

**USA. PROGRESS REPORT ON CETACEAN RESEARCH, MAY 2004 TO APRIL 2005, WITH STATISTICAL DATA FOR THE CALENDAR YEAR 2002**

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The following information summarizes cetacean research conducted or supported by the U.S. National Marine Fisheries Service at Silver Spring, Maryland (NMFS HQ), and by the five NMFS Science Centers; Alaska Fisheries Science Center (AFSC) and Northwest Fisheries Science Center (NWFSC) in Seattle, Washington; Southwest Fisheries Science Center (SWFSC), La Jolla, California, Northeast Fisheries Science Center (NEFSC), Woods Hole, Massachusetts; and the Southeast Fisheries Science Center (SEFSC), Miami, Florida. Information was also contributed by the Center for Coastal Studies, Provincetown, Massachusetts, Alaska Department of Fish and Game (ADFG), Anchorage, Alaska, the Alaska Beluga Whale Committee (ABWC), and the North Slope Borough (NSB), Barrow, Alaska, and the National Museum of Natural History (NMNH), Smithsonian Institution, Washington, DC. The following information was compiled in consultation with the above agencies.

**USA Atlantic and Gulf of Mexico Waters**

**1. Species and stocks studied**

Common name	Scientific name	Area/stock(s)	Items referred to
Atlantic spotted dolphin	<i>Stenella frontalis</i>	North Atlantic	2.1, 4.1, 11.1
Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	Western N. Atlantic	2.1.2, 4.2, 4.3
Beaked whale	<i>Ziphiidae spp.</i>	Western N. Atlantic	2.1.2
Beluga whale	<i>Delphinapterius leucas</i>	Western N. Atlantic	4.3
Blue whale	<i>Balaenoptera musculus</i>	Western N. Atlantic	2.1, 2.1.2
Bottlenose dolphin	<i>Tursiops truncatus</i>	Western N. Atl. Coastal and Offshore, Gulf of Mexico	2.1, 2.1.2, 3.1.1, 3.1.3, 4.1, 4.3, 7.1, 9, 11.1, 11.2
Bryde's whale	<i>Balaenoptera edeni</i>	Gulf of Mexico	2.1, 3.1.1, 4.1
Clymene dolphin	<i>Stenella clymeme</i>	Gulf of Mexico	2.1, 2.1.2, 4.1
Common dolphin	<i>Delphinus delphis</i>	Western N. Atlantic	2.1, 4.1, 4.2, 4.3, 7.1
Fin whale	<i>Balaenopter. physalus</i>	Western N. Atlantic	2.1.2, 3.1.1, 4.1, 4.3, 6.2, 6.2.1, 6.2.3
Harbor porpoise	<i>Phocoena phocoena</i>	Western N. Atlantic	2.1.2, 2.2, 4.2, 4.3, 7.1
Humpback whale	<i>Megaptera novaeangliae</i>	Gulf of Maine	2.1, 2.1.2, 4.1, 4.3, 6.2, 6.2.1, 6.2.2, 6.3.3, 11.1
Killer whale	<i>Orcinus orca</i>	Gulf of Mexico	2.1, 3.1.1, 4.1
Melon Headed whale	<i>Peponocephala electra</i>	Western N. Atlantic	4.3
Minke whale	<i>Balaenoptera acutorostrata</i>	Western N. Atlantic	2.1.2, 4.3, 6.2, 6.2.1, 6.2.3
Pantropical spotted dolphin	<i>Stenella attenuata</i>	Gulf of Mexico	2.1, 4.1
Pilot whale	<i>Globicephala melas and G. macrorhynchus</i>	W. N. Atlantic, Gulf of Mexico	2.1, 3.1.1, 4.1, 4.3, 7.1
Pygmy Sperm Whale	<i>Kogia breviceps</i>	Western N. Atlantic	4.3, 11.1
No. Right whale	<i>Eubalaena glacialis</i>	Western N. Atlantic	2.1, 2.1.2, 3.1.1, 3.2, 4.1, 4.3, 6.2.1, 6.2.2, 6.2.3, 11.1
Risso's dolphin	<i>Grampus griseus</i>	Western N. Atlantic, Gulf of Mexico	2.1, 2.1.2, 4.3, 7.1
Sei whale	<i>Balaenopterra borealis</i>		2.1.2, 3.1.1, 4.1
Sperm whale	<i>Physeter macrocephalus</i>	North Atlantic	2.1, 2.1.2, 3.1.1, 4.1, 4.3, 6.2.1, 9, 11.1
Spinner dolphin	<i>Stenella longirostris</i>	Gulf of Mexico	2.1, 4.1
Striped dolphin	<i>Stenella coeruleoalba</i>	Gulf of Mexico	2.1, 4.3
White-beaked dolphin	<i>Lagenorhynchus albirostris</i>		4.3

## **2. Sightings data**

### *2.1 Field work*

#### **2.1.1 SYSTEMATIC**

### **Shipboard Surveys**

#### **NEFSC**

##### *NOAA R/V ALBATROSS IV, 26 APRIL – 21 MAY 2004. NORTHERN RIGHT WHALE AND PELAGIC CETACEAN BIOLOGY*

The primary objectives of the cruise were to conduct marine mammal observations from the near-shore waters of Cape Cod to throughout the Great South Channel (GSC) Right Whale Critical Habitat area. Specific goals included: (1) photographing and biopsy sampling of large cetaceans (North Atlantic right whales, sei and humpback whales) for individual identification; (2) running transect lines to determine cetacean distribution; (3) attaching time-depth-recorder (TDR) tags on right whales; (4) providing support for the Right Whale Sighting Advisory System (SAS); (5) conducting oceanographic CTD/OPC stations throughout the GSC Right Whale Critical Habitat area; and (6) deploying and retrieving acoustic pop-up buoys in the GSC. The southern border of the study area included the Great South Channel, which is also the southern most portion of the Great South Channel Right Whale Critical Habitat area. The northern border included the waters surrounding the northeast portion of Cape Cod, (Provincetown, Massachusetts) and northernmost portion of the Great South Channel. (Contact: F. Wenzel, NEFSC)

##### *R/V ENDEAVOR, 23 JUNE – 04 AUGUST 2004. MID – ATLANTIC MARINE MAMMAL SHIPBOARD ABUNDANCE SURVEY.*

The survey included the waters from the 100 m contour to the Gulf Stream from Virginia to Cape Cod. The primary objectives of the cruise were to (1) determine the special distribution of cetaceans and turtles in the study region, (2) determine the distribution and relative abundance of sea birds in the same region, and (3) use passive acoustics to record vocalizing cetaceans that will hopefully be used to improve the abundance estimates derived from vessel surveys. A secondary objective was to compare the distribution of these species with each other, physical characteristics, such as water depth and temperature, and biological characteristics, such as relative plankton distribution. (Contact: D. Palka, NEFSC)

##### *NOAA R/V DELAWARE II, 06 – 23 July 2004. PILOT WHALE BIOPSY RESEARCH CRUISE*

The principal objective of this cruise was to biopsy and photograph pilot whales (*Globicephala* spp.) distributed from the southern extreme of Georges Bank to Cape Hatteras North Carolina. Collected tissues were to be used to distinguish between and determine distribution and geographic overlap of long-finned (*Globicephala melas*) and short-finned pilot whales (*G. macrorhynchus*) during the time of year used to conduct a pelagic cetacean assessment cruise (line-transect population size estimation cruise). A secondary objective was to collect biopsy samples of other odontocetes for which additional stock identification data would be useful [e.g. sperm whales (*Physeter catodon*) and striped dolphins (*Stenella* spp.)]. (Contact: R. Pace, NEFSC)

##### *NOAA R/V DELAWARE II, 26 JULY – 19 AUGUST 2004. LARGE WHALE SURVEY*

The principal objective of this survey was to obtain skin samples of humpback whales (*Megaptera novaeangliae*) on the southern flank of Georges Bank, the Northeast Peak, and the Scotian Shelf for genetic analyses of their population structure. In addition, any humpback whales, right whales (*Eubalaena glacialis*) or blue whales (*Balaenoptera musculus*) encountered were photographed for individual identification. The survey area included the waters from Georges Bank to the Laurentian Channel. Survey track lines were laid out to maximize the likelihood of encountering humpbacks, and were primarily directed over areas that had relatively high encounter rates on past surveys. Track lines were typically surveyed at 10 knots, however, on occasion slower speeds were used in marginal sighting conditions. (Contact: T. Cole, NEFSC)

##### *NOAA R/V GORDON GUNTER, 14 JANUARY – 17 MARCH 2005.*

##### *MONAH PROJECT HUMPBACK WHALE SURVEY, SILVER BANK*

A joint NEFSC and SEFSC survey of Silver Bank, Dominican Republic was part of an assessment of North Atlantic humpback whales. The principal objectives were to obtain skin biopsies as well as tail fluke photographs of as many humpback whales as possible for the purposes of identification, estimation of abundance, and refining existing knowledge of population structure and migratory timing. (Contact: R. Pace, NEFSC)

#### **SEFSC**

##### *NOAA R/V GORDON GUNTER, 14 APRIL – 11 JUNE 2004. GULF OF MEXICO ABUNDANCE SURVEY*

From 14 April to 11 June, 2004, a vessel based line-transect survey was conducted in the Gulf of Mexico aboard the R/V *Gordon Gunter*. Systematic line transects covered the entire U.S. EEZ within the Gulf of Mexico in

oceanic waters greater than 200m depth. The primary objectives were abundance estimation and distribution of cetaceans in the oceanic northern Gulf of Mexico. In addition, upon encountering sperm whale groups, 90-minute counts were conducted to improve estimates of group size by allowing observation of animals that were under water during the initial sighting period. At least 15 cetacean species were observed, including numerous sightings of pantropical spotted dolphins, *Stenella attenuata*, sperm whales, *Physeter macrocephalus*, bottlenose dolphins, *Tursiops truncatus*, Risso's dolphins, *Grampus griseus*, striped dolphins, *Stenella coeruleoalba*, spinner dolphins, *S. longirostris*, and Clymene dolphins, *S. clymene*. Other sightings of note included several groups of killer whales, *Orcinus orca*, and Bryde's whales, *Balaenoptera edeni*. Biopsy samples were collected from delphinids at the vessel's bow, and a small boat was occasionally deployed to collect samples from sperm whales, Bryde's whales, killer whales, and pilot whales, *Globicephala macrorhynchus*. In total, 70 samples were collected from nine different species. Photographs of sperm whale flukes and dorsal fins of Bryde's whales, killer whales, and short-finned pilot whales were also collected. In addition, a hydroacoustic array was towed behind the vessel throughout the survey to detect marine mammals and record vocalizations. (Contact, K. Mullin, SEFSC)

#### **NOAA R/V GORDON GUNTER, 22 JUNE – 19 AUGUST 2004. SOUTHERN ATLANTIC ABUNDANCE SURVEY**

From 22 June to 19 August 2004, a vessel based line-transect survey of continental shelf and slope waters (>50 m to U.S. EEZ) of the southeastern U.S. Atlantic Ocean from northern Florida to the Maryland/Delaware border was conducted aboard the R/V *Gordon Gunter*. The primary objectives were abundance estimation and distribution of cetaceans with an emphasis on pilot whales. A visual line transect survey approach was used employing two independent sighting teams to provide estimates of visibility bias. In addition, an acoustic line-transect survey was also conducted using a towed hydrophone array. At least 15 cetacean genera/species were sighted during the survey. Sperm whales (*Physeter macrocephalus*) were sighted with greatest frequency (n = 104), followed by bottlenose dolphins (n = 101), and pilot whales (n = 61). Cetaceans were encountered throughout the survey area but sightings were most frequent in waters North of Cape Hatteras, North Carolina, and along the shelf break. Biopsy samples were collected from delphinids at the vessel's bow, and a small boat was occasionally deployed to collect samples from pilot whales. A total of 45 biopsy samples was collected from five species.

