Carolina at Wilmington (UNC-W). Additional tissue specimens were collected by NIST-Charleston staff working with Wayne McFee, NOS, CCEHBR, Charleston and NIST-Gaithersburg staff. Geoff York coordinates the collection of tissues in Alaska in collaboration with several Federal, state, and local agencies and organizations. Specimens were collected during the reporting period in collaboration with Kristin Simac, USGS, ABSC; Tom Evans, U.S. Fish and Wildlife Service, Marine Mammals Management, ABSC; Todd O'Hara, North Slope Borough Department of Wildlife Management; Pam Tuomi, DVM, , University of Alaska, Fairbanks; Barbara Mahoney and Brad Smith, NMFS, Western Alaska Office; as well as local hunters participating in the subsistence harvests.

The summaries of the NMMTB inventory in Tables 3 through 9 provide information on the status of the banked specimens. Tables 3 through 5 indicate specimens collected by the MMHSRP for which Sample B is homogenized and ready for analysis. Tables 6 through 9 indicate specimens collected by the AMMTAP for which Sample B is homogenized and ready for analysis.

#### **SUPPORT TO THE REAL-TIME BIOMONITORING COMPONENT OF THE MMHSRP AND AMMTAP**

Subsamples of banked tissues are routinely analyzed by NIST, NMFS' Northwest Fisheries Science Center (NWFSC), Environmental Conservation Division (ECD), and other organizations with whom the NMFS, USGS, and NIST collaborate. During the 2002 planning meeting for the MMHSRP and AMMTAP, banked specimens were selected for cryogenic homogenization and analysis for the Program. These analyses were to be conducted by NIST and the ECD.

A total of 15 specimens were homogenized for real-time analysis for the biomonitoring component. Fifteen blubber samples from Northern fur seals collected during a subsistence harvest in 1999 from St. Paul Island, AK were provided to the NMFS, NWFSC, Environmental Conservation Division. A detailed list of all specimens homogenized and distributed for these analyses is provided in the *Report of Analysis – In Progress*, "NBSB Charleston Activities for FY 2002 Marine Mammal Projects Including Cryogenic Homogenization and Distribution of Tissues", which is found in the Appendix of this report.



**Fig. 1.** National Marine Mammal Tissue Bank: regional sampling and collection rate.

**Table 2.** Species, sampling region, location and number of individual animals sampled for marine mammal specimens archived in the NMMTB as of December 31, 2002.

Species	Region	Location	# of Individuals
<u>Cetaceans:</u>			
Bowhead whale ( <i>Balaena mysticetus</i> )	Arctic	Alaska	60
Fin whale ( <i>Balaenoptera physalus</i> )	North Atlantic	Massachusetts	1
Pilot whale ( <i>Globicephala melas or melaena</i> )	North Atlantic	Massachusetts	35
Short finned pilot whale ( <i>G. Macrorhynchus</i> )	North Atlantic	North Carolina	1
Harbor porpoise ( <i>Phocoena phocoena</i> )	North Atlantic	MA/ME/NH/Canada	29
	North Pacific	Washington	1
	Arctic	Alaska	1
White-sided dolphin ( <i>Lagenorhynchus acutus</i> )	North Atlantic	Massachusetts	66
Common dolphin ( <i>Delphinus delphis</i> )	North Atlantic	MA/VA/N.Carolina	14
Rough-toothed dolphin ( <i>Steno bredanensis</i> )	Gulf of Mexico	Florida	24
Beluga whale ( <i>Delphinapterus leucas</i> )	Arctic	Alaska	69
	Bering Sea	Alaska	5
Pygmy sperm whale ( <i>Kogia breviceps</i> )	North Atlantic	South Carolina	8
Dwarf sperm whale ( <i>K. simus</i> )	North Atlantic	North/South Carolina	5
Gervais' beaked whale ( <i>Mesoplodon europaeus</i> )	North Atlantic	South Carolina	1
Striped dolphin ( <i>Stenella coeruleoalba</i> )	North Atlantic	North Carolina/MA	4
Risso's dolphin ( <i>Grampus griseus</i> )	North Atlantic	Virginia/Massachusetts	2
Bottlenose dolphin ( <i>Tursiops truncatus</i> )	North Atlantic	N./S. Carolina/MA	30
Dolphin ( <i>Stenella</i> spp.)	North Atlantic	North Carolina	1
Atl. Spotted dolphin ( <i>Stenella frontalis</i> )	North Atlantic	North Carolina	1
Cuvier's beaked whale ( <i>Ziphius cavirostris</i> )	North Atlantic	North Carolina	1
Eastern Spinner dolphin ( <i>Stenella l. orientalis</i> )	South Pacific		1
Spotted dolphin ( <i>Stenella attenuata</i> )	South Pacific		1
<u>Pinnipeds:</u>			
Harbor seal ( <i>Phoca vitulina</i> )	North Atlantic	Massachusetts	11
	North Pacific	Alaska	14
Ringed seal ( <i>P. hispida</i> )	Arctic	Alaska	77
	Bering Sea	Alaska	24
	North Atlantic	Maine	1
Spotted seal ( <i>P. largha</i> )	Bering Sea	Alaska	3
Harp seal ( <i>P. groenlandica</i> )	North Atlantic	Massachusetts	15
Grey seal ( <i>Halichoerus grypus</i> )	North Atlantic	Massachusetts	3
Hooded seal ( <i>Cystophora cristata</i> )	North Atlantic	Massachusetts	24
Bearded seal ( <i>Erignathus barbatus</i> )	Arctic	Alaska	24
	Bering Sea	Alaska	11
	North Pacific	Alaska	1
Steller sea lion ( <i>Eumetopias jubatus</i> )	North Pacific	Alaska	3
Northern elephant seal ( <i>Mirounga angustirostris</i> )	North Pacific	Alaska	1
	Bering Sea	Alaska	1
Northern fur seal ( <i>Callorhinus ursinus</i> )	N. Pacific/Bering Sea	Alaska	36
California sea lion ( <i>Zalophus californianus</i> )	North Pacific	California	32
Pacific walrus ( <i>Odobenus rosmarus divergens</i> )	Bering Sea	Alaska	34
<u>Fissipeds:</u>			
Polar bear ( <i>Ursus maritimus</i> )	Arctic	Alaska	32
	Bering Sea	Alaska	25
Sea otter ( <i>Enhydra lutris</i> )	North Pacific	Alaska	8
TOTAL NUMBER OF ANIMALS			739

**Table 3.** Marine mammals sampled in the Atlantic Ocean for the NMMTB (L - Liver; K - Kidney; B - Blubber; M - Muscle; R - Brain; a - samples archived; h - subsample B homogenized and divided into aliquots for analyses).

Species	Sex	Individual ID	Location	Date	L	K	B	M	R
Harbor Porpoise	M	MH-90-553Pp	NEA/Boston	10/90	h		h		
Harbor Porpoise	F	MH-91-424Pp	NEA/Boston	1/91	h		h		
Harbor Porpoise	F	MH-91-461Pp	NEA/Boston	3/91	h		h		
Harbor Porpoise	F	MH-91-505Pp	NEA/Boston	5/91	h		h		
Harbor Porpoise	M	MH-91-504Pp	NEA/Boston	5/91	h		h		
Harbor Porpoise	F	MH-92-477Pp	NEA/Boston	4/92	h		a		
Harbor Porpoise		MH-92-575Pp	NEA/Boston	10/92	h		h		
Harbor Porpoise	M	MH-92-597Pp	NEA/Boston	12/92	h		a		
Harbor Porpoise		MH-93-496Pp	NEA/Boston	5/93	a		a		
Harbor Porpoise	M	MH-97-462Pp	Winthrop,MA	3/97	a		h		
Harbor Porpoise	F	GM-97-19Pp	Grand Manan, NB,Canada	8/97	a	a	h		
Harbor Porpoise	F	GM-97-27Pp	Grand Manan, NB,Canada	8/97	a	a	h		
Harbor Porpoise	F	MH-99-437Pp	Great Island, MA	2/99	a	a	a		
Harbor Porpoise	F	MH-99-453Pp	Winthrop, MA	2/99	a	a	a		
Harbor Porpoise	M	MH-99-473Pp	Mayo Beach, MA	3/99	a	a	a		
Harbor Porpoise	F	MH-99-510Pp	Chelsea, MA	3/99	a	a	a		
Harbor Porpoise	M	MH-99-530Pp	Wellfleet, MA	3/99	a	a	a		
Harbor Porpoise	F	GM9920	Grand Manan, NB, Canada	8/99	a	a	a	a	
Harbor Porpoise	M	GM9921	Grand Manan NB, Canada	8/99	a	a	a	a	
Harbor Porpoise	F	MH-99-590Pp	Nantasket Beach, MA	3/99	a	a	a		
Harbor Porpoise	M	MH-99-505Pp	Wellfleet, MA	3/99	a	a	a		
Harbor Porpoise	M	KMS033	Outer Banks, NC	3/00	a	a	a	a	
Harbor Porpoise	M	GM-00-01	Grand Manan, NB, Canada	7/00	a	a	a	a	a
Harbor Porpoise	M	GM-01-96	Grand Manan, NB, Canada	8/01	a	a	a		
Harbor Porpoise	M	GM-01-136	Grand Manan NB, Canada	8/01	a	a	a		
Harbor Porpoise	F	MH-02-624Pp	Brewster, MA	4/02	a	a	a		
Harbor Porpoise	M	MH-02-584Pp	Wellfleet, MA	3/02	a	a	a		
Harbor Porpoise	M	MH-01-695Pp	Wellfleet, MA	4/01	a	a	a		
Harbor Porpoise	F	MH-02-470Pp	Dover, NH	7/02	a	a	a		
Pilot Whale	F	MH-90-597Gm	Hyannis	12/90	h		h		
Pilot Whale	F	MH-90-599Gm	Hyannis	12/90	h		h		
Pilot Whale	F	MH-90-600Gm	Hyannis	12/90	h		h		
Pilot Whale	F	MH-90-617Gm	Hyannis	12/90	h		h		
Pilot Whale	F	MH-90-624Gm	Hyannis	12/90	h		h		
Pilot Whale	F	MH-91-602Gm	Wellfleet	9/91	h		h		
Pilot Whale	F	MH-91-603Gm	Wellfleet	9/91	h		h		
Pilot Whale	M	MH-91-604Gm	Wellfleet	9/91	h		h		
Pilot Whale	M	MH-91-605Gm	Wellfleet	9/91	h		a		
Pilot Whale	F	NMFS 1609	George's Canyon	7/96	h	h	h		
Pilot Whale	F	NMFS 2090	George's Canyon	7/96	h	h	h		
Pilot Whale	M	MH99-705Gm	Long Island,ME	9/98	a	a	a		
Pilot Whale	M	MH-00-620Gm	Nantuckett Island, ME	7/00	a		a		
Pilot Whale	M	MH-00-621Gm	Nantuckett Island, ME	7/00	a	a	a		
Pilot Whale	M	MH-00-622Gm	Nantuckett Island, ME	7/00	a	a	a		
Pilot Whale	M	MH-00-623Gm	Nantuckett Island, ME	7/00	a	a	a	a	

