

# USA Progress report on cetacean research, May 2008 to April 2009, with statistical data for the *calendar year* 2006

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## USA – ATLANTIC WATERS

### 1. SPECIES AND STOCKS STUDIED

Common name	IWC recommended scientific name	Area/stock(s)	Items referred to
Atlantic spotted dolphin	<i>Stenella frontalis</i>	Atlantic and Gulf of Mexico	2.1, 4.1, 8
Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	Western N. Atlantic	2.1, 4.2, 4.3, 8
Blainville's beaked whale	<i>Mesoplodon densirostris</i>	Atlantic and Gulf of Mexico	4.3, 8
Bottlenose dolphin	<i>Tursiops truncatus</i>	Atlantic and Gulf of Mexico	2.1, 3.1, 4.1, 4.3, 7.3, 8, 9
Common dolphin	<i>Delphinus delphis</i>	Atlantic	2.1, 4.2, 4.3, 7.3, 8
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	Atlantic and Gulf of Mexico	4.3, 8
Dwarf sperm whale	<i>Kogia simus</i>	Atlantic and Gulf of Mexico	4.3, 8
Fin whale	<i>Balaenoptera physalus</i>	Atlantic	2.1, 4.3, 6.3, 8, 11
Gervais' beaked whale	<i>Mesoplodon europaeus</i>	Atlantic and Gulf of Mexico	4.3, 8
Harbour porpoise	<i>Phocoena phocoena</i>	Atlantic	2.1, 4.2, 4.3, 7.3, 8, 11
Humpback whale	<i>Megaptera novaeangliae</i>	Atlantic	2.1, 3.1, 4.3, 6.3, 8, 9
Long-finned pilot whale	<i>Globicephala melas</i>	Atlantic	2.1, 4.3, 8
Melon-headed whale	<i>Peponocephala electra</i>	Atlantic and Gulf of Mexico	2.1, 4.3
Minke whale	<i>Balaenoptera acutorostrata</i>	Atlantic	2.1, 4.2, 4.3, 8
North Atlantic right whale	<i>Eubalaena glacialis</i>	Atlantic	2.1, 3.1, 4.1, 4.3, 6.3, 8, 9
Pantropical spotted dolphin	<i>Stenella attenuata</i>	Gulf of Mexico	2.1, 4.1
Pilot whales	<i>Globicephala sp.</i>	Atlantic	4.2, 7.3
Pygmy killer whale	<i>Feresa attenuata</i>	Atlantic and Gulf of Mexico	4.3, 8
Pygmy sperm whale	<i>Kogia breviceps</i>	Atlantic and Gulf of Mexico	4.3, 8
Risso's dolphin	<i>Grampus griseus</i>	Atlantic and Gulf of Mexico	2.1, 4.3, 8
Rough-toothed dolphin	<i>Steno bredanensis</i>	Atlantic and Gulf of Mexico	2.1, 4.1, 8
Sei whale	<i>Balaenoptera borealis</i>	Atlantic	2.1, 6.3, 8, 11
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	Atlantic and Gulf of Mexico	2.1, 4.1, 4.3
Sperm whale	<i>Physeter catodon</i>	Atlantic and Gulf of Mexico	2.1, 4.3, 8
Striped dolphin	<i>Stenella coeruleoalba</i>	Atlantic and Gulf of Mexico	4.3, 7.3, 8
True's beaked whale	<i>Mesoplodon mirus</i>	Atlantic	8
White-beaked dolphin	<i>Lagenorhynchus albirostris</i>	Atlantic	4.3, 8
Unid. beaked whale	<i>Ziphius sp. and Mesoplodon sp.</i>	Atlantic	2.1, 8
Unid. Kogia	<i>Kogia sp.</i>	Atlantic	8

### 2. SIGHTINGS DATA

#### 2.1 Field work

##### 2.1.1 Systematic

##### NEFSC

During August 1-29, 2008, an aerial survey for cetaceans and turtles was conducted using the NOAA Twin Otter. The study area was between New Jersey and Maine, in the waters of the Gulf of Maine and Southern New England. The purpose of the survey was to collect additional data to improve the estimates of  $g(0)$  from previously conducted aerial abundance surveys, where  $g(0)$  is the probability of detecting a group of animals on the track line. This involved conducting as many circle-backs as feasible using the Hiby circle-back data collection and analyses methods.