(Contact: L. Garrison, SEFSC)

#### **Aerial Surveys**

##### **NEFSC**

#### **NOAA TWIN OTTER RIGHT WHALE SIGHTING SURVEYS**

The North Atlantic Right Whale Sightings Survey (NARWSS) is an ongoing NOAA Fisheries program dedicated to locating and recording the seasonal distribution of right whales off the northeastern United States. There were three primary types of surveys flown: broadscale surveys, focused surveys in the Great South Channel region, and focused surveys over potential and realized Dynamic Area Management closure zones. Photographs are catalogued and archived at the New England Aquarium. (Contact: T. Cole, NESFC)

#### **NOAA TWIN OTTER AIRCRAFT CIRCLE-BACK ABUNDANCE SURVEY**

The survey was conducted on the NOAA DeHavilland Twin Otter DHC-6, Series 300 aircraft (N57 RF) from 12 June to 12 July 2004. The study area extended between the state border between Virginia and North Carolina (36°N) to the Bay of Fundy (45°N) and from the US Atlantic shoreline to the entrance of the Gulf of St. Lawrence. (58°W). The objective of this survey was to describe the habitat of and estimate the abundance of cetaceans and turtles that are in the study area. Over 1300 animals were seen, in 297 groups. The additional number of groups seen in circle-back was 30. (Contact: D. Palka, NEFSC)

##### **SEFSC**

#### **NOAA TWIN OTTER SUMMER COASTAL BOTTLENOSE DOLPHIN SURVEY**

An aerial survey was conducted in continental shelf waters of the US coast between central Florida and New Jersey during 15 July - 31 August 2004 to assess distribution and abundance of coastal bottlenose dolphins. A modified DeHavilland DHC-6 Twin Otter was used to conduct the line-transect surveys. A total of 7,300 km of survey effort was completed in waters between 0-40m depth. The primary species sighted included bottlenose dolphins (n=160 sightings) and Atlantic spotted dolphin, *Stenella frontalis*, n = 36). There were also several sightings of unspecific stenellid species. (Contact L. Garrison, SEFSC)

#### **NOAA TWIN OTTER WINTER COASTAL BOTTLENOSE DOLPHIN SURVEY**

An aerial survey was conducted in continental shelf waters of the US Atlantic coast from central Florida to Chesapeake Bay during 27 January - 6 March 2005 to assess distribution and abundance of bottlenose dolphins.

A modified DeHavilland DHC-6 Twin Otter was used to conduct the line-transect surveys. The primary species sighted include bottlenose dolphins and Atlantic spotted dolphins. In addition, there were several sightings of North Atlantic right whales (*Eubalaena glacialis*) off the coast of northern Florida and in North Carolina, and numerous sightings of large groups of common dolphins, *Delphinus delphis*, near the continental shelf break off of North Carolina. (Contact L. Garrison, SEFSC)

### 2.1.2 OPPORTUNISTIC, PLATFORMS OF OPPORTUNITY

The following U.S. organizations responded to a request for information on their use of platforms of opportunity to collect data on cetaceans in 2003. Data for institutions noted with an asterisk were obtained from Palazzo 2003 (SC/55/WW6).

<i>NORTH ATLANTIC</i>						
Institution	US region	Species*	Platform type	Data type**	Collected by	Regional Archive***
Allied Whale, College of the Atlantic, ME	NE	AB	Whale watch	1,2,3,4	Naturalist, dedicated observer	Yes
Blue Ocean Society, NH	NE	ABCDGHI	Whale watch	1,3,4	Naturalist	Yes
Center for Oceanic Research and Education, MA	NE	ABCGIJK	Whale watch	1,2,3,4	Naturalist, dedicated observer	Yes
Coastal Research & Education Society of Long Island, NJ	NE	ABCGOIMP	Whale watch	1,3,4,5	Naturalist, trained volunteers	---
New England Aquarium, MA	NE	ABCDFGHI	Whale watch	1,2,3,4,5,7	Naturalist, interns	Yes
Plymouth Marine Mammal Research Center, MA	NE	ABCEFGHI	Whale watch	1,3,4,5	Naturalist	Yes
Provincetown Center for Coastal Studies, MA	NE	ABCDFGHIP	Whale watch	1,2,3,4,5,7	Naturalist, dedicated observer	Yes
Whale Center of New England, MA	NE	ABCDFGHIP	Whale watch, ferry	1,2,3,4,5,7	Naturalist, dedicated observer	Yes
<p>*<b>Species codes:</b> A) <i>Megaptera novaeangliae</i>, B) <i>Balaenoptera physalus</i>, C) <i>Balaenoptera acutorostris</i>, D) <i>Eubalaena glacialis</i>, E) <i>Balaenoptera musculus</i>, F) <i>Balaenoptera borealis</i>, G) <i>Lagenorhynchus acutus</i>, H) <i>Phocoena phocoena</i>, I) <i>Globicephala melas</i>, J) <i>Ziphiidae</i> spp. K) <i>Physeter macrocephalus</i>, L) <i>Stenella longirostris</i>, M) <i>Tursiops truncatus</i>, N) <i>Stenella attenuata</i>, O) <i>Delphinus delphis</i>, P) <i>Grampus griseus</i>, R) unspecified odontocete species</p> <p>**<b>Data types:</b> 1) cetacean sighting data, 2) survey effort data (varied from general location to logged positions), 3) animal behavior, 4), photo-ID (for at least one listed species), 5) management-oriented data (fisheries interactions, ship strike, harassment), 6) scat/prey collection, 7) environmental data</p> <p>--- Data not available</p> <p>***<b>Archives:</b> data for one or more listed species were contributed to a regional or oceanic archive. Responders reported contributing data to the following other institutions: North Atlantic: Allied Whale, New England Aquarium, Provincetown Center for Coastal Studies, Whale Center New England, North Pacific: Cascadia Research, Scripps Institute of Oceanography</p>						

## 2.2 Analyses/development of techniques

### NEFSC

The NEFSC aerial line transect abundance data collected during the summer of 2004 (see 2.1.1) are being analyzed using the Hiby circle-back method that allows the estimation of the probability of detecting a group on the trackline,  $g(0)$ . Due to sample sizes, estimates of  $g(0)$  are being developed for three species groups: harbor porpoises, dolphins, and whales. The shipboard line transect abundance data (see 2.1.1) also collected during the summer of 2004 are being analyzed to estimate  $g(0)$ , account for responsive movements, and incorporate covariates into the detection function, when appropriate.

### SEFSC

None reported.

## 3. Marking data

### 3.1 Field work

### 3.1.1 NATURAL MARKING DATA

#### NEFSC

Species	Feature	Area/stock	Calendar year/season no. photographed	Catalogued (Y/N)	Catalogue total	Contact person/institute
Humpback whale	animal	Gulf of Maine	2004/56	Y	NA	R. Pace/NEFSC
Sperm whale	animal	N. Atlantic	2004/1	Y	NA	T. Cole/NEFSC
Pilot whale	animal	W.N. Atlantic	2004/69	Y	NA	R. Pace/NEFSC
Right whale	animal	W.N. Atlantic	2004/210	Y	NA	T. Cole/NEFSC
Fin whale	animal	W.N. Atlantic	2004/1	Y	NA	T. Cole/NEFSC
Blue whale	animal	W.N. Atlantic	2004/1	Y	NA	T. Cole/NEFSC
Killer whale	animal	W.N. Atlantic	2004/5	Y	NA	T. Cole/NEFSC
Humpback whale	fluke	Caribbean	2004/524	Y	NA	R. Pace/NEFSC

#### SEFSC

Species	Feature	Area/stock	Calendar year/season no. photographed	Catalogued (Y/N)	Catalogue total	Contact person/institute
Bryde's whale	Dorsal fin	Gulf of Mexico	2004/2	Y	2	K. Mullin, SEFSC
Killer whale	Dorsal fin	Gulf of Mexico	2004/25	N	45	K. Mullin, SEFSC
Short-finned pilot whale	Dorsal fin	Gulf of Mexico	2004/60	N	NA	K. Mullin, SEFSC
Sperm Whale	Fluke	Gulf of Mexico	2004 / 14	N	145	K. Mullin, SEFSC
Bottlenose Dolphin	Dorsal Fin	Mississippi Sound, Gulf of Mexico	2004 / 181	Y	625	K. Mullin, SEFSC
Bottlenose Dolphin	Dorsal Fin	NW Atlantic	2004 / NA	Y	NA	A. Hohn, SEFSC

### 3.1.2. ARTIFICIAL MARKING DATA

None reported.

### 3.1.3 TELEMETRY DATA

#### NEFSC

None reported.

#### SEFSC

Species	Tag type	No. successfully deployed	Maximum time transmitting	Contact person/institute
Bottlenose Dolphin	Satellite	4	Not determined, still transmitting	A. Hohn, SEFSC

In November 2004, ten bottlenose dolphins were captured with a large-mesh gillnet in the coastal waters near Holden Beach, North Carolina. All the dolphins were released unharmed, and four were instrumented with a satellite-linked/VHF tag pinned to their dorsal fin for long-term tracking. As of March 2005, all tags were still functioning. (Contact, A. Hohn, SEFSC)

### 3.2 Analyses/development of techniques

Analysis of North Atlantic right whale survival was conducted using data from the Gulf of Maine that were collected through 2003.

## 4. Tissue/biological samples collected

### 4.1 Biopsy samples for Calendar Year 2004

#### NEFSC

Species	Area/stock	Calendar year/ season no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Humpback whale	Gulf of Maine	45	Y	0	147	F. Wenzel/NEFSC
Humpback whale	Caribbean	659	Y	0	0	F. Wenzel/NEFSC
Fin whale	W.N. Atlantic	1	Y	0	15	F. Wenzel/NEFSC
Sei whale	W.N. Atlantic	3	Y	0	4	F. Wenzel/NEFSC
Pilot Whale	W.N. Atlantic	62	Y	0	164	F. Wenzel/NEFSC
Sperm Whale	W.N. Atlantic	2	Y	0	3	F. Wenzel/NEFSC
Right Whale	W.N. Atlantic	1	Y	0	25	F. Wenzel/NEFSC

#### SEFSC

Species	Area/stock	Calendar year/ season no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Bryde's Whale	Gulf of Mexico	2	Y	0	NA	K. Mullin, SEFSC, P. Rosel, SEFSC
Sperm Whale	Gulf of Mexico	2	Y	0	NA	K. Mullin, SEFSC, P. Rosel, SEFSC
Killer Whale	Gulf of Mexico	2	Y	0	NA	K. Mullin, SEFSC, P. Rosel, SEFSC
Short-finned Pilot Whale	Gulf of Mexico	5	Y	0	NA	K. Mullin, SEFSC, P. Rosel, SEFSC
Unidentified Pilot Whale	North Atlantic	20	Y	0	NA	P. Rosel, SEFSC
Bottlenose Dolphin	North Atlantic	87	Y	0	NA	P. Rosel, SEFSC
Bottlenose Dolphin	Gulf of Mexico	27	Y	0	NA	K. Mullin, SEFSC, P. Rosel, SEFSC
Atlantic Spotted Dolphin	North Atlantic	2	Y	0	NA	P. Rosel, SEFSC
Atlantic Spotted Dolphin	Gulf of Mexico	1	Y	0	NA	P. Rosel, SEFSC
Pantropical Spotted Dolphin	North Atlantic	1	Y	0	NA	P. Rosel, SEFSC
Pantropical Spotted Dolphin	Gulf of Mexico	15	Y	0	NA	K. Mullin, SEFSC, P. Rosel, SEFSC
Spinner Dolphin	Gulf of Mexico	15	Y	0	NA	K. Mullin, SEFSC, P. Rosel, SEFSC
Clymene Dolphin	Gulf of Mexico	1	Y	0	NA	K. Mullin, SEFSC, P. Rosel, SEFSC
Common Dolphin	North Atlantic	3	Y	0	NA	P. Rosel, SEFSC

Biopsy numbers include spring 2004 Gulf of Mexico cruise, summer 2004 Atlantic cruise, and additional bottlenose dolphin samples collected in 2004 from Biscayne Bay, FL, North Carolina (Beaufort, Hatteras, and Cape Fear), Charleston, SC, and Brunswick, GA.

#### 4.2 Samples from directed catches or bycatches for Calendar Year 2002

##### NEFSC

Species	Area/stock	Calendar year/ season	Archive d (Y/N)	Tissue type(s)	Contact person/institute
Atlantic white-sided dolphin	W.N. Atlantic	3	Y	stomach	F. Wenzel/NEFSC
common dolphin	W.N. Atlantic	1	Y	blubber, DNA	F. Wenzel/NEFSC

harbor porpoise	W.N. Atlantic	5	Y	Blubber, finclip, DNA	F. Wenzel/NEFSC
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\*number of samples does not represent number of takes

## SEFSC

None reported.