**Table 3. (continued)**

Species	Sex	Individual ID	Location	Date	L	K	B	M
Pilot Whale	M	MH-00-624Gm	Nantuckett Island, ME	7/00	a	a	a	
Pilot Whale	M	MH-00-625Gm	Nantuckett Island, ME	7/00	a	a	a	
Pilot Whale	M	MH-00-626Gm	Nantuckett Island, ME	7/00	a	a	a	a
Pilot Whale	M	CCSN-02-004-Gm	Kingston, MA	1/02	a	a	a	
Pilot Whale	M	COA010202	Belfast, ME	1/02	a	a	a	
Pilot Whale	M	CCSN-02-178	Dennis Chapin, MA	7/02	a	a	a	
Pilot Whale	M	CCSN-02-178Fetus	Dennis Chapin, MA	7/02	a	a	a	
Pilot Whale	M	CCSN-02-179	Dennis Chapin, MA	7/02	a	a	a	
Pilot Whale	F	CCSN-02-180	Dennis Chapin, MA	7/02	a	a	a	
Pilot Whale	F	CCSN-02-181	Dennis Chapin, MA	7/02	a	a	a	
Pilot Whale	F	CCSN-02-182	Dennis Chapin, MA	7/02	a	a	a	
Pilot Whale	F	CCSN-02-182Fetus	Dennis Chapin, MA	7/02	a	a	a	
Pilot Whale	M	CCSN-02-184	Dennis Chapin, MA	7/02	a	a	a	
Pilot Whale	M	CCSN-02-185	Dennis Chapin, MA	7/02	a	a	a	
Pilot Whale	F	CCSN-02-186	Dennis Chapin, MA	7/02	a	a	a	
Pilot Whale	F	CCSN-02-187	Dennis Chapin, MA	7/02	a	a	a	
Pilot Whale	M	CCSN-02-187Fetus	Dennis Chapin, MA	7/02	a	a	a	
Pilot Whale	M	CCSN-02-188	Dennis Chapin, MA	7/02	a	a	a	
Pilot Whale	M	CCSN-02-235	Dennis Chapin, MA	7/02	a	a	a	
Short Finned Pilot Whale	F	WAM555	Southport, NC	7/00	a	a	a	
Dwarf Sperm Whale	M	MMES 9889 SC	Isle of Palms, SC	7/98	a	a	a	a
Dwarf Sperm Whale	F	MH-99-696Ks	Long Sands Beach, York, ME	8/99	a	a	a	
Dwarf Sperm Whale	F	DAP032	Holden Beach, NC	4/00	a	a	a	a
Dwarf Sperm Whale	F	WAM 566	Cape Fear, NC	3/01	a	a	a	
Dwarf Sperm Whale	M	MMES2001131SC	Sullivans Island, SC	11/01	a	a	a	
Pygmy Sperm Whale	M	WAM 531	Holden Beach, NC	2/98	a	a	h	a
Pygmy Sperm Whale	F	MMES98111SC	Litchfield Beach, SC	8/98	a	a	h	a
Pygmy Sperm Whale	F	MMES98114SC	Debordieu Beach, SC	9/98	a	a	h	
Pygmy Sperm Whale	F	MMES98121SC	Sullivans Island, SC	10/98	a	a	h	
Pygmy Sperm Whale	M	MMES98122SC	Sullivans Island, SC	10/98	a	a	h	
Pygmy Sperm Whale	M	MMES2001013SC	Folly Beach, SC	2/01	a	a	a	
Pygmy Sperm Whale	M	MMES2001045SC	Dewee's Island, SC	6/01	a	a	a	
Pygmy Sperm Whale	F	MMES2001055SC	Charleston, SC	7/01	a	a	a	
Gervais Beaked Whale	F	MMES98119SC	Georgetown	9/98	a	a	a	
Cuvier's Beaked Whale	F	ASF043	Caswell Beach, NC	7/00		a	a	
Bottlenose Dolphin	F	ASF 021	Long Beach, NC	10/97	a	a	a	a
Bottlenose Dolphin	F	MMES 9885 SC	Kiawah Island, SC	7/98			a	a
Bottlenose Dolphin	F	MH-98-673Tt	Gloucester, MA	7/98	a	a	a	
Bottlenose Dolphin	F	H0F 007	NC	9/98	a	a	a	a
Bottlenose Dolphin	F	SDZ 001	Long Beach, NC	10/98	a	a	a	a
Bottlenose Dolphin	M	DAP 031	Long Beach, NC	10/98	a	a	a	a
Bottlenose Dolphin	M	NE Tag #03976	Atlantic Beach, NC	2/99	a		a	a
Bottlenose Dolphin	M	PTM047	NC	4/99	a	a	a	a
Bottlenose Dolphin	M	SDZ005	Topsail Island, NC	4/99	a	a	a	a
Bottlenose Dolphin	F	MMES2000002SC	Stono River, SC	1/00	a	a	a	
Bottlenose Dolphin	M	WAM553	NC	3/00	a	a	a	a
Bottlenose Dolphin	M	NEFC5451	NC	2/00	a	a	a	a
Bottlenose Dolphin	M	NEFSC03701	NC	2/00	a	a	a	a
Bottlenose Dolphin	M	WAM550	Figure 8 Island, NC	4/00	a	a	a	a a
Bottlenose Dolphin	F	MMES2000075SC	Wando River, SC	7/00	a	a	a	
Bottlenose Dolphin	M	VMSM20001049	Norfolk, VA	9/00	a	a	a	
Bottlenose Dolphin	F	NJ-00-111	Sandy Hook, NJ	11/00	a	a	a	
Bottlenose Dolphin	F	WAM559	Wrightsville Beach, NC	11/00	a	a	a	

**Table 3. (continued)**

Species	Sex	Individual ID	Location	Date	L	K	B	M
Bottlenose Dolphin	M	NEFSC5332	Hatteras Inlet, NC	12/00	a	a	a	
Bottlenose Dolphin	M	WAM560	ICW off Lee, NC	11/00	a	a	a	
Bottlenose Dolphin	F	MMES2001001SC	James Isl. Creek, SC	1/01	a	a	a	
Bottlenose Dolphin	F	WJW 007	Avon, NC	3/01	a	a	a	
Bottlenose Dolphin	M	MMES2001042SC	Sullivan's Isl., SC	6/01	a	a	a	
Bottlenose Dolphin	F	WAM 569	Topsail Island, NC	5/01	a	a	a	
Bottlenose Dolphin	F	MMES2001108SC	Hunting Beach, SC	9/01	a	a	a	
Bottlenose Dolphin	M	MMES2002030SC	Charleston, SC	2/02	a	a	a	
Bottlenose Dolphin	F	MMES2002118SC	Kiawah Isl., SC	7/02	a	a	a	
Bottlenose Dolphin	F	MMES2002162SC	Charleston, SC	8/02	a	a	a	
Bottlenose Dolphin	M	REL 014	Beaufort, NC	3/02	a	a	a	
Bottlenose Dolphin	M	WAM 579	Brunswick Co., NC	10/02	a	a	a	
Striped Dolphin	M	ASF 020	Figure Eight Island	10/97	a	a	a	a
Striped Dolphin	M	WAM 524	Coquina Beach, NC	11/97	a	a	a	a
Striped Dolphin	M	MH-98-411Sc	Beverly, MA	1/98	a	a	a	
Striped Dolphin	M	MH-00-674Sc	Kalmus Beach, MA	8/00	a	a	a	
Dolphin ( <i>Stenella sp</i> )	F	SGB114	Nags Head, NC	8/98	a	a	a	a a
Risso's Dolphin	M	VMSM981045	Newport News, VA	8/98	a	a	a	a a
Risso's Dolphin	F	02-621-Gg	Nahant, MA	4/02	a	a	a	
Atlantic Spotted Dolphin	M	MMES99180SC	N. Litchfield Beach NC	9/99	a	a	a	
White Sided Dolphin		MH-93-445La	NEA/Boston	3/93	h		h	
White Sided Dolphin		MH-93-446La	NEA/Boston	3/93	h		h	
White-Sided Dolphin		MH-93-460La	NEA/Boston		h		h	
White-Sided Dolphin		MH-93-461La	NEA/Boston		h		h	
White-Sided Dolphin	M	MH-94-611La	NEA/Boston	12/94	a		h	
White-Sided Dolphin	M	MH-96-408La	NEA/Boston	1/96	h		h	
White-Sided Dolphin	M	MH-97-425La	Brewster, MA	2/97	h		h	
White-Sided Dolphin	M	MH-97-506La	Duxbury, MA	5/97	h		h	
White-Sided Dolphin	F	MH-97-507La	Duxbury, MA	5/97	a		h	
White-Sided Dolphin	F	MH-97-534La	Great Island, MA	8/97	a	a	h	
White-Sided Dolphin	F	MH-98-414La	Brewster, MA	1/98	a	a	h	
White-Sided Dolphin	F	MH-98-415La	Wellfleet, MA	1/98	a	a	h	
White-Sided Dolphin	F	MH-98-460La	Eastham, MA	1/98	a	a	h	
White-Sided Dolphin	M	MH-98-461La	Eastham, MA	1/98	a	a	h	
White-Sided Dolphin	F	MH-98-462La	Eastham, MA	1/98	a	a	h	
White-Sided Dolphin	M	MH-98-447La	Wellfleet, MA	1/98	a	a	h	
White-Sided Dolphin	F	MH-98-464La	Wellfleet, MA	1/98	a	a	h	
White-Sided Dolphin	M	MH-98-456La	Wellfleet, MA	1/98	a	a	h	
White-Sided Dolphin	M	MH-98-459La	Wellfleet, MA	1/98	h	a	h	
White-Sided Dolphin	F	MH-98-455La	Wellfleet, MA	1/98	a	a	h	
White-Sided Dolphin	F	MH-98-418La	Eastham, MA	1/98	a	a	h	
White-Sided Dolphin	M	MH-98-465La	Wellfleet, MA	1/98	h	a	h	
White-Sided Dolphin	F	MH-98-463La	Wellfleet, MA	1/98	a	a	h	
White-Sided Dolphin	F	MH-98-436La	Wellfleet, MA	1/98	a	a	h	
White-Sided Dolphin	F	MH-98-434La	Wellfleet, MA	1/98	a	a	h	
White-Sided Dolphin	F	MH-98-448La	Wellfleet, MA	1/98	a	a	h	
White-Sided Dolphin	M	MH-98-440La	Wellfleet, MA	1/98	a	a	h	
White-Sided Dolphin	F	MH-98-413La	Wellfleet, MA	1/98	a	a	h	
White-Sided Dolphin	M	MH-98-600La	Wellfleet, MA	4/98	a	a	h	
White-Sided Dolphin	M	MH98-800La	Chipmans Cove, MA	11/98	a	a	h	
White-Sided Dolphin	M	MH98-801La	Chipmans Cove, MA	11/98	a	a	h	
White-Sided Dolphin	M	MH98-803La	Great Island, MA	11/98	a	a	h	
White-Sided Dolphin	M	MH-99-538La	Wellfleet, MA	3/99	a	a	h	