A right whale survey was conducted between 16 February and 11 March 2008 aboard the NOAA R/V Delaware II. Cruise objectives included charting right whale (*Eubalaena glacialis*) distribution in the vicinity of Jordan Basin and Cashes Ledge, identifying food resources and oceanographic conditions in these areas, and photographing individual right whales for mark-recapture analyses.

Another right whale cruise was conducted aboard the RV Delaware II between 5 and 31 May 2008. The primary objectives of this 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) providing support

for the Right Whale Sighting Advisory System (SAS); (4) conducting acoustic doppler current profiles throughout the GSC Right Whale Critical Habitat area; (5) deploying oceanographic drifters to observe ocean currents and drift in and around the Great South Channel; and (6) collecting plankton and copepod samples in close proximity to feeding whales.

The North Atlantic Right Whale Sighting Survey (NARWSS) is a NMFS program dedicated to identifying and documenting the locations of right whales off the northeastern United States. All NARWSS flights conducted in 2008 were systematic surveys and followed track lines within nine survey blocks: Cashes Ledge, Franklin Basin, Georges Basin, Georges Shoal, Great South Channel, Howell Swell, Jeffreys Ledge, Jordan Basin, and Stellwagen Bank. During 2008, 53 flights that involved 295 flight hours were conducted in these survey blocks. In addition, there were directed flights to relocate whale carcasses, entangled whales or support disentanglement efforts. The total number of right whales seen on the aerial surveys (tally of estimated group size, not the number of unique individuals identified from photographs) was 639.

### SEFSC

A vessel survey of the U.S. Gulf of Mexico continental shelf and upper continental slope waters was conducted during 16 September – 30 September on NOAA Ship *Gordon Gunter*. Cetacean surveys were conducted in conjunction with a SEAMAP ichthyoplankton survey during daylight hours while in transit between SEAMAP sampling stations. The primary goal of the survey was to collect biopsy samples for genetic stock structure studies of both bottlenose dolphins (*Tursiops truncatus*) and Atlantic spotted dolphins (*Stenella frontalis*). The objectives of the survey were to: 1) Conduct broad-scale visual surveys of the continental shelf and upper continental slope of the northern Gulf of Mexico to locate marine mammals and quantify spatial distribution; and 2) Collect biopsy samples from marine mammal species from the bow of the *Gunter* for genetic stock structure research.

Target species	Date	Area	No. of sightings	Contact person/institute and references
Sperm whale	16 – 30 September 2008	Gulf of Mexico	2	K. Mullin, SEFSC
Short-finned pilot whale	16 – 30 September 2008	Gulf of Mexico	2	K. Mullin, SEFSC
Melon-headed whale	16 – 30 September 2008	Gulf of Mexico	2	K. Mullin, SEFSC
Short-finned pilot whale	16 – 30 September 2008	Gulf of Mexico	2	K. Mullin, SEFSC
Rough-toothed dolphin	16 – 30 September 2008	Gulf of Mexico	2	K. Mullin, SEFSC
Bottlenose dolphin	16 – 30 September 2008	Gulf of Mexico	46	K. Mullin, SEFSC
Atlantic spotted dolphin	16 – 30 September 2008	Gulf of Mexico	22	K. Mullin, SEFSC
Pantropical spotted dolphin	16 – 30 September 2008	Gulf of Mexico	2	K. Mullin, SEFSC

#### 2.1.2 Opportunistic, platforms of opportunity (2008)

The following U.S. organizations reported using “platforms of opportunity” to collect cetacean data in 2008. This is a conservative list of organizations using such platforms in U.S. waters.