### 4.3 Samples from stranded animals for Calendar Year 2004

#### NEFSC

Species	NW Atlantic	Mid-Atlantic	Archived (Y/N)	Tissue type(s)	Contact person/institute
Atlantic White-sided Dolphin	48	7	Y	*	D. Hartley, NER Stranding Network
Beluga Whale	1	0	Y	*	D. Hartley, NER Stranding Network
Bottlenose Dolphin	3	137	Y	*	D. Hartley, NER Stranding Network
Common Short-beaked Dolphin	29	40	Y	*	D. Hartley, NER Stranding Network
Fin Whale	3	3	Y	*	D. Hartley, NER Stranding Network
Harbor Porpoise	72	39	Y	*	D. Hartley, NER Stranding Network
Humpback Whale	7	2	Y	*	D. Hartley, NER Stranding Network
Pilot Whale (Long-finned)	6	3	Y	*	D. Hartley, NER Stranding Network
Melon Headed Whale	0	1	Y	*	D. Hartley, NER Stranding Network
Minke Whale	15	4	Y	*	D. Hartley, NER Stranding Network
Northern Right Whale	1	2	Y	*	D. Hartley, NER Stranding Network
Pygmy Sperm Whale	0	6	Y	*	D. Hartley, NER Stranding Network
Rissos Dolphin	8	7	Y	*	D. Hartley, NER Stranding Network
Sperm Whale	1	0	Y	*	D. Hartley, NER Stranding Network
Striped Dolphin	3	1	Y	*	D. Hartley, NER Stranding Network
Unidentified Balaenopterid	4	0	Y	*	D. Hartley, NER Stranding Network
Unidentified Whale	10	0	Y	*	D. Hartley, NER Stranding Network
Unidentified Dolphin/Porpoise	1	12	Y	*	D. Hartley, NER Stranding Network
Unidentified Pilot Whale	0	1	Y	*	D. Hartley, NER Stranding Network
Unidentified Toothed Whale	0	2	Y	*	D. Hartley, NER Stranding Network
White-beaked Dolphin	1	0	Y	*	D. Hartley, NER Stranding Network

\*Samples include some or all of the following: hard parts (i.e. teeth, jaw, skull, baleen, entire skeleton, etc) and/or soft parts (i.e. skin, gonads, muscle, blubber, blood, organs, etc).

Data are entered as represented by the NOAA Fisheries NER Stranding Network and have not been formally reviewed by NOAA Fisheries.

## SEFSC

None reported.

### 4.4 Analyses/development of techniques

None reported.

## 5. Pollution studies

None reported.

## 6. Statistics for large cetaceans

**Note: Some animals appear in more than one table below.**

### 6.1 Direct catches (commercial, aboriginal and scientific permits) for the calendar year 2004.

None reported.

### 6.2 Other non-natural mortality for the calendar year 2002

Species	Area/stock	Male	Females	Total	Cause	Methodology
Northern right	Eastern USA		1	1	ship strike	*Review of NMFS records
Northern right	Eastern USA		1	1	entanglement	*Review of NMFS records
Humpback	North Atlantic	1	1	2	ship strike	*Review of NMFS records
Humpback	North Atlantic	1	1	3	entanglement	*Review of NMFS records
Fin whale	Western N. Atlantic	?	?	1	entanglement	*Review of NMFS records
Minke whale	Western N. Atlantic		2	2	entanglement	*Review of NMFS records

\* Subsequent review of NMFS/NER stranding records found sufficient information to confirm the cause of death as collision with vessel or fishery interaction/entanglement.

6.2.1 Strandings or dead whales encountered at sea – Calendar year 2002

Whale species	Sex	Location	Cause of death	Det.	Source or contact institution, contact name and telephone and/or e-mail
A. right whale	F	Beach on Nantucket Is.	Entanglement	NA	NOAA/NEFSC Woods Hole, MA Tim Cole <a href="mailto:tcole@whsun1.wh.who.edu">tcole@whsun1.wh.who.edu</a>
B. right whale	F	Off Ocean City, MD	Ship Strike	NA	See above
C. humpback whale	F	Off Cape Henry, VA	Ship Strike	NA	See above
D. humpback whale	M	Off Virginia Beach, VA	Entanglement	NA	See above
E. humpback whale	U	Off Cape Elizabeth, ME	Entanglement	NA	See above
F. humpback whale	M	Long Island, NY	Ship Strike	NA	See above
G. humpback whale	F	Plymouth, MA	Entanglement	NA	See above
Four sperm whales		Massachusetts (1), Florida (2), South Carolina (1)	Stranded - no sign of human interaction	U	See above
minke whale	F	Bar Harbor, ME	Entanglement	NA	See above
minke whale	F	Gloucester, MA	Entanglement	NA	See above
fin whale	U	Georges Bank	Entanglement	NA	See above
Comments: A. Caudal peduncle severely lacerated where entangled. B. Large laceration on dorsal surface. C. Three large lacerations, hemorrhaging, broken bones. D. Deep cuts on caudal peduncle and tail indicative of embedded line. E. Deep cuts on caudal peduncle indicative of embedded line. F. Large hematoma posterior to blow holes. G. Extensive bruising, wrapped in lobster warp.					

6.2.2 Observed or reported Ship strikes– Calendar year 2002

Whale species	Sex	Date	Location	Vessel type	Speed	Fate	Source or contact
Humpback whale	F	Feb 8, 2002	Off Cape Henry, VA	NA	NA	D	NOAA/NEFSC Woods Hole, MA Tim Cole
Humpback whale	M	Oct 1, 2002	Plymouth, MA	NA	NA	D	See above
Right whale	F	Aug 22, 2002	Off Ocean City, MD	NA	NA	D	See above

6.2.3 Fishery bycatch – Calendar year 2002

Whale species	Sex	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Right whale	M	Feb 12, 2002	Off Amelia Island, FL	SI	NA	NA	DA	NOAA/NEFSC Woods Hole, MA Tim Cole <a href="mailto:tcole@whsun1.wh.who.edu">tcole@whsun1.wh.who.edu</a>
Right whale	U	April 7, 2002	Off Cape Fear, NC	SI	NA	NA	DA	See above
Right whale	F	July 6, 2002	Off Briar Island, NS Canada	D	NA	NA	DA	See above



Right whale	F	July 12, 2002	Off Long Beach Island, NJ	SI	NA	NA	DA	See above
Right whale	F	Aug 4, 2002	Bay of Fundy, Canada	SI	NA	NA	DA	See above
Right whale	F	Aug 22, 2002	Scotian Shelf, Canada	SI	NA	NA	DA	See above
Humpback whale	M	Mar 24, 2002	Off Virginia Beach, VA	D	NA	NA	DA	See above
Humpback whale	?	June 3, 2002	Off Cape Elizabeth, ME	D	NA	NA	DA	See above
Humpback whale	?	June 17, 2002	Cape Cod Bay, MA	SI	NA	NA	DA	See above
Humpback whale	F	Oct 1, 2002	Plymouth, MA	D	lobster	8	DA	See above
Fin whale	?	July 28, 2002	Georges Bank	D	NA	NA	DA	See above
Minke whale	F	July 17, 2002	Bar Harbor, ME 44°18.22'N, 68°7'43'W	D	NA	NA	DA	See above
Minke whale	F	Oct 15, 2002	Gloucester, MA 42°36'N, 70°39'W	D	NA	NA	DA	See above

### 6.3 Earlier years' statistics

None reported.

## 7. Statistics for small cetaceans

### 7.1 For the calendar year 2002

#### NEFSC

Species	Area/stock	Directed catch		Incidental mortality			Live-capture
		Reported	Est. total	Reported	Est. total	Source	Reported
Bottlenose dolphin	Coastal stock	0	0	2	69	Coastal gillnet	0
				1	7	S. Atlantic shark gillnet	
Common dolphin	NW and mid-Atlantic	0	0	1	NA	North Atlantic Bottom Trawl	0
Harbor porpoise	Gulf of Maine/ Bay of Fundy and Mid-Atlantic	0	0	10	444	Northeast sink gillnet	0
				Yes*	39 <sup>1</sup>	Mid-Atlantic coastal gillnet	
Pilot whale	NW and mid-Atlantic	0	0	NA	NA	Ilex squid trawl	0
White-sided dolphin	NW Atlantic	0	0	1	30	Northeast sink gillnet	0
				1	TBD	North Atlantic Bottom Trawl	

\*2002 data not available

<sup>1</sup> 5 year average reported.

## SEFSC

Species	Area/stock	Directed catch		Incidental mortality			Live-capture
		Reported	Est. total	Reported	Est. total	Source*	Reported
Common Dolphin	Atlantic	0	0	0	0	Pelagic Longline <sup>1</sup>	1
Rissos Dolphin	Atlantic	0	0	4	28	Pelagic Longline <sup>1</sup>	6
Pilot Whale	Atlantic	0	0	4	54	Pelagic Longline <sup>1</sup>	6
Bottlenose Dolphin	Atlantic	0	0	1	7	Shark Drift Gillnet <sup>2</sup>	0

\*e.g. fishery type

Note: Mortality for pelagic longline includes serious injury.

<sup>1</sup>Garrison, L.P. 2003. Estimated Bycatch of Marine Mammals and Turtles in the U.S. Atlantic Pelagic Longline Fleet During 2001-2002. NOAA Technical Memorandum NOAA FISHERIES-SEFSC-515, 52 p.

<sup>2</sup>Garrison, L.P. 2003. Protected species interactions with the directed shark gillnet fishery of Florida and Georgia from 1999-2002. Available from: National Marine Fisheries Service, Southeast Fisheries Science Center, 75 Virginia Beach Dr., Miami, FL 33149

## 7.2 Earlier years' statistics

None reported.

## 8. Strandings

Dana Hartley, Northeast Region Stranding Network, NEFS Regional Office, Gloucester, MA (978)-281-9328 x 6514

## 9. Other studies and analyses

### NEFSC

#### *East Coast Lightship Meteorological Data*

This ongoing project was funded in 2001 as a component of the History of Marine Animal Populations (HMAP) project under the Census of Marine Life. Atmospheric and oceanographic data collected at lightships along the east coast is being rescued, converted into standard units of measurement, and archived. The data will be used in determining past environmental conditions to better interpret historic records of marine mammal and fish populations (Contact: T. Smith NEFSC).

#### *Sperm Whale Catch History*

This ongoing research program is designed to provide annual regional estimates of catches of sperm whales by all fisheries from the mid-18<sup>th</sup> century to the early 20<sup>th</sup> century. This program makes use of voyage logbooks to determine the changing spatial distribution of sperm whaling over time, as well as oil yields per whale caught and numbers of sighted vessels. The voyage database will be augmented with information from a sample of logbooks, and information on numbers and distribution of sperm whale catches for those voyages are planned to be used to estimate regional annual catches (Contact T. Smith and E. Josephson, NEFSC).

### SEFSC

#### *Gulf of Mexico Bottlenose Dolphin Photo-ID Survey*

A photo-identification study of bottlenose dolphins in Mississippi Sound (north-central Gulf of Mexico) was conducted. Mississippi Sound is a 1600 km<sup>2</sup> marine area with as many as 2000 bottlenose dolphins. These photo-identification surveys built on previous photo-ID work but focused on three small discreet habitat areas to test hypotheses about ranging patterns and site-fidelity of dolphins. The results of this work are part of an overall study of bottlenose dolphin stock structure in inshore waters of the Gulf of Mexico. In 2004 systematic surveys were conducted from a 7-m boat in each area on 16 survey days and dolphin groups were photographed. There were 181 individual dolphins added to the catalog in 2004, bringing the catalog total for this study to 378 dolphins. Dolphins photographed from this study are currently being compared to a master catalog from Mississippi Sound (started in 1995) which contains over 800 individual dolphins. (Contact: K. Mullin, SEFSC).