**Table 3. (continued)**

Species	Sex	Individual ID	Location	Date	L	K	B	M
White-Sided Dolphin	M	MH-99-540La	Wellfleet, MA	3/99	a	a	h	
White-Sided Dolphin	M	MH-99-539La	Wellfleet, MA	3/99	a	a	h	
White-Sided Dolphin	M	MH-99-531La	Wellfleet, MA	3/99	a	a	h	
White-Sided Dolphin	F	MH-99-486La	Chipmans Cove, MA	3/99	a	a	h	
White-Sided Dolphin	F	MH-99-471La	Chipmans Cove, MA	3/99	a	a	h	
White-Sided Dolphin	F	MH-99-487La	Chipmans Cove, MA	3/99	h	a	h	
White-Sided Dolphin	M	MH-99-743La	Popham Beach, Phippsburg, ME	11/99	h	a	h	
White-Sided Dolphin	M	MH-99-519La	Wellfleet, MA	3/99	h	a	h	
White-Sided Dolphin	F	MH-99-537La	Wellfleet, MA	3/99	h	a	h	
White-Sided Dolphin	M	MH-99-536La	Wellfleet, MA	3/99	h	a	h	
White-Sided Dolphin	M	MH-99-520La	Wellfleet, MA	3/99	h	a	h	
White-Sided Dolphin	M	MH-99-518La	Wellfleet, MA	3/99	h	a	h	
White-Sided Dolphin	M	MH-00-724La	Wellfleet, MA	8/00	h	a	h	
White-Sided Dolphin	F	MH-00-725La	Wellfleet, MA	8/00	h	a	h	
White-Sided Dolphin	M	MH-00-726La	Wellfleet, MA	8/00	h	a	h	
White-Sided Dolphin	M	MH-00-727La	Wellfleet, MA	8/00	h	a	h	
White-Sided Dolphin	M	MH-00-531La	Wellfleet, MA	4/00	h	a	h	
White-Sided Dolphin	F	MH-00-532La	Wellfleet, MA	4/00	h	a	h	
White-Sided Dolphin	F	MH-99-521La	Wellfleet, MA	3/99	h	a	h	
White-Sided Dolphin	F	MH-99-522La	Wellfleet, MA	3/99	h	a	h	
White-Sided Dolphin	M	MH-02-500La	Wellfleet, MA	3/02	a	a	a	
White-Sided Dolphin	M	MH-02-501La	Wellfleet, MA	3/02			a	
White-Sided Dolphin	M	MH-02-503La	Wellfleet, MA	3/02	a		a	
White-Sided Dolphin	F	MH-02-549La	Wellfleet, MA	3/02	a	a	a	
White-Sided Dolphin	M	MH-02-548La	Wellfleet, MA	3/02	a	a	a	
White-Sided Dolphin	F	MH-02-551La	Wellfleet, MA	3/02	a	a	a	
White-Sided Dolphin	F	MH-02-547La	Wellfleet, MA	3/02	a	a	a	
White-Sided Dolphin	F	MH-02-545La	Wellfleet, MA	3/02	a	a	a	
White-Sided Dolphin	F	MH-02-571La	Provincetown, MA	3/02	a	a	a	
White-Sided Dolphin	F	MH-02-662La	Wellfleet, MA	4/02	a	a	a	
White-Sided Dolphin	F	MH-02-663La	Wellfleet, MA	4/02	a	a	a	
White-Sided Dolphin	M	MH-02-664La	Wellfleet, MA	4/02	a	a	a	
White-Sided Dolphin	M	MH-02-665La	Wellfleet, MA	4/02	a	a	a	
Common Dolphin	F	NMFS 3960	George's Canyon	7/96	h	h	h	
Common Dolphin	M	NMFS 3694	George's Canyon	7/96	h	h	h	
Common Dolphin	M	NMFS 3069	George's Canyon	7/96	h	h	h	
Common Dolphin	F	MH-97-594Dd	North Falmouth,MA	11/97	a	a	h	
Common Dolphin	F	MH-97-596Dd	North Falmouth,MA	11/97	a	a	h	
Common Dolphin	F	MH-97-597Dd	North Falmouth,MA	11/97	a	a	h	
Common Dolphin	F	MH-97-598Dd	North Falmouth,MA	11/97	a	a	h	
Common Dolphin	F	MH-97-599Dd	North Falmouth,MA	11/97	a	a	h	
Common Dolphin	F	MH-97-600Dd	North Falmouth,MA	11/97	a	a	h	
Common Dolphin	M	MH-98-433Dd	Wellfleet,MA	1/98	a	a	a	
Common Dolphin	F	VMMS981025	Beaufort,NC	6/98	a	h	a	a
Common Dolphin	M	MH-99-742Dd	West Falmouth, MA		a	a	a	
Common Dolphin	M	VMMS20011030	False Cape, VA		a	a	a	
Common Dolphin	F	PTM 135	Cape Point, NC	2/01	a	a	a	
Harp Seal	M	MH-97-460Pg	Quincy,MA	3/97	a		h	
Harp Seal	F	MH-97-469Pg	Beverly,MA	3/97	a		h	
Harp Seal	M	MH-97-483Pg	Scituate,MA	4/97	a		h	
Harp Seal	M	MH-97-629Pg	Revere,MA	12/97	a	a	a	
Harp Seal	F	MH-98-402Pg	Popham Beach,ME	1/98	a	a	a	
Harp Seal	M	MH-98-403Pg	Sandwich,MA	1/98	a	a	a	

**Table 3. (continued)**

Species	Sex	Individual ID	Location	Date	L	K	B	M
Harp Seal	M	MH-98-545Pg	Buzzards Bay,MA	2/98	a	a	a	
Harp Seal	F	MH-99-448Pg	Plymouth, MA	2/99	a	a	a	
Harp Seal	F	MH-99-475Pg	Shore Drive, West Yarmouth, MA	3/99	a	a	a	
Harp Seal	F	MH-99-461Pg	Chipmans Cove, MA	2/99	a	a	a	
Harp Seal	F	MH-98-584Pg	Hyansport, MA	3/98	a	a	a	
Harp Seal	F	MH-99-433Pg	Craigville Beach, MA	2/99	a	a	a	
Harp Seal	F	MH-98-579Pg	Revere Beach, MA	3/98	a	a	a	
Harp Seal	F	MH-99-436Pg	Saulisbury, MA	2/99	a	a	a	
Harp Seal	M	MH-02-529Pg	Cresent Beach, MA	3/02	a	a	a	
Hooded Seal	F	MH-97-428Cc	Hull,MA	2/97	a			h
Hooded Seal	M	MH-97-455Cc	Gloucester,MA	3/97	a			h
Hooded Seal	M	MH-97-461Cc	Plymouth,MA	3/97	a			h
Hooded Seal	M	MH-98-432Cc	Rockport,MA	2/98	a	a	a	
Hooded Seal	M	MH-98-536Cc	Swampsco,MA	2/98	a	a	a	
Hooded Seal	M	MH-98-542Cc	Moon Island,MA	2/98	a	a	a	
Hooded Seal	M	MH-98-625Cc	Deer Island,MA	4/98	a	a	a	
Hooded Seal	M	MH99-412Cc	Plum Island, MA	1/99	a	a	a	
Hooded Seal	M	MH99-411Cc	Rockport, MA	1/99	a	a	a	
Hooded Seal	M	MH99-428Cc	Sagamore, MA	1/99	a	a	a	
Hooded Seal	M	MH-99-509Cc	Good Harbor Beach, Gloucester, MA	3/99	a	a	a	
Hooded Seal	F	MH-98-588Cc	Pleasant Bay, S. Boston, MA	3/98	a	a	a	
Hooded Seal	M	MH-00-436Cc	Plum Island, New Berry Port, MA	2/00	a	a	a	
Hooded Seal	F	MH-00-431Cc	Gloucester, MA	2/00	a	a	a	
Hooded Seal	M	MH-99-435Cc	Saulisbury, MA	2/99	a	a	a	
Hooded Seal	M	MH-99-446Cc	Short Beach, Revere, MA	2/99	a	a	a	
Hooded Seal	F	MH-98-580Cc	Rivenore Beach, Scituate, MA	3/98	a	a	a	
Hooded Seal	F	MH-00-439Cc	Ipswich, MA	2/00	a	a	a	
Hooded Seal	F	MH-99-447Cc	Deer Island, Winthrop, MA	2/99	a	a	a	
Hooded Seal	M	MH-98-563Cc	Weymouth, MA	3/98	a	a	a	
Hooded Seal	M	MH-98-555Cc	Pompanesett Beach, MA	2/98	a	a	a	
Hooded Seal	M	MH-98-433Cc	Spruce Creek, MA	2/00	a	a	a	
Hooded Seal	F	MH-02-469Cc	Lynn, MA	2/02	a	a	a	
Hooded Seal	M	MH-01-457Cc	Gloucester, MA	2/01	a	a	a	
Harbor Seal	F	MH-97-430Pv	Nantucket,MA	2/97	a			h
Harbor Seal	M	MH-97-503Pv	Rockport,MA	5/97	a			h
Harbor Seal	M	MH-97-576Pv	Scituate,MA	11/97	a	a	a	
Harbor Seal	F	MH-98-663Pv	Yarnarth,ME	6/98	a	a	a	
Harbor Seal	F	MH-98-628Pv	Swampsco,MA	5/98	a	a	a	
Harbor Seal	F	MH-98-590Pv	Rockport,MA	3/98	a	a	a	
Harbor Seal	M	MH-98-601Pv	Barnstable,MA	4/98	a	a	a	
Harbor Seal	M	MH98-425Pv	Portland,ME	2/98	a	a	a	
Harbor Seal	F	MH-99-571Pv	Rockport, MA	3/99	a	a	a	
Harbor Seal	M	MH-02-691Pv	Nantasket Beach, MA	7/02	a	a	a	
Harbor Seal	M	MH-02-680Pv	Swampscott, MA	6/02	a	a	a	
Ringed Seal	M	MH-97-431Ph	Corea,ME	2/97	h			h
Grey Seal	M	MH-97-484Hg	Nantucket,MA	4/97	a			h

**Table 3. (continued)**

Species	Sex	Individual ID	Location	Date	L	K	B	M
Grey Seal	F	MH-97-491Hg	Nantucket,MA	5/97	a		h	
Grey Seal	M	MH-97-493Hg	Nantucket,MA	5/97	a		h	
Fin Whale	F	MH-97-531Bp	Eastham,MA	8/97			a	
Leatherback Turtle	F	MH-97-609Dc	Bourne,MA	11/97	a	a	a	

**Table 4.** Marine mammals sampled in the Pacific Ocean (L - Liver; K - Kidney; B - Blubber; M - Muscle; a - samples archived; h - subsample B homogenized and divided into aliquots for analyses).

Species	Sex	Individual ID	Location	Date	L	K	B	M
Harbor Porpoise	M	PTG-126	Seattle	4/93	a		a	
California Sea Lion	F	CSL 2203	Morro Bay	9/93	a	a	a	
California Sea Lion	M	CSL 2217	Casper Bay	10/93	a	a	a	
California Sea Lion	M	CSL 2881	Monterey	5/96	a	a	a	a
California Sea Lion	M	CSL 3067	Sausalito	8/96	a	a	a	
California Sea Lion	M	CSL 3101	Sausalito	10/96	a	a	h	
California Sea Lion	M	CSL 3096	Pebble Beach	10/96	a	a	h	a
California Sea Lion	M	CSL 3103	Monterey Dunes	11/96	a	a	h	
California Sea Lion	M	CSL 3105	Aquatic Park	11/96	a	a	h	
California Sea Lion	M	CSL 3110	Monterey County	12/96	a	a	h	
California Sea Lion	F	CSL 3127	Corcoran Lagoon	4/97	a	a	h	
California Sea Lion	M	CSL 3153	Sonoma County	5/97	a	a	h	
California Sea Lion	M	CSL 3264		8/97	a	a	h	
California Sea Lion	M	CSL 3306		9/97	a	a	h	
California Sea Lion	M	CSL 3314		11/97	a	a	a	
California Sea Lion	M	CSL 3321		11/97	a	a	a	
California Sea Lion	M	CSL 3377		11/97	a	a	a	
California Sea Lion	M	CSL 3449	Fanshell Beach	12/97	a	a	a	
California Sea Lion	F	CSL 3438	Santa Cruz County	11/97	a	a	a	
California Sea Lion	M	CSL 3609	San Francisco, CA	4/98	a	a	a	
California Sea Lion	M	CSL4328	Santa Cruz, CA	9/99	a	a	a	
California Sea Lion	F	CSL4331	Sanluis Obispo, CA	9/99	a	a	a	
California Sea Lion	M	CSL4357	San Francisco, CA	10/99	a	a	a	
California Sea Lion	F	CSL4592	Sanluis Obispo, CA	8/00	a	a	a	
California Sea Lion	F	CSL4570	Sanluis Obispo, CA	8/00	a	a	a	
California Sea Lion	F	CSL4649	Cayucos, CA	9/00	a	a	a	
California Sea Lion	M	CSL4736	Pacific Grove, CA	9/00	a	a	a	
California Sea Lion	M	CSL4595	San Francisco, CA	7/00	a	a	a	
California Sea Lion	F	CSL4573	Sanluis Obispo, CA	8/00	a	a	a	
California Sea Lion	M	CSL4669	Santa Cruz, CA	8/00	a	a	a	
California Sea Lion	F	CSL4670	Guadelupo, CA	8/00	a	a	a	
California Sea Lion	F	CSL4851	San Mateo Co., CA	11/00	a	a	a	
California Sea Lion	F	CSL4809	San Mateo Co., CA	10/00	a	a	a	
Eastern Spinner Dolphin	F	SJC10E.	Tropical Pacific	8/01	a	a	a	
Spotted Dolphin	F	SJC11E.	Tropical Pacific	9/01	a	a	a	

**Table 5.** Marine mammals sampled in the Gulf of Mexico for the MMHSRP (L - Liver; K - Kidney; B - Blubber; M - Muscle; a - samples archived; h - subsample B homogenized and divided into aliquots for analyses).