NORTH ATLANTIC						
Institution	US region	Species*	Platform type	Data type**	Collected by	Other Archive***

Allied Whale, College of the Atlantic, ME	NE	ABCDGHI	Whale watch	1,3,4,7	Naturalist, dedicated observer	Yes
Blue Ocean Society, NH	NE	ABCDEFGHI	Whale watch	1,3,4,7	Naturalist, dedicated observer	Yes
Coastal Research & Education Society of Long Island, NJ	NE	ABCDGIKMOP	Whale watch, fishing vessel	1,3,4	Naturalist, trained volunteers	Yes
Dolphin Fleet, MA	NE	ABCDFGH	Whale watch	1,2,3,4,7	Naturalist, dedicated observer	Yes
New England Coastal Wildlife Alliance/ Bridgewater State College, MA	NE	ABCDGHI	Whale watch	1,3,4,7	Naturalist	Yes
Cape Ann Whale Watch	NE	AB	Whale watch	1,2,3,4,5,7	Interns	None
Whale Center of New England, MA	NE	ABCDFGHI	Whale watch, ferry	1,2,3,4,5,6,7	Naturalist, dedicated observer	Yes
Whale and Dolphin Conservation Society, MA	NE	ABCDGHIO	Whale watch	1,3,4,5	Naturalist, dedicated observer	Yes
<p>*Species codes: 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, S) <i>Orcinus orca</i>, T) <i>Stenella coeruleoalba</i>, U) <i>Globicephala macrorhynchus</i>, V) <i>Feresa attenuata</i></p> <p>**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) human impacts (fisheries interactions, ship strike, harassment), 6) scat/prey collection, 7) environmental data</p> <p>***ARCHIVES: DATA FOR ONE OR MORE LISTED SPECIES WERE CONTRIBUTED TO ANOTHER ARCHIVE OR CATALOG. RESPONDERS REPORTED CONTRIBUTING DATA TO THE FOLLOWING INSTITUTIONS: ALLIED WHALE, MINGAN ISLAND CETACEAN STUDY (CANADA), NORTH ATLANTIC RIGHT WHALE CONSORTIUM DATABASE, PROVINCETOWN CENTER FOR COASTAL STUDIES OR THE WHALE CENTER NEW ENGLAND.</p>						

**2.2 Analyses/development of techniques 2008**

None

**3. MARKING DATA**

**3.1 Field work 2008**

*3.1.1 Natural marking data*

**NEFSC**

Species	Feature	Area/stock	No. photo-id'd	Catalogue (Y/N)	Catalogue total	Contact person/institute; refs
North Atlantic right whale	Calosities	W.N. Atlantic	935	Y	NA	Richard Pace/NEFSC
Humpback whale	Dorsal fin	W.N. Atlantic	2	Y	NA	Richard Pace/NEFSC

\*number photographed for ID purposes, not identified individuals.

**SEFSC**

Species	Feature	Area/stock	No. photo-id'd	Catalogue (Y/N)	Catalogue total	Contact person/institute; refs
Bottlenose dolphin	Dorsal Fin	Gulf of Mexico / Mississippi Sound	NA	Y	NA	K. Mullin, SEFSC
Bottlenose dolphin	Dorsal Fin	Gulf of Mexico/Lake Ponchartrain, LA	NA	Y	NA	K. Mullin, SEFSC
Bottlenose dolphin	Dorsal Fin	W.N. Atlantic/Coastal North Carolina	NA	Y	NA	L. Hansen, SEFSC
Bottlenose dolphin	Dorsal Fin	W.N. Atlantic/Coastal Biscayne Bay FL	NA	Y	NA	L. Garrison, SEFSC

### 3.1.2. Artificial marking data

None.

### 3.1.3 Telemetry data

None.

### 3.2 Analyses/development of techniques

None.