#### *Gulf of Mexico Sperm Whale Photo-ID Survey*

Sperm whale photo-identification studies were continued in a 53,000 km<sup>2</sup> region south of the Mississippi River

delta in the north-central Gulf of Mexico. The objectives of this ongoing study are to collect photo-identification data to test hypotheses concerning the site-fidelity and association patterns of sperm whales. Surveys were conducted from an 18-m vessel during April and September 2004. Systematic surveys were conducted in a zig-zag pattern along the 1000-m isobath for 3 to 5 days each month. A two-element passive acoustic array was used to track and locate sperm whales for photo-identification. (Contact: K. Mullin, SEFSC).

#### *North Atlantic Bottlenose Dolphin Biopsy Survey*

Stock structure of nearshore bottlenose dolphins: Skin and blubber biopsy samples, for genetic, stable isotope, and contaminant analyses, were collected from small boats in coastal waters during 2004. All samples were collected using either a modified dart gun or a crossbow with a specially designed sampling head. Samples were collected in; coastal waters along Beaufort, Hatteras, and Cape Fear, NC; Jekyll Island, GA; and Charleston, SC; and estuarine waters in Charleston, SC; Brunswick and Jekyll Island, GA; and Biscayne Bay, FL. (Contact: A. Hohn, SEFSC)

#### *North Atlantic Bottlenose Dolphin Photo-Id Study*

In 2004 the SEFSC conducted photo-ID studies of bottlenose dolphins from small boats in coastal waters in the vicinity of: Beaufort, NC; Charleston County, SC; Brunswick, GA; Biscayne Bay, FL; and southwest Puerto Rico. Dorsal fin and fluke photographs are being collected to identify individuals and examine parameters such as residency, movement patterns, abundance, habitat use, and reproductive seasonality. (Contact A. Hohn, L. Garrison, SEFSC)

## **10. Literature cited**

Garrison, L.P. 2003. Estimated Bycatch of Marine Mammals and Turtles in the U.S. Atlantic Pelagic Longline Fleet During 2001-2002. NOAA Technical Memorandum NOAA FISHERIES-SEFSC-515, 52 p.

Garrison, L.P. 2003. Protected species interactions with the directed shark gillnet fishery of Florida and Georgia from 1999-2002. Available from: National Marine Fisheries Service, Southeast Fisheries Science Center, 75 Virginia Beach Dr., Miami, FL 33149

Palazzo, 2003. A Worldwide Directory of Whale Watching Research (SC/55/WW6).

Waring et al. 2004. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2004 NOAA, NMFS. (in review)

## **11. Publications**

### *11.1 Published or 'In Press' papers only*

#### **NEFSC**

Palka, D. 2005. Aerial surveys in the Northwest Atlantic: Estimation of  $g(0)$ . pg 12-17. in Proceedings of the Workshop on estimation of  $g(0)$  in line-transect surveys of cetaceans. Editors: F. Thomsen, F. Ugarte and P. Evans. ECS Newsletter No. 44 - Special Issue.

Palka, D. 2005. Shipboard surveys in the Northwest Atlantic: Estimation of  $g(0)$ . pg 32-35. in Proceedings of the Workshop on estimation of  $g(0)$  in line-transect surveys of cetaceans. Editors: F. Thomsen, F. Ugarte and P. Evans. ECS Newsletter No. 44 - Special Issue.

Reeves, R.R., T.D. Smith, E. Josephson, P. Clapham and G. Woolmer. 2004. Historical observations of humpback and blue whales in the North Atlantic Ocean: clues to migratory routes and possibly additional feeding grounds. *Marine Mammal Science* 20(4):774-786.

Reeves, R.R., E. Josephson and T.D. Smith. 2004. Putative historical occurrence of North Atlantic right whales in mid-latitude offshore waters: 'Maury's Smear' is likely apocryphal. *Marine Ecology Progress Series* 282:295-305.

## **SEFSC Publications and Presentations**

### *Publications and Reports*

- Biggs, D. C., A. E. Jochens, M. K. Howard, S. F. DiMarco, K. D. Mullin, R. R. Leben, F. E. Muller-Karger and C. Hu. In press. Eddy forced variations in on-margin and off-margin summertime circulation along the 1000 m isobath of the northern Gulf of Mexico, 2000-2003. *In: New Developments in Ocean Circulation of the Gulf of Mexico*. AGU (American Geophysical Union) Books.
- Garrison, L. P. and P. M. Richards. 2004. Estimated bycatch of marine mammals and turtles in the U.S. pelagic longline fleet during 2003. NOAA Technical Memorandum NMFS-SEFSC-527. 57 pp.
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- Garrison, L. P. 2004. Preliminary estimates of protected species bycatch rates in the U.S. Atlantic pelagic longline fishery between 1 July and 30 September, 2004. Southeast Fisheries Science Center PRD Contribution #PRD-04/05-02. 16pp.
- Griffin, R. B. and N. J. Griffin. 2004. Temporal variation in Atlantic spotted dolphin (*Stenella frontalis*) and bottlenose dolphin (*Tursiops truncatus*) densities on the west Florida continental shelf. *Aquatic Mammals* 30:380-390.
- Harms, C.A., R. Lo Piccolo, D.S. Rotstein, A. A. Hohn. 2004. Struvite penile urethrolithiasis in a pygmy sperm whale, *Kogia breviceps*. *J. Wildlife Diseases* 40(3):588-593
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- Miller, P. J. O., M. P. Johnson, P. L. Tyack and E. A. Terray. 2004. Swimming gaits, passive drag and buoyancy of diving sperm whales, *Physeter macrocephalus*. *The Journal of Experimental Biology* 207:1953-1967.
- Miller, P. J. O., M. P. Johnson and P. L. Tyack. 2004. Sperm whale behavior indicates the use of echolocation click buzzes 'creaks' in prey capture. *Proceedings of the Royal Society of London B* 271:2239-2247.
- Mullin, K. D. and G. L. Fulling. 2004. Abundance of cetaceans in the oceanic northern Gulf of Mexico, 1996-2001. *Marine Mammal Science* 20(4):787-807.
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- Wells, R. S., H. L. Rhinehart, L. J. Hansen, J. C. Sweeney, F. I. Townsend, R. Stone, D. R. Casper, M. D. Scott, A. A. Hohn, and T. K. Rowles. 2004. Bottlenose dolphins as marine ecosystem sentinels: developing a health monitoring system. *EcoHealth* 1(3): 246-255.

## 11.2 Unpublished literature

### Presentations

- Barry, C. S., M. Cope Mattson, K. Maze-Foley and K. D. Mullin. 2004. Site fidelity of bottlenose dolphins in Mississippi Sound. Fourth Annual Southeast and Mid-Atlantic Marine Mammal Symposium. 26-29 March 2004. Fort Pierce, FL.

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- Windham-Reid, A. 2004. 2003-2004 FWC North Atlantic Right Whale Aerial Survey Results. Southeast North Atlantic right whale implementation team meeting. 4 May 2004.
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## USA Pacific Waters

### 1. Species and stocks studied

Common name	Scientific name	Area/stock(s)	Items referred to
Atlantic whitesided dolphin	<i>Lagenorhynchus acutus</i>	Western North Atlantic	5
Baird's beaked whale	<i>Berardius bairdii</i>	West Coast USA	2.1, 4.1
Beluga	<i>Delphinapterus leucas</i>	Cook Inlet, Alaska; Beaufort Sea	2.1.1, 3.1.1, 4.1, 7.1, 9
Blue whale	<i>Balaenoptera musculus</i>	West Coast, USA	2.1, 4.1, 6.2.1
Bowhead	<i>Balaena mysticetus</i>	Bering-Chukchi-Beaufort	2.1.1, 4.2, 5, 9
Common bottlenose dolphin	<i>Tursiops truncatus</i>	West Coast USA	2.1.1, 4.3
Cuvier's Beaked whale	<i>Ziphius cavirostris</i>	West Coast USA	2.1, 4.1, 6.2.1
Dall's porpoise	<i>Phocoenoides dalli</i>	Bering Sea	2.1.1, 4.1, 4.3, 7.1
Fin whale	<i>Balaenoptera physalus</i>	Bering Sea	2.1, 4.1
Gray whale	<i>Eschrichtius robustus</i>	E North Pacific	2.1.1, 4.1, 4.2, 4.3, 6.2.1
Harbour porpoise	<i>Phocoena phocoena</i>	Bering Sea	2.1.1
Humpback whale	<i>Megaptera novaeangliae</i>	Southeast Alaska	2.1.1, 4.1, 6.2.3
Humpback whale	<i>Megaptera novaeangliae</i>	Eastern North Pacific	2.1.2, 4.1, 4.2
Killer whale	<i>Orcinus orca</i>	Southeast Alaska	2.1.1, 3.1.1, 4.1, 7.1
Killer whale	<i>Orcinus orca</i>	Western North Pacific	4.1
Killer whale	<i>Orcinus orca</i>	Tropical Pacific	4.1, 4.3
Killer whale	<i>Orcinus orca</i>	Eastern North Pacific (Alaska, California Current)	2.1.2, 3.1, 4.1, 5, 9
Long-beaked common dolphin	<i>Delphinus capensis</i>	West Coast USA	4.2, 4.3, 6.2.3, 7.1
Minke whale	<i>Balaenoptera acutorostrata</i>	Bering Sea	2.1.1
North Pacific right whale	<i>Eubalaena japonica</i>	E. North Pacific	2.1.3.1.3, 4.1, 9
Northern right whale	<i>Eubalaena glacialis</i>	SE Bering Sea	4.1
Northern Right whale dolphin	<i>Lissodelphis borealis</i>	West Coast USA	4.2, 6.2.3, 7.1
Short-beaked common dolphin	<i>Delphinus delphis</i>	West Coast USA	4.2, 4.3, 6.2.3, 7.1
Sperm whale	<i>Physeter macrocephalus</i>	Western North Pacific	2.1, 2.1.2, 4.1
Spinner Dolphin	<i>Stenella longirostris</i>	Tropical Pacific	2.1.2
Pacific white-sided dolphin	<i>Lagenorhynchus obliquidens</i>	Bering Sea, West Coast USA	2.1.1, 4.1, 4.3
Pantropical spotted dolphin	<i>Stenella attenuata</i>	Gulf of Mexico	2.1.2
Unknown large whale	<i>Balaenoptera sp.</i>	West Coast USA	2.1, 4.1

### 2. Sightings data

#### 2.1 Field work

##### 2.1.1 SYSTEMATIC

##### AFSC

##### *Aerial Surveys of Beluga Whales in Cook Inlet, Alaska*

The National Marine Fisheries Service (NMFS) conducted an aerial survey of the beluga population in Cook Inlet, Alaska, during 2-9 June 2004. The 45 hr survey was flown in a manner consistent with NMFS' surveys conducted each year since 1993 (Rugh *et al.*, 2000; 2005). The flights included one or more surveys of coastal areas (flown 1.4 km offshore) around the entire Inlet and 1,653 km of transects across the Inlet, effectively searching 31% of Cook Inlet but nearly 100% of the coastal areas. After finding beluga groups, a series of aerial passes were made with two pairs of primary observers each making four or more independent counts of each group. Whale distribution was highly stratified, with almost all sightings occurring near a few river mouths or along shallow mud flats. This sighting distribution has been consistent in June or July most years since 1996. The sum of the median aerial estimates (a very rough but quick index of relative abundance, not corrected for estimates of whales missed) for June 2004 is 187 belugas. This is below index counts for years prior to 1998 (302 in 1993, 276 in 1994, 322 in 1995, 287 in 1996 and 261 in 1997), but it is similar to counts made during the past six years (192 in 1998, 217 in 1999, 184 in 2000, 210 in 2001, 181 in 2002 and 174 in 2003; Rugh *et al.*, 2005). (Contact D. Rugh, AFSC).

### ***Gray Whale Surveys***

No shore-based counts or aerial surveys were conducted by NMML in 2004.

### ***Bowhead Whale Surveys***

No field work on bowhead whales was conducted by NMML in 2004. In April 2005, an aerial photographic survey of bowheads near St Lawrence Island was supported in part by NMML and in part by the North Slope Borough.