Species	Sex	Individual ID	Location	Date	L	K	B	M
Rough-Toothed Dolphin	M	RTDL-001	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	M	RTDL-002	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	F	RTDL-003	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	M	RTDL-004	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	M	RTDL-005	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	M	RTDL-006	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	F	RTDL-007	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	F	RTDL-008	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	F	RTDL-009	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	F	RTDL-010	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	F	RTDL-011	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	M	RTDL-012	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	F	RTDL-013	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	M	RTDL-014	St Joseph's State Park	12/97	h	h	h	
Rough-Toothed Dolphin	F	RTDL-015	St Joseph's State Park	12/97	h	h	h	
Rough Toothed Dolphin	F	RTDL-016	Port St Joe	12/97	h	h		
Rough Toothed Dolphin	M	RTDL-017	Port St Joe	12/97	h	h		
Rough Toothed Dolphin	F	GW01006D	Port St Joe	2/01	a	a	a	
Rough Toothed Dolphin	F	GW01002D	Port St Joe	2/01	a	a	a	
Rough Toothed Dolphin	F	GW01007D	Port St Joe	2/01	a	a	a	
Rough Toothed Dolphin	F	GW01005D	Port St Joe	2/01	a	a	a	
Rough Toothed Dolphin	M	GW01004D	Port St Joe	2/01	a	a	a	
Rough Toothed Dolphin	M	GW01001D	Port St Joe	2/01	a	a	a	
Rough Toothed Dolphin	M	GW01003D	Port St Joe	2/01	a	a	a	

**Table 6.** Marine mammals sampled in the Arctic Ocean for the AMMTAP (L - Liver; K - Kidney; B - Blubber; M - Muscle; a - samples archived; h - subsample B homogenized and divided into aliquots for analyses).

Species	Sex	Individual ID	Location	Date	L	K	B	M
Ringed Seal	M	692-RGSL-001	Barrow	7/88	a	a	a	
Ringed Seal	F	692-RGSL-002	Barrow	7/88	h	a	a	
Ringed Seal	M	692-RGSL-003	Barrow	7/88	a	a	a	
Ringed Seal	M	692-RGSL-004	Barrow	7/88	h	h	h	
Ringed Seal	F	692-RGSL-005	Barrow	7/88	a	a	a	
Ringed Seal	F	692-RGSL-006	Barrow	7/88	a	a	a	
Ringed Seal	M	692-RGSL-007	Barrow	7/88	a	a	a	
Ringed Seal	M	692-RGSL-008	Barrow	7/88	h	h	h	
Ringed Seal	M	692-RGSL-009	Barrow	7/88	h	a	a	
Ringed Seal	F	692-RGSL-010	Barrow	7/88	h	a	a	
Ringed Seal	M	692-RGSL-019	Barrow	7/91	a	a	a	
Ringed Seal	M	692-RGSL-020	Barrow	7/91	h	a	a	
Ringed Seal	M	692-RGSL-021	Barrow	7/91	a	a	a	
Ringed Seal	M	692-RGSL-022	Barrow	7/91	a	a	a	
Ringed Seal	F	692-RGSL-023	Barrow	7/91	h	a	a	
Ringed Seal	M	692-RGSL-024	Barrow	7/91	a	a	a	
Ringed Seal	F	692-RGSL-025	Barrow	7/91	h	a	a	
Ringed Seal	M	692-RGSL-026	Barrow	7/91	a	a	a	
Ringed Seal	M	692-RGSL-027	Barrow	7/91	a	a	a	
Ringed Seal	F	692-RGSL-028	Barrow	7/91	h	a	a	
Ringed Seal	M	692-RGSL-037	Barrow	7/94	a	a	a	
Ringed Seal	M	692-RGSL-038	Barrow	7/94	a	a	a	
Ringed Seal	F	692-RGSL-039	Barrow	7/94	h	a	a	
Ringed Seal	M	692-RGSL-040	Barrow	7/94	a	a	a	
Ringed Seal	M	692-RGSL-041	Barrow	7/94	a	a	a	
Ringed Seal	M	692-RGSL-042	Barrow	7/94	a	a	a	
Ringed Seal	F	692-RGSL-043	Barrow	7/95	a	a	a	
Ringed Seal	M	692-RGSL-044	Barrow	7/95	a	a	a	
Ringed Seal	F	692-RGSL-045	Barrow	7/95	a	a	a	
Ringed Seal	M	692-RGSL-047	Barrow	7/96				h
Ringed Seal	F	692-RGSL-048	Barrow	7/96				h
Ringed Seal	M	692-RGSL-049	Barrow	7/96				h
Ringed Seal	M	692-RGSL-050	Barrow	7/96				h
Ringed Seal	M	692-RGSL-051	Barrow	7/96				h
Ringed Seal	M	692-RGSL-052	Barrow	7/96				h
Ringed Seal	M	692-RGSL-053	Barrow	7/96				h
Ringed Seal	F	692-RGSL-054	Barrow	7/96				h
Ringed Seal	F	692-RGSL-055	Barrow	7/96				h
Ringed Seal	M	692-RGSL-057	Barrow	7/96				a
Ringed Seal	M	692-RGSL-061	Barrow	7/99	h			h
Ringed Seal	M	692-RGSL-062	Barrow	7/99	h			h
Ringed Seal	M	692-RGSL-063	Barrow	7/99	h			h
Ringed Seal	F	692-RGSL-064	Barrow	7/99	h			h
Ringed Seal	F	692-RGSL-065	Barrow	7/99	h			h
Ringed Seal	M	692-RGSL-066	Barrow	7/99	h			h
Ringed Seal	M	692-RGSL-067	Barrow	7/99	h			h
Ringed Seal	M	692-RGSL-068	Barrow	7/99	h			h
Ringed Seal	M	692-RGSL-069	Barrow	7/99	h			h
Ringed Seal	M	692-RGSL-070	Barrow	7/99	h			h
Ringed Seal	M	692-RGSL-071	Barrow	7/00	a	a	a	
Ringed Seal	F	692-RGSL-072	Barrow	7/00	a		a	
Ringed Seal	M	692-RGSL-073	Barrow	7/00	a		a	

**Table 6. (continued)**

Species	Sex	Individual ID	Location	Date	L	K	B	M
Ringed Seal	F	692-RGSL-074	Barrow	7/00	a	a	a	
Ringed Seal	F	692-RGSL-075	Barrow	7/00	a	a	a	
Ringed Seal	F	692-RGSL-076	Barrow	7/00	a		a	
Ringed Seal	M	692-RGSL-077	Barrow	7/00	a	a	a	
Ringed Seal	F	692-RGSL-078	Barrow	7/00	a	a	a	
Ringed Seal	M	692-RGSL-079	Barrow	7/00	a	a	a	
Ringed Seal	M	692-RGSL-080	Barrow	7/00	a	a	a	
Ringed Seal	M	692-RGSL-081	Barrow	7/00	a	a	a	
Ringed Seal	M	692-RGSL-082	Barrow	7/00	a		a	
Ringed Seal	M	692-RGSL-083	Barrow	7/00	a	a	a	
Ringed Seal	M	692-RGSL-084	Barrow	7/01	a		a	
Ringed Seal	F	692-RGSL-085	Barrow	7/01	a		a	
Ringed Seal	M	692-RGSL-086	Barrow	7/01	a		a	
Ringed Seal		692-RGSL-087	Kotzebue Sound	3/02	a	a	a	
Ringed Seal	F	692-RGSL-088	Kotzebue Sound	3/02	a	a	a	
Ringed Seal	F	692-RGSL-089	Kotzebue Sound	3/02	a	a	a	
Ringed Seal	M	692-RGSL-090	Kotzebue Sound	3/02	a	a	a	
Ringed Seal	M	692-RGSL-091	Kotzebue Sound	3/02	a	a	a	
Ringed Seal	M	692-RGSL-092	Kotzebue Sound	3/02	a	a	a	
Ringed Seal	M	692-RGSL-093	Kotzebue Sound	3/02	a	a	a	
Ringed Seal	M	692-RGSL-094	Kotzebue Sound	3/02	a	a	a	
Ringed Seal	M	692-RGSL-095	Kotzebue Sound	3/02	a	a	a	
Ringed Seal	M	692-RGSL-096	Kotzebue Sound	3/02	a	a	a	
Ringed Seal	F	692-RGSL-097	Kotzebue Sound	3/02	a	a	a	
Ringed Seal	M	692-RGSL-098	Kotzebue Sound	3/02	a	a	a	
Bearded Seal	M	692-BDSL-002	Barrow	7/89	a	a	a	
Bearded Seal	M	692-BDSL-003	Barrow	7/89	a		a	
Bearded Seal	M	692-BDSL-056	Barrow	7/96				h
Bearded Seal	M	692-BDSL-010	Barrow	7/99	a	a		
Bearded Seal	F	692-BDSL-016	Barrow	7/00	a	a	a	
Bearded Seal	M	692-BDSL-017	Barrow	7/00	a	a	a	
Bearded Seal	F	692-BDSL-018	Barrow	7/00	a	a	a	
Bearded Seal	F	692-BDSL-019	Barrow	7/00	a	a	a	
Bearded Seal	M	692-BDSL-020	Barrow	7/00	a	a	a	
Bearded Seal	F	692-BDSL-021	Barrow	7/00	a	a	a	
Bearded Seal	F	692-BDSL-022	Barrow	7/00	a	a	a	
Bearded Seal	M	692-BDSL-023	Barrow	7/00	a	a	a	
Bearded Seal	F	692-BDSL-024	Barrow	7/00	a	a	a	
Bearded Seal	M	692-BDSL-025	Barrow	7/00	a	a	a	
Bearded Seal	M	692-BDSL-026	Barrow	7/00	a	a	a	
Bearded Seal	M	692-BDSL-014	Barrow	7/00	a	a	a	
Bearded Seal	F	692-BDSL-015	Barrow	7/00	a	a	a	
Bearded Seal	M	692-BDSL-027	Barrow	7/01	a		a	
Bearded Seal	F	692-BDSL-028	Barrow	7/01	a	a	a	
Bearded Seal	F	Ebs-02-01	Flaxman Island	3/02	a	a	a	
Bearded Seal	M	692-BDSL-030	Kotzebue Sound	9/02	a	a	a	
Bearded Seal	M	692-BDSL-031	Kotzebue Sound	9/02	a	a	a	
Bearded Seal	F	692-BDSL-032	Kotzebue Sound	9/02	a	a	a	
Bearded Seal	M	692-BDSL-033	Kotzebue Sound	9/02	a	a	a	
Beluga Whale	F	692-BLKA-001	Point Hope	5/89	h	a	h	
Beluga Whale	F	692-BLKA-002	Point Hope	5/89	h	a	h	
Beluga Whale	F	692-BLKA-003	Point Hope	5/89	h	a		
Beluga Whale	M	692-BLKA-004	Point Hope	5/89	h			