## 4. TISSUE/BIOLOGICAL SAMPLES COLLECTED

### 4.1 Biopsy samples (summary only) 2008

#### NEFSC

Species	Area/stock	Calendar year/season - no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
North Atlantic right whale	W.N. Atlantic	2008/14	Y	NA	NA	Richard Pace/NEFSC

#### SEFSC

Species	Area/stock	Calendar year/season - no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Rough-toothed dolphin	Gulf of Mexico	2008/Fall - 4	Y	0	NA	P. Rosel, SEFSC
Bottlenose dolphin	Gulf of Mexico	2008/Fall - 27	Y	0	NA	P. Rosel, SEFSC
Atlantic spotted dolphin	Gulf of Mexico	2008/Fall - 23	Y	0	NA	P. Rosel, SEFSC
Pantropical spotted dolphin	Gulf of Mexico	2008/Fall - 4	Y	0	NA	P. Rosel, SEFSC
Short-finned pilot whale	W. North Atlantic/North Carolina	2008/Spring - 11	Y	0	NA	P. Rosel, SEFSC
Bottlenose dolphin	W. North Atlantic/Georgia	2007/Spring - 42	Y	0	NA	P. Rosel, SEFSC

Bottlenose dolphin	W. North Atlantic/Florida	2008/Spring - 37	Y	0	NA	P. Rosel, SEFSC
Bottlenose dolphin	W. North Atlantic/Georgia	2008/Spring - 21	Y	0	NA	P. Rosel, SEFSC

#### 4.2 Samples from directed catches (commercial, aboriginal and scientific permits) or bycatches 2006 NEFSC

Species	Area/stock	Tissue type(s)	No. collected	Archived (Y/N)	No. analysed	Contact person/institute
Harbor porpoise	N. Atlantic	Stomach	5	Y	unk	Fred Wenzel/NEFSC
Harbor porpoise	N. Atlantic	Jaw	3	Y	unk	Fred Wenzel/NEFSC
Harbor porpoise	N. Atlantic	Kidney	2	Y	unk	Fred Wenzel/NEFSC
Harbor porpoise	N. Atlantic	Liver	2	Y	unk	Fred Wenzel/NEFSC
Harbor porpoise	N. Atlantic	Skin	36	Y	unk	Fred Wenzel/NEFSC
Harbor porpoise	N. Atlantic	Head	10	Y	unk	Fred Wenzel/NEFSC
Harbor porpoise	N. Atlantic	Whole	5	Y	unk	Fred Wenzel/NEFSC
Harbor porpoise	N. Atlantic	Blubber	14	Y	unk	Fred Wenzel/NEFSC
Harbor porpoise	N. Atlantic	Muscle	6	Y	unk	Fred Wenzel/NEFSC
Minke Whale	N. Atlantic	Skin	1	Y	unk	Fred Wenzel/NEFSC
Minke Whale	N. Atlantic	Blubber	1	Y	unk	Fred Wenzel/NEFSC
Common dolphin	N. Atlantic	Skin	12	Y	unk	Fred Wenzel/NEFSC
Common dolphin	N. Atlantic	Head	1	Y	unk	Fred Wenzel/NEFSC
Common dolphin	N. Atlantic	Whole	2	Y	unk	Fred Wenzel/NEFSC
Short-finned pilot whale	N. Atlantic	Skin	85	Y	unk	Fred Wenzel/NEFSC
Pilot whale spp.	N. Atlantic	Skin	2	Y	unk	Fred Wenzel/NEFSC
Atlantic white-sided dolphin	N. Atlantic	Muscle	2	Y	unk	Fred Wenzel/NEFSC
Atlantic white-sided dolphin	N. Atlantic	Skin	9	Y	unk	Fred Wenzel/NEFSC
Atlantic white-sided dolphin	N. Atlantic	Blubber	5	Y	unk	Fred Wenzel/NEFSC
Atlantic white-sided dolphin	N. Atlantic	Whole	1	Y	unk	Fred Wenzel/NEFSC
Atlantic white-sided dolphin	N. Atlantic	Head	2	Y	unk	Fred Wenzel/NEFSC