### ***Right Whale Satellite Tagging***

In August 2004, the Cetacean Assessment and Ecology Program (CAEP) at the National Marine Mammal Laboratory and the Greenland Institute for Natural Resources (GINR) initiated a North Pacific right whale tagging project. A charter vessel was used to conduct a 10 day survey in the Southeast Bering Sea where any right whale encountered would be satellite tagged, photographed for the identification catalogue, and biopsy sampled for genetic studies. Nine scientists participated in the survey, including a sighting team of six scientists using binoculars to visually scan for whales, two acoustic technicians using directional sonobuoys to listen for right whale calls, and a technician to deploy the satellite tags. On 10 August 2004, two North Pacific right whales were found at 57 44.7N, 164 53.9W after hearing calls over 50 miles away from a deployed sonobuoy. The ship approached the whales for some photographs, and then launched a 22-foot rigid-hulled inflatable skiff to deploy satellite tags. An Argos satellite-transmitter was attached to each whale. We obtained 56 positions from Argos over a 40 d period from 11 August to 19 September. Positions were only received from one tag (Tag 22850). Temperature data were received from both tags showing a decline in temperature over time indicating that the tags were migrating out of the blubber layer. It is not clear why the other tag (Tag 22849) failed. Transmissions ended after 51 d (both tags stopped transmitting temperature data on 1 October) when the tags either fell off the whales or suffered premature electronic failure. While acquiring the telemetry data, we were able to direct another team of scientists to the location of the tagged whale where they discovered the largest group of right whales since the 1960s (Shelden et al. in press). For 3 days (7-9 September), the research team on the NOAA *RV MacArthur II* photographed and biopsy sampled right whales, many of which were observed in close proximity to other whale species such as humpback whales (*Megaptera novaeangliae*) and fin whales (*Balaenoptera physalus*). (Contact: K. Shelden, AFSC)

### ***Southeast Alaska Vessel Surveys***

Project involves vessel surveys to collect sighting data on Southeast Alaskan cetaceans. The target species are killer whales and humpback whales, and the intent is to find and photograph as many as possible. Two surveys were conducted in 2004; one in July and one in September (duration = approximately 14 days each survey).

### ***SE Bering Sea shelf cetacean survey***

A cetacean line-transect survey was conducted in conjunction with an acoustic-trawl survey for walleye pollock on the Bering Sea shelf from 5 June to 3 July 2004 aboard the NOAA ship *Miller Freeman*. The objective was to examine the abundance and distribution of cetacean species across the three hydrographic domains on the Bering Sea shelf and compare to previous survey years. The survey included 2032 km of effort during which 101 (93 on effort & 8 off effort) cetacean sightings were made. Seven species were identified: 26% Dall's porpoise (26 on effort & 1 off effort sightings), 4% harbour porpoise (4 on effort sightings), 4% fin whales (3 on effort & 1 off effort sightings), 6% minke whales (6 on effort sightings), 10% killer whales (8 on effort & 2 off effort sightings), 20% humpback whales (20 on effort sightings), 1% Pacific white-sided dolphins (1 on effort sightings) and 29% unidentified whales or dolphins (25 on effort & 4 off effort sightings). (Contact: J. Waite or N. Friday, AFSC).

### ***Gulf of Alaska cetacean survey***

A cetacean survey was conducted in conjunction with an acoustic-trawl survey for walleye pollock off the east side of Kodiak Island, Gulf of Alaska from 12 August to 6 September 2004 aboard the NOAA ship *Miller Freeman*. The objective was to examine the distribution of large whales in relation to the results of an in depth acoustic fish and oceanographic survey. (Contact: J. Waite or N. Friday, AFSC).

### ***Gray Whales off the Washington Coast***

The Makah tribe conducted some surveys for photo-ID work and biopsied some gray whales.

### **NWFSC**

None reported.

### **SWFSC**

*Structure of populations, levels of abundance and status of humpbacks (SPLASH)*

The SPLASH Project collaboration brings together national research programs and independent whale researchers from the United States, Canada, Mexico, Russia and Japan. The Southwest Fisheries Science Center was directly involved in sampling the summer feeding areas in the Aleutian Islands, the Bering Sea, and the Gulf of Alaska in 2004. The primary field methods employed during the SPLASH research program were photo-identification and biopsy sampling in all known feeding and wintering areas. Large areas of the North Pacific that have not been systematically and comprehensively sampled were surveyed using methods employed in other areas.

### 2.1.2 OPPORTUNISTIC, PLATFORMS OF OPPORTUNITY

The following U.S. organizations responded to a request for information on their use of platforms of opportunity to collect data on cetaceans in 2003. Data for institutions noted with an asterisk were obtained from Palazzo 2003 (SC/55/WW6).

<i>NORTH PACIFIC</i>						
Institution	US region	Species*	Platform type	Data type**	Collected by	Regional Archive***
Pacific Whale Foundation, HI*	HI	AR	Whale watch	1,3,4,5	---	---
Wild Dolphin Society, HI	HI	ALMN	Whale watch	1,2,3,4,7	Captain, crew, observers	No
Univ. of Alaska SE, AK	NW	K	Fishing vessels	1,4,5	Captain, crew	Yes
Channel Island National Marine Sanctuary Naturalist Corps, CA	SW	AE	Whale watch	1,4	Naturalist, dedicated observer	Yes
Monterey Bay Whale Watch, CA	SW	AE	Whale watch	1,4	Naturalist, dedicated observer	Yes
Oceanic Society, CA	SW	AE	Whale watch	1,4	Naturalist, dedicated observer	Yes
Pacific Cetacean Group, UC MBEST Center, CA*	SW	A	Whale watch	1,3,4,5,6	---	---
San Francisco Bay Whale Watching, CA	SW	AE	Whale watch	1,4	Naturalist, dedicated observer	Yes

\*Species codes: A) *Megaptera novaeangliae*, B) *Balaenoptera physalus*, C) *Balaenoptera acutorostra*, D) *Eubalaena glacialis*, E) *Balaenoptera musculus*, F) *Balaenoptera borealis*, G) *Lagenorhynchus acutus*, H) *Phocoena phocoena*, I) *Globicephala melas*, J) *Ziphiidae* spp. K) *Physeter macrocephalus*, L) *Stenella longirostris*, M) *Tursiops truncatus*, N) *Stenella attenuata*, O) *Delphinus delphis*, P) *Grampus griseus*, R) unspecified odontocete species

\*\*Data types: 1) cetacean sighting data, 2) survey effort data (varied from general location to logged positions), 3) animal behavior, 4), photo-ID (for at least one listed species), 5) management-oriented data (fisheries interactions, ship strike, harassment), 6) scat/prey collection, 7) environmental data

--- Data not available

\*\*\*Archives: data for one or more listed species were contributed to a regional or oceanic archive. Responders reported contributing data to the following other institutions: North Atlantic: Allied Whale, New England Aquarium, Provincetown Center for Coastal Studies, Whale Center New England, North Pacific: Cascadia Research, Scripps Institute of Oceanography

### NWFSC

Sightings of killer whales were reported by the general public and commercial boat operators in ports and harbors along the west coast as part of a coast-wide sighting network. These reports provide information on where Southern Resident killer whale pods are in the late fall, winter, and early spring when they are not in Puget Sound or the Georgia Basin, and will help identify habitat-use and potential foraging areas during the winter.

Locations of identified killer whales in the Puget Sound area were documented by both biweekly surveys and responses to sighting network reports to determine areas in the Puget Sound and Georgia Basin used by the Southern Resident pods during the late fall through early spring.

### 2.2 Analyses/development of techniques

None reported.



### 3. Marking data

#### 3.1 Field work

##### 3.1.1 NATURAL MARKING DATA

###### AFSC - 2004

Species	Feature	Area/stock	Calendar year/season/no. photographed	Catalogued (Y/N)	Catalogue total	Contact person/institute
Humpback whale	Fluke	SE Alaska	115	Y	112	NMML (Dahlheim)
Humpback whale	Fluke	SE Bering Sea Gulf of Alaska Gulf of Alaska & Bering Sea	25 26 118	Y Y Y	26 24 115	C. Sims & N. Friday/AFSC C. Sims & N. Friday/AFSC C. Sims & N. Friday & P. Wade/AFSC
Killer whales	Dorsal fin/saddle	SE Alaska	74	Y		NMML (Dahlheim)

##### NWFSC

Species	Feature	Area/stock	Calendar year/season/ no.	Catalogued (Y/N)	Catalogue total	Contact person/institute
Killer whale	Dorsal Fin and Saddle Patch	Southern Resident population-N. Pacific, California Current	2004/ all animals, multiple photos	Y	83 for Southern Resident killer whales	Ken Balcomb/Center for Whale Research

##### SWFSC

None reported.

##### 3.1.2. ARTIFICIAL MARKING DATA

None reported.

##### 3.1.3 TELEMETRY DATA

###### AFSC

Species	Tag type	No. successfully deployed	Maximum time transmitting	Contact person/institute
North Pacific right whale	Satellite	2	51 days	K. Sheldon, AFSC

##### NWFSC and SWFSC

None reported.

#### 3.2 Analyses/development of techniques

None reported.

### 4. Tissue/biological samples collected

#### 4.1 Biopsy samples

##### AFSC – Calendar year 2004

Species	Area/stock	Calendar year/ season no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Beluga whale	Bristol Bay	30	Y	30	30	L. Quakenbush/ADF&G
Humpback whale	SE Alaska	7	Y			NMML (Dahlheim)
Humpback whale	SE Bering Sea; Gulf of Alaska & Bering Sea	6 45	Y Y	? ?	? ?	P. Wade/AFSC P. Wade/AFSC
Fin whale	Aleutian Is./Bering Sea	3	Y			NMML (Durban)
Humpback whale	Aleutian Is./Bering Sea	45	Y			NMML (Durban)
Killer whale	SE Alaska	5	Y			NMML (Dahlheim)
Killer whale	Aleutian Is./Bering Sea	22	Y			NMML (Durban)

NP right whale	Aleutian Is./Bering Sea	2	Y			NMML (Durban)
Pacific whitesided dolphin	Aleutian Is./Bering Sea	2	Y			NMML (Durban)

*NWFSC 1 May 2004 – 31 March 2005*

Species	Area/stock	Calendar year/ season no. collected	Archive d (Y/N)	No. analysed	Total holdings*	Contact person/institute
Humpback whale	SE Alaska	2004/Spring/ n=70	Y	0	70	Craig Matkin, North Gulf Oceanic Society
Humpback whale	SE Alaska	2004/Summer/ n=32	Y	0	32	Paul Wade, NMML
Humpback whale	SE Alaska	2004/Summer/ n=6	Y	0	6	Marilyn Dahlheim, NMML
Humpback whale	Washington State	N=1	Y	0	1	Sally Mizroch, NMML
Humpback whale	Western Pacific	2004/Spring /Summer/n=1	Y	0	1	Vladimir Burkanov, NMML
Northern right whale	SE Bering Sea	2004/Summer/ n=1	Y	0	1	Paul Wade, NMML
Pacific whitesided dolphin	Bering Sea	2004/Summer/ n=1	Y	0	1	Paul Wade, NMML
Sperm whale	NW Pacific	2004/Summer/ n=1	Y	0	1	Vladimir Burkanov, NMML
Gray whale	NE Pacific	2003/Spring/ n=1	Y	0	1	Marilyn Dahlheim, NMML
Gray whale	Russia/NW Pacific	2004 /Summer/n=1	Y	0	1	Vladimir Burkanov, NMML
Killer whale	Alaska/ AT-1, Northern Resident	2003/Spring 2004/Fall/ n=77	Y	58	41	Craig Matkin, North Gulf Oceanic Society
Killer whale	E. Pacific	2004/Summer/ n=16	Y	16	12	Paul Wade, NMML
Killer whale	Alaska/ Transient?	1990/?/n=2 1995/Spring/ n=3 1995/Fall/n=3 1997/Fall/n=4 1999/?/n=1 2002/Spring/n=3 Total: n=16	Y	4	16	Marilyn Dahlheim, NMML
Killer whale	NE Pacific /West Coast Transient	2000/Winter- Spring/n=4 2001/Spring/ n=1 2002/Winter- Spring/n=2 2004/Spring- Fall/n=16 Total: n=23	Y	7	18	Marilyn Dahlheim, NMML Nancy Black, Monterey Bay Cetacean Project/Whale Watch
Killer whale	Russia/NW Pacific	2004/Spring- Summer/n=8	Y	0	8	Vladimir Burkanov, NMML
Killer whale	NE Pacific/ West Coast Transient	2005/Winter- Spring /n=8	N	8	0	Paul Wade, John Durban, NMML
Killer whale	NE Pacific/ Mexico	1999/n=3 2000/n=6 2003/Summer/ n=14 Total: n=23	Y	23	10	Bob Pittman, SWFSC
Killer whale	NE Pacific/ US	2001/Fall/n=3	N	3	0	Bob Pittman, SWFSC
Killer whale	E Tropical Pacific /Central America	2003/Fall/n=9	Y	9	4	Bob Pittman, SWFSC
Killer whale	S Pacific/ Hawaii	2002/Fall/n=6	Y	6	3	Bob Pittman, SWFSC

Killer whale	Pacific Ocean/"IFS"	2000/Winter/ n=3 2001/Fall/n=1 2003/Fall/n=2 Total: n=6	N	6	1	Bob Pittman, SWFSC
Killer whale	Antarctic Ocean	2001, 2002, 2003/n=14	N	14	0	Bob Pittman, SWFSC
Killer whale	Indian Ocean	2004/Spring/ n=3	Y	3	3	Bob Pittman, SWFSC

\*Total holdings includes samples not analyzed, as well as samples for which some tissue remained after analysis.