**Table 6. (continued)**

Species	Sex	Individual ID	Location	Date	L	K	B	M
Beluga Whale	F	692-BLKA-005	Point Lay	7/90	h	a	h	
Beluga Whale	M	692-BLKA-006	Point Lay	7/90	h	a	h	
Beluga Whale	F	692-BLKA-007	Point Lay	7/90	h	h	h	
Beluga Whale	M	692-BLKA-008	Point Lay	7/90	h	a	h	
Beluga Whale	M	692-BLKA-009	Point Lay	7/90	h	a	h	
Beluga Whale	M	692-BLKA-010	Point Lay	7/90	h	a	h	
Beluga Whale	M	692-BLKA-011	Point Lay	7/90	h	h	h	
Beluga Whale	F	692-BLKA-012	Point Lay	7/90	h	a	h	
Beluga Whale	M	692-BLKA-013	Point Lay	7/90	h	h	h	
Beluga Whale	F	692-BLKA-014	Point Lay	7/90	h	a	h	
Beluga Whale	M	692-BLKA-040	Point Lay	7/96	h	a	h	h
Beluga Whale	F	692-BLKA-041	Point Lay	7/96	h	a	h	a
Beluga Whale	F	692-BLKA-042	Point Lay	7/96	h	a	h	a
Beluga Whale	M	692-BLKA-043	Point Lay	7/96	h	a	h	h
Beluga Whale	M	692-BLKA-044	Point Lay	7/96	h	a	h	h
Beluga Whale	M	692-BLKA-045	Point Lay	7/96	h	a	h	h
Beluga Whale	M	692-BLKA-046	Point Lay	7/96	h	a	h	h
Beluga Whale	F	692-BLKA-047	Point Lay	7/96	h	a	h	a
Beluga Whale	F	692-BLKA-048	Point Lay	7/96	h	a	h	a
Beluga Whale	F	692-BLKA-049	Point Lay	7/96	h	a	h	a
Beluga Whale	F	692-BLKA-053	Point Hope	5/97	a	a		
Beluga Whale	M	692-BLKA-054	Barrow	7/97	h		h	
Beluga Whale	M	692-BLKA-055	Barrow	7/97	h	a	h	
Beluga Whale	M	692-BLKA-056	Barrow	7/97	h	a	h	
Beluga Whale	M	692-BLKA-057	Point Lay	6/99	a	a	a	
Beluga Whale	M	692-BLKA-058	Point Lay	6/99	a	a	a	
Beluga Whale	M	692-BLKA-059	Point Lay	6/99	a	a	a	
Beluga Whale	M	692-BLKA-060	Point Lay	6/99	a	a	a	
Beluga Whale	M	692-BLKA-061	Point Lay	6/99	a	a	a	
Beluga Whale	M	692-BLKA-062	Point Lay	6/99	a	a	a	
Beluga Whale	M	692-BLKA-063	Point Lay	6/99	a	a	a	
Beluga Whale	F	692-BLKA-064	Point Lay	6/99	a	a	a	
Beluga Whale	M	692-BLKA-065	Point Lay	6/99	a	a	a	
Beluga Whale	F	692-BLKA-066	Point Lay	6/99	a	a	a	
Beluga Whale	M	692-BLKA-067	Wainwright	7/99	a		a	
Beluga Whale	F	692-BLKA-068	Wainwright	7/99	a		a	
Bowhead Whale	F	692-BWHD-001	Barrow	5/92	h	a	a	
Bowhead Whale	F	692-BWHD-002	Barrow	5/92		a	a	
Bowhead Whale	F	692-BWHD-003	Barrow	9/92	a		a	
Bowhead Whale	M	692-BWHD-004	Barrow	9/92	a		a	
Bowhead Whale	F	692-BWHD-005	Barrow	9/92	h		a	
Bowhead Whale	F	692-BWHD-006	Barrow	9/92	h		a	
Bowhead Whale	M	692-BWHD-007	Barrow	9/92	h		h	
Bowhead Whale	M	692-BWHD-008	Barrow	9/92	h		a	
Bowhead Whale	M	692-BWHD-009	Barrow	9/92	a		a	
Bowhead Whale	F	692-BWHD-010	Barrow	10/92	a		a	
Bowhead Whale	M	692-BWHD-011	Barrow	10/92	h		a	
Bowhead Whale	F	692-BWHD-012	Barrow	4/93	a		a	
Bowhead Whale	F	692-BWHD-013	Barrow	5/93	h		a	
Bowhead Whale	F	692-BWHD-014	Barrow	5/93	h		a	
Bowhead Whale	F	692-BWHD-015	Barrow	5/93	a		a	
Bowhead Whale	F	692-BWHD-016	Barrow	5/93	a		a	
Bowhead Whale	F	692-BWHD-017	Barrow	5/93	a		a	
Bowhead Whale	M	692-BWHD-020	Barrow	10/93	h		a	



**Table 6. (continued)**

Species	Sex	Individual ID	Location	Date	L	K	B	M
Bowhead Whale	M	692-BWHD-021	Barrow	10/93	a		a	
Bowhead Whale	M	692-BWHD-022	Barrow	10/93			a	
Bowhead Whale	M	692-BWHD-024	Barrow	5/94	a		a	
Bowhead Whale	M	692-BWHD-025	Barrow	5/94	a		a	
Bowhead Whale	M	692-BWHD-026	Barrow	5/94			a	
Bowhead Whale	M	692-BWHD-027	Barrow	5/94	a		a	
Bowhead Whale	M	692-BWHD-028	Barrow	5/94	a		a	
Bowhead Whale	M	692-BWHD-029	Barrow	5/94			a	
Bowhead Whale		692-BWHD-030	Barrow	/96	a		a	
Bowhead Whale		692-BWHD-031	Barrow	/96	a		a	
Bowhead Whale		692-BWHD-032	Barrow	/96	a		a	
Bowhead Whale		692-BWHD-033	Barrow	/96	a		a	
Bowhead Whale		692-BWHD-034	Barrow	/96	a		a	
Bowhead Whale	F	692-BWHD-035	Barrow	9/96			a	
Bowhead Whale	M	692-BWHD-036	Barrow	9/96	a		a	
Bowhead Whale	M	692-BWHD-037	Barrow	9/96	a		a	
Bowhead Whale	M	692-BWHD-038	Barrow	9/96	a		a	
Bowhead Whale	F	692-BWHD-039	Barrow	9/96	a		a	
Bowhead Whale	M	692-BWHD-040	Barrow	9/96	a		a	
Bowhead Whale	F	692-BWHD-041	Barrow	9/96	a		a	
Bowhead Whale	F	692-BWHD-042	Barrow	9/96	a		a	
Bowhead Whale	F	692-BWHD-043	Barrow	9/96	a		a	
Bowhead Whale	F	692-BWHD-044	Barrow	9/96	a		a	
Bowhead Whale	M	692-BWHD-045	Barrow	9/96	a		h	
Bowhead Whale	M	692-BWHD-046	Barrow	9/96	a		h	
Bowhead Whale	M	692-BWHD-048	Barrow	5/97	a		a	
Bowhead Whale	F	692-BWHD-049	Barrow	5/97	a	a	a	
Bowhead Whale	F	692-BWHD-050	Barrow	5/97	a	a	a	
Bowhead Whale	F	692-BWHD-051	Barrow	5/97	a	a	h	
Bowhead Whale	F	692-BWHD-052	Barrow	5/97	a	a	h	
Bowhead Whale	F	692-BWHD-053	Barrow	6/97	a	a	a	
Bowhead Whale	M	692-BWHD-054	Barrow	5/99	a	a	a	
Bowhead Whale	F	692-BWHD-055	Barrow	5/99	a	a	h	
Bowhead Whale	F	692-BWHD-056	Barrow	5/99	a	a	a	
Bowhead Whale	M	692-BWHD-057	Barrow	5/99	a	a	a	
Bowhead Whale	M	692-BWHD-058	Barrow	5/99	a	a	a	
Bowhead Whale	F	692-BWHD-059	Barrow	5/99	a	a	a	
Bowhead Whale	M	692-BWHD-060	Barrow	4/00	a	a	a	
Bowhead Whale	M	692-BWHD-060	Barrow	9/00			a	
Bowhead Whale	M	692-BWHD-061	Barrow	9/00		a	a	
Bowhead Whale	M	692-BWHD-062	Barrow	10/00	a	a	a	
Bowhead Whale	M	692-BWHD-063	Barrow	10/00	a	a		
Polar Bear	M	692-PLBR-001	Barrow	3/96	h	h	h	
Polar Bear	M	692-PLBR-002	Barrow	3/96	h	h	h	
Polar Bear		692-PLBR-003	Barrow	3/96	a	a		
Polar Bear	M	692-PLBR-004	Barrow	5/96	a	a		
Polar Bear		692-PLBR-005	Barrow	9/96	a	a		
Polar Bear		692-PLBR-006	Barrow	10/96	a	a	h	
Polar Bear		692-PLBR-007	Barrow	10/96	a	a	h	
Polar Bear	F	692-PLBR-008	Barrow	10/96	a	a	h	
Polar Bear		692-PLBR-009	Barrow	10/96	a	a	h	
Polar Bear	F	692-PLBR-010	Barrow	10/96	a	a	h	
Polar Bear	M	692-PLBR-011	Barrow	12/96	a	a	h	
Polar Bear	F	692-PLBR-012	Barrow	10/96	a	a	h	

**Table 6. (continued)**

Species	Sex	Individual ID	Location	Date	L	K	B	M
Polar Bear	M	692-PLBR-013	Barrow	10/96	a	a	h	
Polar Bear		692-PLBR-014	Barrow	12/96	a	a	h	
Polar Bear	F	692-PLBR-015	Barrow	10/96	a	a	h	
Polar Bear	M	692-PLBR-016	Barrow	12/96	h	h	h	
Polar Bear	M	692-PLBR-017	Barrow	12/96	h	h	h	
Polar Bear		692-PLBR-018	Barrow		a			
Polar Bear		692-PLBR-019	Barrow	5/97	a	a	h	
Polar Bear	M	692-PLBR-022	Point Lay	2/97	h	a		
Polar Bear	M	692-PLBR-025	Point Lay	12/96	a	a		
Polar Bear	M	692-PLBR-026	Barrow	3/97	a	a		
Polar Bear	F	692-PLBR-027	Barrow	3/97	a	a		
Polar Bear	M	692-PLBR-028	Barrow	5/97	h	h		
Polar Bear	M	692-PLBR-031	Nuigsut	9/97	a	a		
Polar Bear	M	692-PLBR-032	Barrow	12/97	a	a	a	
Polar Bear	M	692-PLBR-033	Barrow	12/97	a	a	a	
Polar Bear	M	692-PLBR-034	Point Lay	2/98	a	a		
Polar Bear	M	692-PLBR-037	Barrow	5/99	a	a		
Polar Bear	F	692-PLBR-047	Prudhoe Bay	10/99	a	a	a	
Polar Bear	M	692-PLBR-048	Barrow	5/00	a	a	a	
Polar Bear	F	692-PLBR-050	Barrow	11/99	a	a	a	
Polar Bear	M	692-PLBR-054	Kaktovik	9/01			a	
Harbor Porpoise	F	HP-BRW-97-1	Barrow	8/97	a		a	
Pacific Walrus	F	692-WLRS-022	Barrow	6/97		a	a	
Pacific Walrus	F	692-WLRS-034	Barrow	7/99		a	a	

**Table 7.** Marine mammals sampled in the Gulf of Alaska for the AMMTAP (L - Liver; K - Kidney; B - Blubber; M - Muscle; S - Serum; a - samples archived; h - subsample B homogenized and divided into aliquots for analyses).