#### SWFSC – calendar year 2004

Species	Area/stock	Calendar year/ season	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Balenoptera sp.	West Coast USA	1	Y	0	4	Kelly Robertson, SWFSC
Blue whale	West Coast USA	6	Y	6 sequenced	668	Kelly Robertson, SWFSC
Fin whale	West Coast USA	63	Y	0	336	Kelly Robertson, SWFSC
Baird's beaked whale	West Coast USA	6	Y	0	33	Kelly Robertson, SWFSC
Northern right whale	West Coast USA	25	Y	25 sequenced, msats	48	Kelly Robertson, SWFSC
Humpback whale	E. North Pacific stock	564	Y	400 extracted	2050	Kelly Robertson, SWFSC
Killer whale	West Coast USA	48	Y	48 sequenced	465	Kelly Robertson, SWFSC
Dall's porpoise	West Coast USA	2	Y	0	321	Kelly Robertson, SWFSC
Sperm whale	West Coast USA	10	Y	0	1759	Kelly Robertson, SWFSC
Cuvier's beaked whale	West Coast USA	1	Y	0	53	Kelly Robertson, SWFSC

#### 4.2 Samples from directed catches or bycatches

##### NWFSC

Species	Area/stock	Calendar year/ season total	Archived (Y/N)	Tissue type(s)*	Contact person/institute
Humpback whale	Alaska	2004/n=1	Y	Skin, blubber	Kawerak, Inc.
Bowhead whale	Beaufort Sea	2001/n=15	N	blubber	Todd O'Hara, University of Alaska, Fairbanks

\*e.g. liver, skin, blubber etc.

##### SWFSC

Species	Area/stock	Calendar year/ season total	Archived (Y/N)	Tissue type(s)*	Contact person/institute
Long-beaked common dolphin	ENP	2004/1	Y	Skin, skull, teeth, blubber, gonads, adrenals, stomachs	S. Chivers, SWFSC (858)546-7093
Short-beaked common dolphin	ENP	2004/8	Y	See above	See above
Northern right whale dolphin	ENP	2004/1	Y	See above	See above
Gray whale	ENP	2004/1	Y	See above	See above

\*e.g. liver, skin, blubber etc.

##### AFSC

None reported.

#### 4.3 Samples from stranded animals

## NWFSC

Species	Area/stock	Calendar year/ season total	Archived (Y/N)	Tissue type(s)*	Contact person/institute
Killer whale	Hawaii /Tropical Pacific	2004 n=1	Y	Skin, heart, kidney, lymph node, liver, spleen, mammary gland, lung, brain	Bradley Hanson, NWFSC Brad Ryan, PIRO

\*e.g. liver, skin, blubber etc.

## SWFSC – calendar year 2004

Species	Area/stock	Calendar year/ season total	Archived (Y/N)	Tissue type(s)*	Contact person/institute
Long-beaked common dolphin	San Diego Coast	8	Y	Head, teeth, stomach, blubber. skin, ovaries, testes, adrenals, fetus	Kerri Danil/Susan Chivers, SWFSC
Short-beaked common dolphin	San Diego Coast	6	Y	Head, teeth, stomach, blubber. skin, ovaries, testes, adrenals, fetus	Kerri Danil/Susan Chivers, SWFSC
Gray whale	San Diego Coast	2	Y	Head, teeth, stomach, blubber. skin, testes, adrenals	Kerri Danil/Susan Chivers, SWFSC
Pacific white sided dolphin	San Diego Coast	1	Y	Head, teeth, stomach, blubber. skin, adrenals	Kerri Danil/Susan Chivers, SWFSC
Dall's porpoise	San Diego Coast	1	Y	Head, teeth, stomach, blubber. skin, ovaries, adrenals, fetus	Kerri Danil/Susan Chivers, SWFSC
Common bottlenose dolphin	San Diego Coast	3	Y	Head, teeth, stomach, blubber. skin, testes, adrenals	Kerri Danil/Susan Chivers, SWFSC

\*e.g. liver, skin, blubber etc.

## AFSC

None reported.

### 4.4 Analyses/development of techniques

None reported.

## 5. Pollution studies

### NWFSC

*Atlantic white-sided dolphins.* Blubber samples of 50 Atlantic white-sided dolphins (*Lagenorhynchus acutus*) that stranded on the Massachusetts State coast from July 1998 – May 1999 were analyzed for toxic organochlorines and lipids. The lipid values ranged from 36 – 64%, with an overall mean ( $\pm$ SD) of  $52 \pm 6.5\%$ . We compared the mean percent lipid values measured in blubber of juvenile (both males and females), reproductive females and adult males and found no significant difference ( $p = 0.066$ ) in lipid content among these groups. This percent lipid value (52%) is higher than the mean percent lipid (43.8%) reported in blubber of Atlantic white-sided dolphins that stranded along Cape Cod from 1994-1996. The dolphin blubber samples contained triglycerides (99%) and phospholipids (1%). From the percent lipid and lipid class data of the Atlantic white-sided dolphins, it appears that the blubber samples were relatively fresh and did not appear to be decomposed.

Concentrations of summed PCBs and summed DDTs ranged from 4,000 – 120,000 ng/g, lipid and 880 – 67,000 ng/g, lipid, respectively and are similar to those reported in blubber of Atlantic white-sided dolphins that stranded in Massachusetts from 1993 - 2000 (Weisbrod *et al.*, 2001; Tuerk *et al.*, 2005). We found that reproductive females had significantly lower levels of  $\Sigma$ PCB,  $\Sigma$ PCB TEQs and  $\Sigma$ DDT levels than did juveniles or adult male dolphins. Mean concentrations of  $\Sigma$ PCBs and  $\Sigma$ DDTs measured in adult males were higher than the mean values in juveniles. However, no significant difference in mean PCB TEQs was found between adult males and juveniles. (Contact: G. Ylitalo, NWFSC).

*Bowhead Whales.* Analyses of different blubber strata have suggested interspecies differences in vertical distribution of organochlorine concentrations and lipid content. In a collaborative study with Dr. Todd O'Hara of

the University of Alaska-Fairbanks (formerly with the North Slope Borough), blubber samples of whales harvested in 1998, 2000, and 2001 have been analyzed for lipid and lipid classes as well as for OCs. The lipid concentrations in the blubber samples of bowhead whale collected in 2001 ranged from 48 – 88% and are similar to those measured in blubber of bowheads collected in the three previous years. As expected, the blubber contained primarily triglycerides (98 – 100%) and, in some cases, there was a small portion of phospholipids (less than 2% of total lipid). In general, the mean percent lipid values in the blubber of bowhead whales collected in 1998 ( $60 \pm 1.2\%$ ) and 1999 ( $48 \pm 0.76\%$ ) were significantly lower than the mean concentrations measured in the 2000 ( $67 \pm 0.96\%$ ) and 2001 ( $69 \pm 1.4\%$ ) animals. The mean proportion of triglycerides contributing to the total percent lipid was significantly lower in the 1998 animals ( $98.5 \pm 0.10\%$ ) compared to the mean 1999, 2000 and 2001 bowhead whale blubber levels ( $99.6 \pm 0.067\%$ ,  $99.6 \pm 0.085\%$  and  $99.5 \pm 0.12\%$ , respectively). These differences may be related to the time of year (season) the samples were collected as well as to the sex and age class of animals collected each year.

The fungicide, hexachlorobenzene, was the OC present in the highest concentrations; *o,p'*-DDT and *p,p'*-DDE were the predominant DDTs present. However, all analytes were present at relatively low concentrations (< 160 ng/g, wet weight). In 2005, these data will be analyzed in more detail to determine if there are differences in lipid classes and lipid content, as well as OC levels, based on sex, length, collection year, season, blubber strata and blubber depth. (Contact: G. Ylitalo, NWFSC)

*Killer whales.* The population of southern resident killer whales that live in waters of Puget Sound during May through October was nearly 100 individuals in the mid-1990s but declined by approximately 20% by 2001. Potential factors that may be contributing to the decline of southern resident killer whales include: exposure to high levels of toxic contaminants (e.g., organochlorines), reduced prey quality or quantity and vessel traffic/noise disturbances. Studies to date have shown that southern residents contain higher concentrations of POPs than those in northern resident killer whales. Elevated contaminant levels may be due to dietary differences between these whale populations or to regional differences in POP concentrations in their prey. In 2003-2004, more than 300 whole bodies of various salmon species collected from waters of the Pacific Northwest and California were analyzed for OCs, polybrominated diphenyl ethers (PBDEs) and lipid content. Examination of ratios of contaminants in southern residents and their potential prey showed that the whales are more likely feeding on salmon than other prey fish species from the Puget Sound region. These data suggest that Chinook salmon, particularly Puget Sound fish, are a likely source of POPs to southern resident killer whales. In 2005, these samples will be analyzed for lipid classes, caloric content and proximate analyses to assess whether changes in prey quality may be contributing to the decline of southern residents.

Biopsy blubber samples (n = 90) from free-ranging killer whales from the eastern North Pacific were analyzed for OCs and lipids in 2004. Toxic PCB congeners were measured, as well as additional OCs (e.g.,  $\beta$ -HCH, chlordane) to provide information on the profiles and levels of toxic environmental contaminants. The contaminant data and biological information were reviewed in CY03 and will be incorporated into draft manuscript in 2005 that will report OC levels in blubber biopsy samples of killer whales from various regions of the North Pacific (Contact: G. Ylitalo, NWFSC).

*Killer whales.* A feeding ecology study that includes contaminant analyses is discussed in Section 9 below, *Feeding ecology of killer whales inferred from chemical profiles.*

#### **AFSC and SWFSC**

None reported.

### **6. Statistics for large cetaceans**

#### *6.1 Direct catches (commercial, aboriginal and scientific permits) for the calendar year 2004.*

None reported.

#### *6.2 Non-natural mortality for the calendar year 2002.*

None reported.

#### **6.2.1 STRANDINGS OR DEAD WHALES ENCOUNTERED AT SEA- 20002**

##### **AFSC and NWFSC**

None reported.

## SWFSC

(Information for dead whale strandings found on San Diego beaches in 2002.)

Whale species	Sex	Location	Cause of death	Det.	Source or contact
Blue whale	M	33d15m, 117d26m	U	U	Kerri Danil, 8604 La Jolla Shores Drive, La Jolla CA 92037 (858) 546-7001 Kerri.Danil@noaa.gov
Gray whale	M	33d02m, 117d18m	U	U	See above
Cuvier's beaked whale	F	33d15m, 117d26m	U	U	See above

Note: Gray whale had old scars indicative of past entanglement event.

### 6.2.2 OBSERVED OR REPORTED SHIP STRIKES

None reported.

### 6.2.3 FISHERY BYCATCH

#### AFSC

Whale species	Sex	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Humpback whale <sup>1</sup>	U	07/30 (2002)	54°15'N 166°17'W	R	NA	FPO	F	M. Perez, AFSC
Humpback whale <sup>2</sup>	U	11/03 (2002)	54°07'N 166°27'W	R	NA	FPO	F	M. Perez, AFSC

<sup>1</sup>:Entangled in pot gear lines; released from gear unharmed.

<sup>2</sup>:Entangled in pot gear lines; released with trailing gear

#### NWFSC and SWFSC

None reported.

### 6.3 Earlier years' statistics

None reported.

## 7. Statistics for small cetaceans

### 7.1 For the calendar year 2002

#### AFSC

Species	Area/stock	Directed catch		Incidental mortality			Live-capture
		Reported	Est. total	Reported	Est. total	Source*	Reported
Killer whale	Bering Sea	0	0	1	1	Trawl	0
Dall's porpoise	Bering Sea	0	0	1	1	Trawl	0
		Directed catch Average 1998-2002					
Beluga Whale	Beaufort Sea	42	59				
Beluga Whale	Chukchi Sea	64	68				
Beluga Whale	E. Bering Sea	196	221				
Beluga Whale	Kuskokwim	2	2				
Beluga Whale	Bristol Bay	15	16				

\*e.g. fishery type

Information from M. Perez (AFSC; Pers. Comm..)

#### SWFSC

Species	Area/stock	Directed catch		Incidental mortality			Live-capture
		Reported	Est. total	Reported	Est. total	Source*	Reported
Long-beaked common dolphin	CA	0	0	3	NA	Drift gillnet	NA
Short-beaked common dolphin	CA	0	0	10	NA	Drift gillnet	NA

Pacific white sided dolphin	CA	0	0	1	NA	Drift gillnet	NA
Northern right whale dolphin	CA	0	0	3	NA	Drift gillnet	NA

\*e.g. fishery type

## NWFSC

None reported.

### 7.2 Earlier years' statistics

None reported.

## 8. Strandings

Kerri Danil, SWFSC, (858) 546-7001

## 9. Other studies and analyses

### AFSC

#### Passive Acoustic Sampling

Two autonomous recording packages (ARPs) were recovered in October 2004 after a year-long deployment in the Alaskan Beaufort Sea to monitor waters northeast of Barrow, Alaska for bowhead whale calls. Deployment was accomplished through collaboration with researchers conducting the NSF-sponsored Shelf Basin Interaction study (<http://sbi.utk.edu>). Analyses are underway on the 2003-04 dataset. A follow-on year long deployment of a high-frequency ARP (HARP) is anticipated for July 2005. The HARP will record beluga and ice seal calls in addition to those of bowhead whales.

Three ARPs were deployed along the Bering Sea shelf break and two HARPs were moored in the southeast Bering Sea middle-shelf, in spring and autumn 2004; these instruments were re-cycled (recovered, data downloaded and redeployed) in April 2005. Deployment sites were selected to optimize detection of calls from North Pacific right whales. Analyses of data from these and previously deployed recorders is underway, as part of a graduate student (L. Munger) dissertation at Scripps Institution of Oceanography. (Contact: S. Moore, AFSC)

#### Arctic Issues

The AFSC is involved in various aspects of planning for the 2<sup>nd</sup> International Conference on Arctic Research Planning (ICARPII), scheduled for November 2005, as well as the International Polar Year (IPY) to commence in 2007. Four presentations on marine mammal habitats in Arctic seas were made in support of Arctic research planning: one at the ICARPII Gateways and Margins Workshop (Paris, France; February 2005); one at the NSF Shelf Basin Interaction PI Meeting (Monterey, CA USA; March 2005) and two at the Arctic Science Summit Week (Kunming, China; April 2005). The goal is the inclusion of cetacean research in broad-scale studies focused on the Arctic ecosystem and climate change. (Contact: S. Moore, AFSC)

A workshop was held 23-24 Feb 2005 at NMML to make decisions on proposed studies of stock structure of the Bering-Chukchi-Beaufort Sea bowhead whale, as initiated at the June 2004 IWC SC meetings. Among the nearly 30 attendees, there were representatives from the US, Japan, Norway and Russia.

### NWFSC

#### *Annual Southern Resident killer whale survey*

The annual photo-identification survey was conducted to document all the individual Southern Resident killer whales in the population in late spring and early summer each year. This is the continuation of the long-term monitoring effort (since mid-1970s) that reports the presence or absence of individuals for demographic and population dynamics studies. (Contact: Ken Balcolmb, Center for Whale Research)

#### *Vessel Interactions and Noise effects on Southern Resident Killer Whales.*

Research projects on vessel interactions and noise effects initiated in 2003 were continued in 2004 and will be conducted again in 2005. Behavioral and respiration data were collected from a small boat during 50 focal follows (15-126 min in duration) of 15 whales to evaluate the energetic costs to whales in response to vessels. Concurrently, 51 hours of killer whale group behavior data were collected to examine the influence of vessels on social behavior. Land-based surveys of killer whale behavior and vessel traffic were also conducted, and preliminary analyses of data from two field seasons suggest that the Southern Resident killer whales tend to travel in less direct paths and to feed less when vessels are present. A comparative behavioral study was

conducted on Northern Resident killer whales in British Columbia in 2004. This study included experimental manipulation of the number of vessels near the whales (no boat, 1, 2 or >2 boats). Data were collected from 28 animals over 74 hours of observations. (Contact: Dawn Noren, NWFSC)

#### *Noise Characterization in Puget Sound*

A study was conducted in May 2004 to characterize the dynamic environmental acoustic levels killer whales are exposed to in Haro Strait using a calibrated vertical hydrophone array. Acoustic source level data were also collected from a representative sample of major vessel classes under typical operating conditions. A study modeling sound propagation in Haro Strait was also initiated. Compilation of information on vessel activities off San Juan Island was continued and is being added to the long term data base on vessels in Puget Sound. (Contact: Brad Hanson, NWFSC)

#### *Distribution and Habitat of Southern Resident Killer Whales*

Studies on winter and summer distribution of Southern Resident killer whales were continued in 2004. A study of summer habitat use by each of the three Southern Resident killer whale pods is using data from a network that supplies Southern Resident killer whale sighting information in the San Juan Island region to the whale watch industry. To assess the accuracy of sighting reports from the network, killer whale surveys were conducted at multiple locations in 2004. The study showed that the network sighting data provide reliable location data for each of the pods. Results to date indicate that although Southern Resident killer whales are often sighted on the west side of San Juan Island, there is variation in the frequency that each pod uses that area as well as variation in use of other areas of Puget Sound region.

Additional sightings of killer whales off the U.S. west coast during the winter were obtained through continuation of the coast-wide sighting network. Opportunistic sightings are obtained from fisherman, the general public, fishery observes and other scientists. (Contact: Linda Jones, NWFSC)

In March and April 2005, two types of passive acoustic recorders were moored off Washington to monitor occurrence of killer whales and other cetaceans during the spring/early summer period. The hydrophones will be recovered in July. (Contact: Brad Hanson, NWFSC)

#### *Social dynamics of Southern Resident killer whales*

A retrospective assessment is in progress of photographic identification data (Center for Whale Research, WA) of all Southern Resident killer whales between 1977 and 2003. These individual-based longitudinal data allow examination of the temporal changes in social affiliations within and among the three Southern Resident pods. Known genealogies have enabled assessment of social dynamics at the level of both the individual whale and the matriline, the most stable social unit. The quantitative clustering methods adopted during this study will allow quantitative description of trends in the social organization of this killer whale population, and examination of the demographic consequences of social changes and matrilineal extinctions. (Contact: Kim Parsons, NWFSC)

#### *Southern Resident killer whale foraging and prey*

Time-depth recorder (TDRs) data collected from wild Southern Resident killer whales in the Puget Sound area from 1993 to 2002 were analyzed. Dive depths and changes in swimming velocity recorded by the TDRs are being used to characterize diving behaviors, the occurrence of possible foraging activities, and other behaviors. Dive rates did not change with age or differ among pods or between males and females, although adult males dove deep significantly more frequently than adult females during the day. For all whales, dive rates and swim speed were greater during the day than at night, suggesting decreased activity levels at night. Dive rates to deeper depths during the day decreased over the study period, which may suggest a change in prey behaviour or abundance.

A 10-day pilot project was conducted in late August and early September 2004 to evaluate the viability of collecting prey remains in conjunction with behavioral cues of predation events for Southern Resident killer whales. Whales were followed for prey sample collection for a total of 12.7 hours, and events suggesting predation were observed 27 times. Prey remains were collected from 10 of these events (37%). Three of the 10 events involved a series of fast non-directional surfacings or active prey chases, while in five of the events, prey chase and capture occurred out of sight of surface-based observers. All fish remains collected were identified as Chinook salmon (6 samples).

Killer whale movements and salmon run data are being analyzed to determine if there are particular species/runs of salmon that are targeted by different pods/subpods of Southern Resident killer whales.



A pilot study was conducted in September 2004 to map prey fields and predator/prey interactions using echosounders. (Contact: J. Horne, University of Washington, and Brad Hanson, NWFSC)

#### *Killer whale disease database*

Stranding and necropsy data on killer whales worldwide is being compiled into a standardized database. This required the development of a standardized data collection form and necropsy parameter database. Reports from 198 stranded killer whales from 1944 to 2003 were included in the database. Sufficient information was available from 46 killer whales stranded since 1973 to document the observation of 226 abnormal tissues. Infectious and parasitic diseases were the most common diagnostic category and bacteria were the most common group identified in abnormal tissues. (Contact: J. Gaydos, U.C. Davis, and Brad Hanson, NWFSC)

#### *Feeding ecology of killer whales inferred from chemical profiles*

In a killer whale feeding ecology study, blubber biopsy samples of free-ranging killer whales from the North Pacific were analyzed for persistent organic pollutants (e.g., PCBs, DDTs, chlordanes, polybrominated diphenyl ethers) and fatty acids, and skin for stable isotopes of carbon and nitrogen. Fatty acid profiles were sufficiently distinct among the three reported ecotypes (“resident,” “transient” or “offshore”) to correctly classify the whales in this study by ecotype using a previously developed discriminant function model. In addition, a new discriminant function model was developed using data from whales from both the new and previous studies. PCB profiles also allowed unambiguous classification of all three killer whale ecotypes (also using both the old and new models). OC concentrations and ratios were used to provide additional insight on the dietary preferences of killer whales biopsied in Alaska, particularly for the offshores, about which little dietary information is available. For example, based on summed PCB and summed DDT levels measured in the offshore whales, it appears that they feed at a high trophic level or consume species containing high levels of summed PCB and summed DDT, perhaps shark or tuna species. Ratios of certain contaminants have been used to define regions from which prey may originate. Contaminant ratios (e.g.,  $\sum\text{DDTs}/\sum\text{PCBs}$  and  $p,p'$ - $\text{DDT}/\sum\text{DDTs}$ ) from offshore killer whales generally fell between those of the West Coast transients and those of the Alaska residents and transients. Because the offshores are known to have a range that extends from Alaska to California, their contaminant ratios and other chemical profiles may represent a mix of prey species acquired from California to the Arctic. However, this study demonstrates that offshore killer whales consume prey species that are distinctly different from those of sympatric resident and transient killer whales. These data have been incorporated into a manuscript that will be presented at the 2005 IWC meeting in Ulsan, Korea in May 2005. (Contact: P. Krahn, NWFSC)

#### *Reconvening of the Biological Review Team for Southern Resident killer whales*

The Biological Review Team (BRT) was reformed to consider the status of Southern Resident killer whales under the Endangered Species Act (ESA) as ordered by the U.S. District Court. Dr. Peggy Krahn was selected as the Team Leader for the BRT, providing coordination, organization and communication for the team and was the primary author for the updated status review report. In addition, Dr. Brad Hanson (habitat/foraging ecology/whale watching), Dr. Mike Ford (distinct population segment), Dr. John Stein (toxicology), Dr. Robin Waples (genetics) and Gina Ylitalo (contaminants) served as team members and Dr. Linda Jones served as an adviser. All of these team members were from NWFSC. W. F. Perrin (SWFSC), P. R. Wade (NMML), R. P. Angliss (NMML), B. L. Taylor (SWFSC), and M. E. Dahlheim (NMML) also served on the BRT. The majority of the BRT attended a session of the Cetacean Systematics Conference entitled “Killer whales: A case study of the interface between cetacean systematics and conservation” that was held in La Jolla, CA in April 30 – May 2, 2004 to obtain the most current information on taxonomy and conservation of this species. The taxonomic information and recommendations obtained at this workshop were used by the BRT to help determine if this population of killer whales was a distinct population segment. In August 2004, the Southern Resident killer whale BRT submitted an updated status review report to the NOAA Fisheries’ Northwest Regional Office. Finally, the status review report was formatted for a NOAA tech memo and published in December 2004. After review of the status review report, the Northwest Regional Office has proposed to list this killer whale population as “threatened” under the ESA. (Contact: P. Krahn, NWFSC).