Species	Sex	Individual ID	Location	Date	L	K	B	M	S
Harbor Seal	M	692-HBSL-001	Prince William Sound	3/90	a	a	a		
Harbor Seal	F	692-HBSL-002	Prince William Sound	4/90	a	a	a		
Harbor Seal	M	692-HBSL-003	Prince William Sound	4/90	a	a	a		
Harbor Seal	F	692-HBSL-004	Anchorage	6/94	a	a	a		
Harbor Seal	F	692-HBSL-009	Cook Inlet	3/97	a	a	h		
Harbor Seal	M	692-HBSL-010	Cook Inlet	3/97	a	a	h		
Harbor Seal		692-HBSL-011	Cook Inlet	5/98		a			
Harbor Seal	M	692-HBSL-011	Seward	12/00	a	a	a		
Harbor Seal	M	692-HBSL-012	Carter Bay	8/01	a	a	a		
Harbor Seal	F	PV-75-008-98C	Seward	8/2	a	a	a		
Stellar Sea Lion	F	692-STSL-001	Cook Inlet	3/90	a	a	a		
Stellar Sea Lion	M	692-STSL-002	Amlia Pass	2/97	a	a	h		
Stellar Sea Lion	F	692-STSL-003	Atka Korovin Bay	2/97	a	a	h		
Beluga Whale	M	692-BLKA-015	Cook Inlet	10/92	h	h	h		
Beluga Whale	M	692-BLKA-016	Cook Inlet	7/94			h		
Beluga Whale	F	692-BLKA-017	Cook Inlet	7/94			h		
Beluga Whale	M	692-BLKA-018	Cook Inlet	7/94			h		
Beluga Whale	F	692-BLKA-020	Cook Inlet	5/95	h		h		
Beluga Whale	M	692-BLKA-021	Cook Inlet	6/95	h	h	h		
Beluga Whale	F	692-BLKA-022	Cook Inlet	5/95	h	h	h		
Beluga Whale	F	692-BLKA-023	Cook Inlet	6/95	h	h	h		
Beluga Whale	F	692-BLKA-024	Cook Inlet	6/95	h	h	h		
Beluga Whale	F	692-BLKA-025	Cook Inlet	6/95	h	h	h		
Beluga Whale	M	692-BLKA-026	Cook Inlet	6/95	h	h	h		
Beluga Whale	M	692-BLKA-027	Cook Inlet	6/95	h	h	h		
Beluga Whale	M	692-BLKA-028	Cook Inlet	6/95	h	h	h		
Beluga Whale	M	692-BLKA-029	Cook Inlet	8/95	h	h	h		
Beluga Whale	F	692-BLKA-031	Cook Inlet	6/96	h	h	h	a	
Beluga Whale	F	692-BLKA-032	Cook Inlet	7/96	h	h	h	a	
Beluga Whale	F	692-BLKA-033	Cook Inlet	7/96	h	h	h	a	
Beluga Whale	F	692-BLKA-034	Cook Inlet	8/96	h	h	h	a	
Beluga Whale	M	692-BLKA-035	Cook Inlet	10/96	h	h	h	a	
Beluga Whale	M	692-BLKA-036	Cook Inlet	10/96		a	a	a	
Beluga Whale	M	692-BLKA-037	Cook Inlet	10/96	h	h	h	a	
Beluga Whale	F	692-BLKA-038	Cook Inlet	4/98	a	a	a	a	
Beluga Whale	F	692-BLKA-039	Cook Inlet	4/98	a	a	a	a	
Beluga Whale	F	692-BLKA-050	Cook Inlet	5/98	a	a	a		
Beluga Whale	M	692-BLKA-051	Cook Inlet	5/98	a	a	a		
Beluga Whale	M	692-BLKA-052	Cook Inlet	5/98	a	a	a	a	
Beluga Whale	F	692-BLKA-073	Cook Inlet	7/01	a	a	a		
Beluga Whale	F	692-BLKA-074	Cook Inlet	10/01	a	a	a		
Beluga Whale	M	692-BLKA-076	Cook Inlet	7/02	a	a	a		
Sea Otter	M	692-SEOT-001	Sitka	9/97	a	a			a
Sea Otter	M	692-SEOT-002	Sitka	9/97	a	a			
Sea Otter	F	692-SEOT-003	Sitka	9/97	a	a			a
Sea Otter	M	692-SEOT-004	Seward	2/00	a	a			
Sea Otter	M	692-SEOT-005	Homer	7/01	a	a			
Sea Otter	M	Els-02-01	Seward	7/02	a	a	a		
Sea Otter	M	Els-02-02	Seward	7/02	a	a	a		
Sea Otter	M	Els-02-03	Seward	7/02	a	a	a		

**Table 8.** Marine mammals sampled in the Aleutian Islands for the AMMTAP (L - Liver; K - Kidney; B - Blubber; M - Muscle; a - samples archived; h - subsample B homogenized and divided into aliquots for analyses).

<b>Species</b>	<b>Sex</b>	<b>Individual ID</b>	<b>Location</b>	<b>Date</b>	<b>L</b>	<b>K</b>	<b>B</b>	<b>M</b>
Harbor Seal	F	692-HBSL-005	Amlia Island	1/97		a		
Harbor Seal	M	692-HBSL-006	Amlia Island	1/97	a	a		a
Harbor Seal	F	692-HBSL-007	Akun Island	2/97	a		h	
Harbor Seal	F	692-HBSL-008	Green Island	2/97	a	a	h	

**Table 9.** Marine mammals sampled in the Bering Sea for the AMMTAP (L - Liver; K - Kidney; B - Blubber; M - Muscle; S - Serum; a - samples archived; h - subsample B homogenized and divided into aliquots for analyses).

Species	Sex	Individual ID	Location	Date	L	K	B	M	S
Ringed Seal	M	692-RGSL-011	Nome	5/89	h	a	h		
Ringed Seal	F	692-RGSL-012	Nome	5/89	h	a	h		
Ringed Seal	M	692-RGSL-013	Nome	5/89	h	a	h		
Ringed Seal	M	692-RGSL-014	Nome	5/89	h	a	h		
Ringed Seal	F	692-RGSL-015	Nome	5/89	h	a	a		
Ringed Seal	M	692-RGSL-016	Nome	5/91	h	a	h		
Ringed Seal	F	692-RGSL-017	Nome	5/91	h	a	h		
Ringed Seal	F	692-RGSL-018	Nome	5/91	h	a	h		
Ringed Seal	M	692-RGSL-029	Nome	5/93	h	a	h		
Ringed Seal	M	692-RGSL-030	Nome	5/93	h	a	a		
Ringed Seal	M	692-RGSL-031	Nome	5/93	h	a	h		
Ringed Seal	M	692-RGSL-032	Nome	6/93	h	a	h		
Ringed Seal	M	692-RGSL-033	Nome	5/94	a	a	a		
Ringed Seal	M	692-RGSL-034	Nome	5/94	a	a	a		
Ringed Seal	F	692-RGSL-035	Nome	5/94	h	a	a		
Ringed Seal	F	692-RGSL-036	Nome	5/94	h	a	a		
Ringed Seal	M	692-RGSL-046	Nome	5/96	a	a	a		
Ringed Seal	F	692-RGSL-056	Nome	1/97	h	a	h		
Ringed Seal	F	692-RGSL-048	Nome	5/97	h	a	h		
Ringed Seal	F	692-RGSL-058	Nome	5/98	a	a	a		
Ringed Seal	M	692-RGSL-059	Cape Wooly	5/98	a	a	a		
Ringed Seal	F	692-RGSL-060	Teller	6/98	a	a	a		
Ringed Seal	M	692-RGSL-061	Gambell	5/99	a	a	a		
Ringed Seal		692-RGSL-060	Norton Sound	6/99	a	a	a		
Spotted Seal	F	692-SPSL-001	Nome	5/91	h	a	a		
Spotted Seal	M	692-SPSL-002	Nome	5/96	a	a	a		
Spotted Seal	M	692-SPSL-004	Nome	9/97	a	a	a		
Bearded Seal	M	692-BDSL-001	Nome	5/89	h	a	a		
Bearded Seal	M	692-BDSL-004	Nome	5/93	h	a	a		
Bearded Seal	M	692-BDSL-005	Nome	6/93	h	a	h		
Bearded Seal	M	692-BDSL-006	Nome	5/94	a	a	h		
Bearded Seal	M	692-BDSL-007	Nome	5/94	a	a	h		
Bearded Seal	M	692-BDSL-008	Nome	5/94	a	a	h		
Bearded Seal	F	692-BDSL-009	Nome	5/94	a	a	h		
Bearded Seal	F	692-BDSL-011	Norton Sound	6/99	a	a	a		
Bearded Seal	M	692-BDSL-012	Norton Sound	6/99	a	a	a		
Bearded Seal	F	692-BDSL-012	Norton Sound	9/99	a	a	a		
Bearded Seal		692-BDSL-013	Norton Sound	9/99	a	a	a		
Northern Fur Seal	M	692-FRSL-001	St. Paul	7/87	a	a	a	a	
Northern Fur Seal	M	692-FRSL-002	St. Paul	7/87	a	a	a	a	
Northern Fur Seal	M	692-FRSL-003	St. Paul	7/87	a	a	a	a	
Northern Fur Seal	M	692-FRSL-004	St. Paul	7/87	h	h	h	h	
Northern Fur Seal	M	692-FRSL-005	St. Paul	7/87	h	h	h	h	
Northern Fur Seal	M	692-FRSL-006	St. Paul	7/90	a	a	a		
Northern Fur Seal	M	692-FRSL-007	St. Paul	7/90	h	a	a		
Northern Fur Seal	M	692-FRSL-008	St. Paul	7/90	a	a	a		
Northern Fur Seal	M	692-FRSL-009	St. Paul	7/90	a	a	a		
Northern Fur Seal	M	692-FRSL-010	St. Paul	7/90	h	a	a		
Northern Fur Seal	M	692-FRSL-011	St. Paul	7/90	h	a	a		
Northern Fur Seal	M	692-FRSL-012	St. Paul	7/90	a	a	a		