## **SWFSC**

#### *Depleted Dolphin Stocks*

The SWFSC conducted line-transect research cruises in 1986 through 1990, 1998 through 2000, and in 2003 to investigate Pantropical spotted and spinner dolphin stocks. From data collected on these cruises, abundance and trends of these stocks were estimated and evaluated through 2000 (Gerrodette & Forcada, in press). Line-transect sightings data from the 2003 monitoring cruise were carefully edited and processed, with analyses begun during 2004. Updated abundance estimates are being completed now in 2005.

In addition to the line transect survey, aerial photogrammetry work was conducted on these cruises in order to calibrate observer estimates. Aerial photographs were also analyzed for calf production and length at independence for both spotted and spinner dolphins (Cramer *et al.* in prep).

Further research was conducted by SWFSC on data collected by fishery observers on ETP tuna purse-seine vessels. The unobserved kill of spotted dolphins in purse-seine sets from 1973–90 and 1996–2000 was estimated annually (Archer *et al.* 2004). These estimates were based on mothers killed in sets without their calves, and they increased the reported kill of dolphins by about 14% in each year. The chase and capture of dolphins in the purse seine fishery may also lead to fetal mortality by physiological stress and/or energy depletion causing miscarriage. Fetal mortality was estimated for spotted and spinner dolphins and it was estimated that total mortality from conception to birth ranged from 78 to 87% (Chivers *et al.*, in progress). Stomach contents of spotted dolphins killed in the fishery were analyzed to model the weaning process of calves and to determine diet (Archer & Robertson 2004). A better understanding of the weaning process, especially quantifying the period of time when calves are nutritionally dependent on their mothers may lead to a better evaluation of their potential vulnerability to the disturbance caused by the purse-seine fishery. Additionally, age distributions were constructed for female eastern and whitebelly spinner dolphins incidentally killed in the purse seine fishery (Larese & Chivers, submitted) to better understand their life history.

#### *Dolphin Energetics*

Several studies on dolphin energetics (hydrodynamics and drafting) were conducted in 2004 to investigate the potential effects of high speed chase by the purse-seine fishery on dolphin mother and calf pairs. A study of dolphin calf hydrodynamics was initiated to examine the possibility that age-related constraints on calf swimming performance is a significant contributing factor in the calf deficit observed in tuna purse-seine set mortality records (Noren *et al.*, in progress). For this study, digital video was collected at Dolphin Quest in Hawaii, of dolphin calves and mothers swimming together and alone at various velocities, for calf ages from birth through 1 year of age. The first mathematical examination of the physical basis for drafting by dolphin calves was completed and published (Weihs 2004). This analysis, backed by observations of free-swimming dolphin schools, indicates that hydrodynamic interactions with mothers play an important role in enabling dolphin calves to keep up with rapidly moving adult school members. A study estimating duration limits for sustained unassisted swimming at various speeds by spotted dolphin calves was submitted for publication (Edwards, submitted). A review of dolphin behavioral and physiological ontogeny, with respect to potential effects on dolphin calf separation during chase by tuna purse-seiners will be complete after final editing (Edwards & Noren, to be submitted). Additionally, a proposal was developed to extend Dr. Weih's dolphin hydrodynamics work to examine the specific conditions likely to pertain during attempted escape from tuna purse-seine sets, including the effects of high-speed maneuvering on dolphin calf drafting. The proposal is ready to implement, contingent upon FY05 funding.

#### *Non-depleted ETP Cetaceans*

Various data on ETP cetaceans not targeted by the tuna purse-seine fishery were analyzed and submitted for publication in 2004. One such study was on the life history of ETP common dolphins (Danil 2004), the third most frequently killed cetacean in the ETP tuna purse-seine fishery. Prior to this study, a comprehensive life history study of ETP common dolphins had not been done. This research utilized biological samples collected by fishery observers, with data going back to the early 1970's. Specifically, this study posed three primary questions (Danil 2004): “(1) Can age estimations and archiving of tooth slides be improved through the use of an image analysis system? (Danil *et al.* 2004) (2) What are the growth and reproductive parameters of central female common dolphins? and (3) Does geographic variation occur in female common dolphins on both large and fine scales? These three questions are important for management because accuracy of age estimates directly effects reproductive parameter estimates and understanding the basic reproductive parameters and their spatial variation provides essential information to improve management plans for each cetacean species/stock recognized.”

#### *ETP Oceanography*

A Review of Eastern Tropical Pacific Oceanography is being edited by Paul Fiedler (SWFSC/PRD) and Miguel Lavin (CICESE) as a special issue of *Progress in Oceanography*. The goal of this effort is to update Klaus Wyrski's seminal reviews (1966, 1967) by incorporating new data and published observational and modelling studies. The volume will include ten papers reviewing topics of regional physical and biological oceanography: atmospheric forcing, hydrography, circulation, eddies and mesoscale processes, ENSO variability, interdecadal variability and climate change, primary productivity and geochemical cycling, zooplankton, fisheries

oceanography, and oceanographic influences on seabirds and cetaceans. Almost all of the papers have been submitted and reviewed. Publication is expected in late 2005 or early 2006.

### *Ecosystem Data Management*

The Ecosystem Studies Program of SWFSC's PRD completed the design of a new data management system and began its implementation. The system will ensure that all datasets (past, present, and future) collected by this program are more easily integrated, as well as properly edited, processed, documented, stored, and maintained. Data collection and maintenance is a primary function of the SWFSC, from which all other research products result. As a regular part of the periodic dolphin abundance research vessel cruises in the ETP, the Ecosystem Studies Program has been collecting an increasing number of datasets on ecosystem attributes (physical and biological oceanography, abundance and distribution of mid- and top-trophic level species) to the point where each cruise now returns with up to 37 separate ecosystem data sets. These data sets represent a long-term (> 2 decades) time series of species and environmental data which provide the basis for interpretation of the status and trends data on the depleted dolphin stocks. The new data management system will ensure that these data will be preserved and available to test hypotheses about ecosystem structure and function, with a view toward better understanding of the status of depleted dolphins

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None reported.

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## SMALL CETACEAN CATCHES 2001-2004

All information was taken from National Progress reports unless otherwise stated. Catches are presented by nation, rather than ocean area, except in the case of the data submitted by the IATTC for the eastern tropical Pacific (ETP). In this case, the submitted estimated catches are not broken down by country and a summed total incidental catch for the participating countries is given. The reported catch columns include catches reported by observer programmes, from interviews with fishermen and incidental reports (e.g. stranded whales determined to have died in nets).

Catches are tabled according to the calendar year in which they were taken. All direct and incidental removals (including live captures) are recorded but not stranded animals.

Table: USA

Species	2001			2002			2003			2004										
	Direct		Indirect	Live	Direct		Indirect	Live	Direct		Indirect	Live								
	Rep.	Est. total	Rep.	Est. total	Rep.	Rep.	Est. total	Rep.	Rep.	Est. total	Rep.	Rep.	Est. total	Rep.						
White whale	463 <sup>a</sup>	-	-	-	-	394 <sup>n</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Killer whale	-	-	2 <sup>b</sup>	2 <sup>b</sup>	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-
Atl. pilot whale( <i>Globicephala</i> sp.)	-	-	16 <sup>c</sup>	94 <sup>c</sup>	6	-	-	4 <sup>p</sup>	54 <sup>p</sup>	6	-	-	-	-	-	-	-	-	-	-
Pac.pilot whale( <i>Globicephala macrorhynchus</i> )	-	-	-	-	-	-	-	-	-	-	-	-	1 <sup>o</sup>	5 <sup>o</sup>	-	-	-	-	-	-
Atlantic white-sided dolphin	-	-	3 <sup>d</sup>	28 <sup>d</sup>	-	-	-	2	30 <sup>q</sup>	-	-	-	-	-	-	-	-	-	-	-
Pacific white-sided dolphin	-	-	2 <sup>e</sup>	6 <sup>e</sup>	-	-	-	1 <sup>m</sup>	5 <sup>m</sup>	-	-	-	-	-	-	-	-	-	-	-
Atl. Bottlenose dolphin	-	-	-	-	-	-	-	4	83	-	-	-	-	-	-	-	-	-	-	-
Pac. Bottlenose dolphin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pac. Short-beaked common d.	-	-	7 <sup>e</sup>	22 <sup>e</sup>	-	-	-	9 <sup>m</sup>	49 <sup>m</sup>	-	-	-	17 <sup>o</sup>	84 <sup>o</sup>	-	-	-	-	-	-
Pac. Long-beaked common d.	-	-	-	-	-	-	-	4 <sup>m</sup>	15 <sup>m</sup>	-	-	-	-	-	-	-	-	-	-	-
Atl. Common dolphin (sp.)	-	-	2 <sup>f</sup>	126 <sup>f</sup>	-	-	-	1	NA	1	-	-	-	-	-	-	-	-	-	-
Pacific Common dolphin (sp.)	-	-	0 <sup>g</sup>	3 <sup>g</sup>	-	-	-	-	3 <sup>l</sup>	-	-	-	-	-	-	-	-	-	-	-
Northern right whale dolphin	-	-	5 <sup>e</sup>	9 <sup>e</sup>	-	-	-	3 <sup>m</sup>	15 <sup>m</sup>	-	-	-	1 <sup>o</sup>	5 <sup>o</sup>	-	-	-	-	-	-
Atlantic Risso's dolphin	-	-	4 <sup>h</sup>	26 <sup>h</sup>	6	-	-	4	54	6	-	-	-	-	-	-	-	-	-	-
Pacific Risso's dolphin	-	-	-	-	-	-	-	-	-	-	-	-	4 <sup>o</sup>	20 <sup>o</sup>	-	-	-	-	-	-
Atlantic harbour porpoise	-	-	5 <sup>i</sup>	79 <sup>i</sup>	-	-	-	10 <sup>r</sup>	483 <sup>r</sup>	-	-	-	-	-	-	-	-	-	-	-
Pacific harbour porpoise	-	-	1 <sup>j</sup>	5 <sup>j</sup>	-	-	-	-	16 <sup>l</sup>	-	-	-	-	-	-	-	-	-	-	-
Dall's porpoise	-	-	2 <sup>k</sup>	3 <sup>k</sup>	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-

The reported catch columns include catches reported by observer programs, from interviews with fishermen and incidental reports (e.g. stranded animals determined to have died in nets). All information is taken from published USA National Marine Fisheries Service Annual Marine Mammal Stock Assessment Reports (SAR) unless otherwise indicated. Stranded animals are not included.

In the following notes the estimated catch is given, followed by observed catch in brackets

- Figure includes 51 struck and lost – does not include figures for Cook Inlet.
- Bering Sea, animals hit trawl vessel propellers.
- Figure composed as follows: 11(11) NW and Mid-Atlantic herring trawl and 29(1) NW and Mid-Atlantic pelagic longline + 54 (4) Atlantic pelagic longline.
- Figure composed as follows: 26(1) Northeast sink gillnet and 2(2) herring trawl.
- California swordfish/thresher shark drift gillnet fishery.
- S. New England *Loligo* squid trawl.

- (g) California halibut/angel shark set gillnet.
- (h) Figure composed as follows: 26 (4) Atlantic pelagic longline .
- (i) Figure composed as follows: 53(4) N.E. sink gillnet, 26(1) Mid-Atlantic coastal gillnet.
- (j) Figure composed as follows: 2(1) Bering Sea trawl, 3(0) California halibut/angel shark set.
- (k) Bering Sea trawl.
- (l) SC/55/SM3 – California set gillnet fishery.
- (m) SC/55/SM3 – California drift gillnet fishery.
- (n) Figure includes 30 struck and lost – does not include figures for Cook Inlet.
- (o) SC/56/SM1- Preliminary estimates of marine mortality in California gillnet fisheries.
- (p) Pelagic longline fishery only, Ilex squid trawl data not available.
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