**Table 9. (continued)**

Species	Sex	Individual ID	Location	Date	L	K	B	M	S
Northern Fur Seal	M	692-FRSL-013	St. Paul	7/90	a	a	a		
Northern Fur Seal	M	692-FRSL-014	St. Paul	7/90	a	a	a		
Northern Fur Seal	M	692-FRSL-015	St. Paul	7/90	a	a	a		
Northern Fur Seal	M	692-FRSL-016	St. Paul	8/97	a	a	a		a
Northern Fur Seal	M	692-FRSL-017	St. Paul	8/97	a	a	a		a
Northern Fur Seal	M	692-FRSL-018	St. Paul	8/97	a	a	a		a
Northern Fur Seal	M	692-FRSL-019	St. Paul	8/97	a	a	a		a
Northern Fur Seal	M	692-FRSL-020	St. Paul	8/97	a	a	a		a
Northern Fur Seal	M	692-FRSL-021	St. Paul	8/97	a	a	a		a
Northern Fur Seal	M	692-FRSL-022	St. Paul	7/00	a	a	h		
Northern Fur Seal	M	692-FRSL-023	St. Paul	7/00	a	a	h		
Northern Fur Seal	M	692-FRSL-024	St. Paul	7/00	a	a	h		
Northern Fur Seal	M	692-FRSL-025	St. Paul	7/00	a	a	h		
Northern Fur Seal	M	692-FRSL-026	St. Paul	7/00	a	a	h		
Northern Fur Seal	M	692-FRSL-027	St. Paul	7/00	a	a	h		
Northern Fur Seal	M	692-FRSL-028	St. Paul	7/00	a	a	h		
Northern Fur Seal	M	692-FRSL-029	St. Paul	7/00	a	a	h		
Northern Fur Seal	M	692-FRSL-030	St. Paul	7/00	a	a	h		
Northern Fur Seal	M	692-FRSL-031	St. Paul	7/00	a	a	h		
Northern Fur Seal	M	692-FRSL-032	St. Paul	7/00		a	h		
Northern Fur Seal	M	692-FRSL-033	St. Paul	7/00	a	a	h		
Northern Fur Seal	M	692-FRSL-034	St. Paul	7/00	a	a	h		
Northern Fur Seal	M	692-FRSL-035	St. Paul	7/00	a	a	h		
Northern Fur Seal	M	692-FRSL-036	St. Paul	7/00	a	a	h		
Elephant Seal	M	692-ELSL-001	Izembek NWR	5/96	a	a	a		
Pacific Walrus	M	692-WLRS-001	Nome	6/93	a	a	h		
Pacific Walrus		692-WLRS-021	Nome	5/98	a				
Pacific Walrus	M	692-WLRS-002	Nome	6/93	a	a	a		
Pacific Walrus	M	692-WLRS-003	Nome	5/94	a	a	h		
Pacific Walrus	M	692-WLRS-004	Nome	5/94	a	a	h		
Pacific Walrus	M	692-WLRS-005	Nome	5/94	a	a	h		
Pacific Walrus	F	692-WLRS-006	Gambell	5/95	a	a	a		
Pacific Walrus	F	692-WLRS-007	Gambell	5/95	a	a	a		
Pacific Walrus	F	692-WLRS-008	Gambell	5/95	a	a	a		
Pacific Walrus	M	692-WLRS-009	Gambell	5/95	a	a			
Pacific Walrus	F	692-WLRS-010	Gambell	5/95	a	a	a		
Pacific Walrus	M	692-WLRS-011	Gambell	5/95	a	a	a		
Pacific Walrus	F	692-WLRS-012	Gambell	5/95	a	a	a		
Pacific Walrus	F	692-WLRS-013	Gambell	5/96	a	a	h		
Pacific Walrus	F	692-WLRS-014	St Lawrence Island	5/96	a	a	h		
Pacific Walrus	M	692-WLRS-015	Round Island	10/96	a	a			
Pacific Walrus	M	692-WLRS-016	Round Island	10/96	a	a	h		
Pacific Walrus	M	692-WLRS-017	Round Island	10/96	a	a	h		
Pacific Walrus	M	692-WLRS-018	Round Island	10/96	a	a	h		
Pacific Walrus	M	692-WLRS-019	Round Island	10/96	a	a			
Pacific Walrus		692-WLRS-020	Round Island	10/96	a	a	h		
Pacific Walrus	M	692-WLRS-022	Round Island,AK	10/98	a	a			
Pacific Walrus	M	692-WLRS-023	Round Island,AK	10/98	a	a			
Pacific Walrus	M	692-WLRS-024	Round Island,AK	10/98	a	a			
Pacific Walrus	M	692-WLRS-026	Gambell	5/99	a	a	a		
Pacific Walrus	M	692-WLRS-027	Gambell	5/99	a	a	a		

**Table 9. (continued)**

Species	Sex	Individual ID	Location	Date	L	K	B	M	S
Pacific Walrus	M	692-WLRS-028	Gambell	5/99	a	a	a		
Pacific Walrus	M	692-WLRS-029	Gambell	5/99	a	a	a		
Pacific Walrus	M	692-WLRS-030	Gambell	5/99	a	a	a		
Pacific Walrus	M	692-WLRS-031	Gambell	5/99	a	a	a		
Pacific Walrus	M	692-WLRS-032	Gambell	5/99	a	a	a		
Pacific Walrus	M	692-WLRS-033	Gambell	5/99	a	a			
Stellar Sea Lion	M	692-STSL-004	St George Island	3/97		a		h	
Polar Bear	M	692-PLBR-020	Gambell	3/97	a	a		h	
Polar Bear	M	692-PLBR-021	Gambell	3/97	a	a		h	
Polar Bear	M	692-PLBR-023	Gambell	3/97	a	a			
Polar Bear	M	692-PLBR-024	Savoonga	3/97		a		h	
Polar Bear	M	692-PLBR-029	Savoonga	2/98		h		h	
Polar Bear	M	692-PLBR-030	Savoonga	3/98				h	
Polar Bear	M	692-PLBR-035	Little Diomedede	4/98	a	a		a	
Polar Bear	F	692-PLBR-036	Gambell	5/99	a	a		a	
Polar Bear	M	692-PLBR-038	Savoonga	5/99	a	a		a	
Polar Bear	M	692-PLBR-039	Gambell	4/99	a	a		a	
Polar Bear	M	692-PLBR-040	Gambell	5/99	a	a		a	
Polar Bear	M	692-PLBR-041	Gambell	5/99	a	a		a	
Polar Bear	M	692-PLBR-042	Savoonga	5/99	a	a			
Polar Bear	M	692-PLBR-043	Gambell	6/99	a	a		a	
Polar Bear	M	692-PLBR-044	Savoonga	2/99		a			
Polar Bear	F	692-PLBR-045	Savoonga	5/99	a	a			
Polar Bear	M	692-PLBR-046	Little Diomedede	5/99	a	a			
Polar Bear	M	692-PLBR-049	Little Diomedede	1/00	a	a			
Polar Bear	M	692-PLBR-051	Little Diomedede	4/00	a	a			
Polar Bear	M	692-PLBR-052	Kivalina	4/01				a	
Polar Bear	F	692-PLBR-053	Little Diomedede	6/01	a	a			
Polar Bear	M	692-PLBR-055	Gambell	3/02	a	a			
Polar Bear	M	692-PLBR-056	Gambell	3/02	a	a		a	
Polar Bear	M	692-PLBR-057	Gambell	1/02	a	a		a	
Polar Bear	M	692-PLBR-058	Savoonga	4/02	a	a		a	
Beluga Whale	M	692-BLKA-069	Norton Sound	10/00	a	a		a	
Beluga Whale	F	692-BLKA-070	Norton Sound	10/00	a	a			
Beluga Whale	F	692-BLKA-071	Norton Sound	10/00	a	a		a	
Beluga Whale	M	692-BLKA-072	Norton Sound	10/00	a	a		a	a
Beluga Whale	M	692-BLKA-075	Bristol Bay	5/02	a	a		a	

## **ANALYSIS OF SAMPLES**

One Report of Analysis (ROA) was produced in CY02 on analysis completed by the Northwest Fisheries Science Center (NWFSC) for samples distributed in FY00 and FY02. The report, *ROA-839.02-03-010*, "Data from NBSB Marine Mammal Tissues Distributed to the Northwest Fisheries Science Center (NWFSC) for FY00 and FY02" is located in the appendix of this report. Results of analysis of blubber samples from ten ringed seals (*Phoca hispida*), three beluga whales (*Delphinapterus leucas*), and fifteen Northern fur seals (*Phoca vitulina*) for PCB congeners and chlorinated pesticides are reported. Concentrations of Ag, Al, As, Cd, Cr, Cu, Fe, Mg, Ni, Sn, V, Zn, Hg, Pb, and Se were measured in livers of the ten ringed seals and three beluga whales using Atomic Absorption (AA). Specifically, Hg was measured by flow-injection cold vapor AA and Pb and Se were measured by graphite furnace AA.

## **PROTOCOL TRAINING**

During the reporting period, training on proper protocols for collecting, processing, and transporting specimens to the NMMTB was conducted at the New England Aquarium (May 8-9, 2002), the Mystic Aquarium (May 10-12, 2002) and the Marine Mammal Center (July 17-19, 2002). There was a staff change at the New England Aquarium, therefore, the training was necessary. Belinda Rubenstein has taken Greg Early's position and will be the primary point of contact at the NEA. Belinda, PJ Gibson, Dagmar Sonntag-Bensch, and two volunteers attended the training.

The training session at the Mystic Aquarium coincided with the Northeast Regional Stranding Network Annual Meeting and Conference and provided training to new personnel interested in collecting tissues for the NMMTB. David St. Aubin (Mystic Aquarium), Katie Touhey and Kristin Patchett (Cape Cod Stranding Network), and Eric Montie (Woods Hole Oceanographic Institution) were among the 12 that attended the training.

The training at the Marine Mammal Center was a refresher course for Dr. Francis Gulland and staff, including Denise Greig and Dr. Martin Haulena. Dr. Melissa Miller and other staff members from the Department of Fish and Game in Santa Cruz, CA also attended the training with interest in collecting sea otter tissues for the NMMTB.

## **PRESENTATIONS, REPORTS, AND JOURNAL PUBLICATIONS**

Five presentations, four posters, two formal agency reports, one Master's Thesis and five peer-reviewed journal publications were produced and/or published during the reporting period.

### **Oral Presentations and Posters**

Becker, P.R. "Environmental Specimen Banking," Marine Sanctuary Research Coordinators Workshop, Center for Coastal Environmental Health and Biomolecular Research, Charleston, SC, January 31, 2002.

Christopher, S.J. NIST/NOAA/MMHSRP Interlaboratory Comparison Exercise Program for Organic Contaminants and Trace Elements in Marine Mammal Tissues (2001)". Exercise discussion and presentation of reports. The 2002 Winter Conference on Plasma



Spectrochemistry, Scottsdale, AZ, Jan. 6-12, 2002

Kucklick, J.R., Schantz, M.S., Poster, D.L., Becker, P.R., Porter, B.J., Pugh, R.S., and Wise, S.A. Reference Materials and Quality Assurance Activities to Support Measurements of Persistent Organic Pollutants in the Marine Environment. 2002 Pittsburgh Conference. New Orleans, LA. February 2002.

Christopher, S.J., Becker, P., Kucklick, J., Pugh R., Vander Pol, S., Stahl, K., Day, R. and Hauswaldt, S. Marine Science Programs at NIST Charleston. 2002 NIST/NRC Panel Review, Gaithersburg, Maryland, February 2002.

Kucklick, J.R. Contamination of the Marine Environment as Shown in Samples from the National Biomonitoring Specimen Bank. Invited talk. April 1, 2002: University of Charleston, Department of Biology.

Porter, B.J., Pugh, R.S., Becker, P.R., Wise, S.A. Development of the National Biomonitoring Specimen Bank (NBSB). International Society of Biological and Environmental Repositories Annual Meeting, Boston, Massachusetts, May 5-8, 2002.

Kucklick, J.R., Tuerk, K.J.S., McFee, W., Becker, P.R., Pugh, R.S., Stapleton, H., and Baker, J.E. Toxaphene and PBDEs in Atlantic white-sided and rough-toothed dolphins. Presented at the 22nd International Symposium on Halogenated Environmental Organic Pollutants and POPs. August 11-16, 2002. Barcelona, Spain.

Kucklick, J.R., M.M. Krahn, P.R. Becker, B.J. Porter, M.M. Schantz, G.W. York, T.M. O'Hara. Comparison of organochlorine contaminant concentrations and patterns in ringed seals (*Phoca hispida*) from Nome and Barrow, Alaska. Second AMAP International Symposium on Environmental Pollution of the Arctic, Rovaniemi, Finland, October 1-4, 2002.

Tuerk, K.J.S., J.R. Kucklick, W.E. McFee, R.S. Pugh, P.R. Becker. Life history effects on POPs in Atlantic white-sided and rough-toothed dolphins. Society of Environmental Toxicology and Chemistry, Salt Lake City, Utah, November 16-20, 2002

### **Conference Proceedings**

Kucklick, J.R., M.M. Schantz, D.L. Poster, P.R. Becker, B.J. Porter, R.S. Pugh, S.A. Wise. 2002. Reference Materials and Quality Assurance Activities to Support Measurements of Persistent Organic Pollutants in the Marine Environment. 2002 Pittsburgh Conference, New Orleans, LA, March 19, 2002. Extended abstract.

Kucklick, J.R., P R. Becker, W.D.J. Struntz, M.M. Schantz, S.A. Wise. 2002. Persistent Organochlorine Pollutants (POPs) in Marine Mammals Collected from Alaskan Coastal Waters. Proceedings of the International Workshop on Marine Pollution by Persistent Organic Pollutants (POPs). The 17th Global Environment Tsukuba, February 26-27, 2001. Center for Global Environmental Research, National Institute for Environmental Studies CGER-I052-2002, pages 29-43

Kucklick, J.R., K.J. Stahl, W. McFee, P.R. Becker, H. Stapleton, J.E. Baker. 2002. Toxaphene

and PBDEs in White-Sided and Rough-Toothed Dolphins. 22nd International Symposium on Halogenated Environmental Organic Pollutants and Persistent Organic Pollutants (POPs), Barcelona, Spain, August 14, 2002. Extended abstract.

Kucklick, J.R., S.S. Vander Pol, P.R. Becker, R.S. Pugh, K. Simac, G.W. York, D.G. Roseneau. 2002. Persistent Organic Pollutants in Murre Eggs from the Gulf of Alaska and Bering Sea. 22nd International Symposium on Halogenated Environmental Organic Pollutants and Persistent Organic Pollutants (POPs), Barcelona, Spain, August 15, 2002. Extended abstract.

Kucklick, J.R., M.M. Krahn, P.R. Becker, B.J. Porter, M.M. Schantz, G.W. York, T.M. O'Hara. 2002. Comparison of Organochlorine Contaminant Concentrations and Patterns in Ringed Seals (*Phoca hispida*) from Nome and Barrow, Alaska. Second AMAP International Symposium on Environmental Pollution of the Arctic, Rovaniemi, Finland, October 1-4, 2002. Extended abstract P-P19. AMAP Report 2002.2, Arctic Monitoring and Assessment Program (AMAP), Oslo, Norway

### Reports and Publications

Keller, J., Kucklick, J.R., and McLellan-Green, P. Organochlorine contaminants in loggerhead sea turtle blood: extraction techniques and distribution among plasma and red blood cells. To be submitted to *Archives of Environmental Contamination and Toxicology*. *In review*.

Kucklick, J.R., Christopher, S.J., Becker, P.R., Pugh, R.S., Porter, B.J., Schantz, M.M., Mackey, E.A., Mackey, E.A., Wise, S.A., and Rowles, T.K. Description and results of the 2000 NIST/NOAA interlaboratory comparison exercise program for organic contaminants and trace elements in marine mammal tissues. National Institute of Standards and Technology, Gaithersburg, Maryland, **NISTIR 6849**, 26 p. + appendices (2002).

Kucklick, J.R., Becker, P.R., Struntz, W.D.J., Mackey, E.A., Porter, B.J., Schantz, M.M., Oflaz, R.D., Epstein, M.S., Wise, S.A., Rowles, T.K., McFee, W.E., and Stolen, M.K. Persistent organochlorine pollutants and elements determined in tissues of rough-toothed dolphin (*Steno bredanensis*) banked from a mass stranding event. National Institute of Standards and Technology, Gaithersburg, Maryland, **NISTIR 6857**, 57 p. (2002).

Kucklick JR, Struntz WDJ, Becker PR, York GW, O'Hara TM, Bohonowych JE. Persistent organochlorine pollutants in ringed seals and polar bears collected from northern Alaska. *Science of the Tot. Environ.*; 287:45-59 (2002).

Kucklick, J.R., Becker, P.R., Struntz, D.J.W., Schantz, M.M., and Wise, S.A. Persistent organochlorine pollutants (POPs) in marine mammals collected from Alaskan coastal waters. In: Proceedings of the International Workshop on Marine Pollution by Persistent Organic Pollutants (POPs). The 17<sup>th</sup> Global Environment Tsukuba, Japan. CGER 1052-2002. pp. 29-43. Feb. 26-27, 2001.

Mackey, E.A., R.D. Oflaz, M.S. Epstein, B. Buehler, B.J. Porter, T. Rowles, S.A. Wise, P.R. Becker. Elemental composition of liver and kidney tissues of rough-toothed dolphins (*Steno bredanensis*). *Arch. Env. Contam. Toxicol.* (In press).

Struntz, D.J.W., McLellan, W.A., Dillaman, R.M., Blum, J.E., Kucklick, J.R., and Pabst, D.A. Blubber development in bottlenose dolphins (*Tursiops truncatus*). *Journal of Morphology*. In press.

Tuerk, K.J.S. Persistent Organic Pollutants in Atlantic White-Sided Dolphins (*Lagenorhynchus acutus*) and Rough-Toothed Dolphins (*Steno bredanensis*). Masters Thesis. The College of Charleston, Charleston, SC.

## CONCLUSIONS

During the reporting period (January 1, 2002 – December 31, 2002), 220 specimens were collected from 75 animals. The inventory of the NMMTB now includes specimens from 18 species of cetaceans, 12 species of pinnipeds, polar bears, sea otters, and loggerhead turtles. Of the 2,073 tissue specimens now archived in the NMMTB, 56% were collected from animals in Alaska.

A total of 15 specimens collected and banked in 1999 were homogenized and aliquots provided to the NMFS, NWFC, Environmental Conservation Division, for real time analysis in support of the Biomonitoring component of the MMHSRP. Details on these aliquots are provided in the appendix of this report.

Training sessions were conducted at the New England Aquarium, Mystic Aquarium and the Marine Mammal Center for animals sampled through the MMHSRP.

Results of the organic analysis of blubber tissues from ringed seals, beluga whales, and Northern fur seals and inorganic analysis of liver of ringed seals and beluga whales were completed in 2002 and finalized in the NIST *Reports of Analysis* (ROA) series. This ROA is provided in the appendix of this report.

Three additional *Reports of Analysis* (ROA's) that pertain to animals sampled for the NMMTB were published during the reporting period and are provided in the appendix of this report.

## REFERENCES

- Becker, P.R., B.J., Koster, S.A. Wise, and R. Zeisler. Biological specimen banking in Arctic research: an Alaska perspective, *Sci. Total Environ.* 139/140, 69-95 (1993)
- Becker, P.R., E.A. Mackey, R. Demiralp, M.M. Schantz, B.J. Koster, & S.A. Wise. Concentrations of chlorinated hydrocarbons and trace elements in marine mammal tissues archived in the U.S. National Biomonitoring Specimen Bank. *Chemosphere.* 34(9/10): 2067 – 2098 (1997).
- Becker, P.R., B.J. Porter, E.A. Mackey, M.M. Schantz, R. Demiralp, and S.A. Wise. National Marine Mammal Tissue Bank and Quality Assurance Program: Protocols, Inventory, and Analytical Results, **NISTIR 6279**, National Institute of Standards and Technology, Gaithersburg, Maryland (1999).
- Becker, P.R., D. Wilkinson, and T.I. Lillestolen. Marine Mammal Health and Stranding Response Program: Program Development Plan, **NOAA Technical Memorandum NMFS-OPR-94-2**, National Oceanic and Atmospheric Administration, Silver Spring, Maryland (1994).
- Becker, P.R., S.A. Wise, B.J. Koster, R. Zeisler. Alaskan Marine Mammal Tissue Archival Project: A Description Including Collection Protocols. U.S. Dep. Commer., National Bureau of Standards, **NBSIR 88-3750**. Gaithersburg, Maryland (1988)
- Becker, P.R., S.A. Wise, B.J. Koster, R. Zeisler. Alaska Marine Mammal Tissue Archival Project: Revised Collection Protocol. USDOC, National Institute of Standards and Technology, **NISTIR 4529**, Gaithersburg, Maryland (1991).
- Christopher, S.J. NIST results for the 2000 interlaboratory comparison exercise for trace elements in marine mammals, *Report of Analysis 839.01-01-015*, January 16, 2001, National Institute of Standards and Technology, Gaithersburg, Maryland (2001).
- Christopher, S.J., S.E. Long, M.R. Rearick. Development of isotope dilution cold vapor inductively coupled plasma mass spectrometry and its application to the certification of mercury in NIST Standard Reference Materials. *Anal. Chem.* 73:2190-2199 (2001).
- Epstein, M.S. Analysis of rough toothed dolphin kidney and liver tissue, *Report of Analysis 839.01-00-043*, May 8, 2000, National Institute of Standards and Technology, Gaithersburg, Maryland (2000).
- Epstein, M.S., and B. Buehler. Analysis of whale tissue, *Report of Analysis 839.01-98-026*, February 6, 1998, National Institute of Standards and Technology, Gaithersburg, Maryland (1998).
- Mackey, E.A., P.R. Becker, R. Demiralp, R.R. Greenberg, B.J. Koster, & S.A. Wise. Bioaccumulation of vanadium and other trace elements in livers of Alaskan cetaceans and pinnipeds. *Arch. Environ. Contam. Toxicol.* 30: 503-512 (1996).

Mackey, E.A., R. Demiralp, P.R. Becker, R.R. Greenberg, B.J. Koster, & S.A. Wise. Trace element concentrations in cetacean liver tissues archived in the National Marine Mammal Tissue Bank. *Sci. Total Environ.* 175:25-41 (1995).

Schantz, M.M., B.J. Koster, L.M. Oakley, S.B. Schiller, & S.A. Wise. Certification of polychlorinated biphenyl congeners and chlorinated pesticides in whale blubber standard reference material. *Anal. Chem.* 67(5): 901-910 (1995).

Schantz, M.M., B.J. Koster, R. Zeisler, S.A. Wise, P.R. Becker. Determination of PCBs and chlorinated hydrocarbons in marine mammal tissues. *Sci. Total Environ.* 139/140: 323-345 (1993).

Struntz, W.D.J., and J.R. Kucklick. Polychlorinated biphenyl congeners and organochlorine pesticides in Pacific walrus samples analyzed by the NIST Charleston Laboratory in 1999, *Report of Analysis 839.02-00-009*, National Institute of Standards and Technology, Gaithersburg, Maryland (2000).

Struntz, W.D.J., J.R. Kucklick, and P.R. Becker. Organochlorines in rough-toothed dolphins (*Steno bredanensis*) sampled during an unusual mass stranding event, *Report of Analysis 839.02-00-058*, National Institute of Standards and Technology, Gaithersburg, Maryland (2000).

Tutschku, S., M.M. Schantz, M. Horvat, M. Logar, H. Akagi, H. Emons, M. Levenson, and S.A. Wise. Certification of the methylmercury content in SRM 2977 Mussel Tissue (organic contaminants and trace elements) and SRM 1566b Oyster Tissue, *Fresenius J. Anal. Chem.*, 369, 364-369 (2001).

Wise, S. A. & B.J. Koster. Considerations in the Design of an Environmental Specimen Bank: Experiences of the National Biomonitoring Specimen Bank Program. *Environ. Health Perspect.* 103 (Suppl. 3): 61-67 (1995).

Zeisler, R., J.K. Langland, & S.H. Harrison. Cryogenic Homogenization of Biological Tissues. *Anal. Chem.* 55: 2431-2434 (1983).

## APPENDIX

### REPORTS OF ANALYSIS

**839.02-02-004**, NBSB Gaithersburg Activities for FY2001 NMBS Marine Mammal Projects Including Cryogenic Homogenization and Distribution of Tissue

**839.05-02-002**, Analysis of Marine Environmental Materials for the National Marine Analytical Quality Assurance Program

**839.02-02-008**, Analysis of Atlantic White-Sided Dolphin (*Lagenorhynchus acutus*) Liver Tissue.

**839.02-02-092**, Collection of Pilot Whale Tissues for the NIST NBSB from a Mass Stranding Event in Dennis, MA.

**839.02-03-009**, NBSB Charleston Activities for FY02 Marine Mammal Projects Including Cryogenic Homogenization and Distribution of Tissues.

**839.02-03-010**, Data from NBSB Marine Mammal Tissues Distributed to the Northwest Fisheries Science Center (NWFSC) for FY00 and FY02.