#### SEFSC

None

**4.3 Samples from stranded animals 2008<sup>a</sup>****NEFSC**

species	Area/stock	Tissue type(s) <sup>b</sup>	No. collected	Archived (Y/N)	No. analysed <sup>c</sup>	Contact person/institute
Atlantic white-sided dolphin	N. Atlantic		34	Y	NA	Mendy Garron, NER Stranding Network
Bottlenose dolphin	N. Atlantic		73	Y	NA	Mendy Garron, NER Stranding Network
Cuvier's beaked whale	N. Atlantic		1	Y	NA	Mendy Garron, NER Stranding Network
Dwarf sperm whale	N. Atlantic		2	Y	NA	Mendy Garron, NER Stranding Network
Fin whale	N. Atlantic		2	Y	NA	Mendy Garron, NER Stranding Network
Gervais beaked whale	N. Atlantic		1	Y	NA	Mendy Garron, NER Stranding Network
Harbor porpoise	N. Atlantic		22	Y	NA	Mendy Garron, NER Stranding Network
Humpback whale	N. Atlantic		3	Y	NA	Mendy Garron, NER Stranding Network
Long-finned pilot whale	N. Atlantic		3	Y	NA	Mendy Garron, NER Stranding Network
Melon-headed whale	N. Atlantic		2	Y	NA	Mendy Garron, NER Stranding Network
Minke whale	N. Atlantic		1	Y	NA	Mendy Garron, NER Stranding Network
Pygmy sperm whale	N. Atlantic		1	Y	NA	Mendy Garron, NER Stranding Network
Risso's dolphin	N. Atlantic		7	Y	NA	Mendy Garron, NER Stranding Network
Common dolphin	N. Atlantic		31	Y	NA	Mendy Garron, NER Stranding Network
Striped dolphin	N. Atlantic		1	Y	NA	Mendy Garron, NER Stranding Network
Unidentified delphinid	N. Atlantic		1	Y	NA	Mendy Garron, NER Stranding Network
Unidentified whale	N. Atlantic		2	Y	NA	Mendy Garron, NER Stranding Network
White-beaked dolphin	N. Atlantic		2	Y	NA	Mendy Garron, NER Stranding Network

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

b. 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).

c. Samples are sent to various educational and scientific collections and number analyzed is unknown.

**SEFSC**

Species	Area/stock	Tissue type(s)	No. collected	Archived (Y/N)	No. analysed	Contact person/institute
Atlantic white-sided dolphin	W.N. Atlantic	Various	4	Y	NA	B. Mase, SEFSC

Blainville's beaked whale	W. N. Atlantic	Various	1	Y	NA	B. Mase, SEFSC
Bottlenose dolphin	W. N. Atlantic and Gulf of Mexico	Various	315	Y	NA	B. Mase, SEFSC
Cuvier's beaked whale	W. N. Atlantic	Various	2	Y	NA	B. Mase, SEFSC
Dwarf sperm whale	W. N. Atlantic and Gulf of Mexico	Various	4	Y	NA	B. Mase, SEFSC
Fin Whale	W. N. Atlantic	Various	1	Y	NA	B. Mase, SEFSC
Gervais' beaked whale	W. N. Atlantic and Gulf of Mexico	Various	2	Y	NA	B. Mase, SEFSC
Harbor porpoise	W. N. Atlantic	Various	2	Y	NA	B. Mase, SEFSC
Humpback whale	W. N. Atlantic	Various	2	Y	NA	B. Mase, SEFSC
Melon-headed whale	W. N. Atlantic	Various	8	Y	NA	B. Mase, SEFSC
Minke whale	W. N. Atlantic	Various	1	Y	NA	B. Mase, SEFSC
North Atlantic right whale	W. N. Atlantic	Various	3	Y	NA	B. Mase, SEFSC
Pygmy killer whale	W. N. Atlantic and Gulf of Mexico	Various	3	Y	NA	B. Mase, SEFSC
Pygmy sperm whale	W. N. Atlantic and Gulf of Mexico	Various	18	Y	NA	B. Mase, SEFSC
Risso's dolphin	W. N. Atlantic	Various	1	Y	NA	B. Mase, SEFSC
Common Dolphin	W. N. Atlantic	Various	1	Y	NA	B. Mase, SEFSC
Short-finned pilot whale	W. N. Atlantic	Various	2	Y	NA	B. Mase, SEFSC
Sperm whale	Gulf of Mexico	Various	4	Y	NA	B. Mase, SEFSC
Striped dolphin	W. N. Atlantic	Various	2	Y	NA	B. Mase, SEFSC

#### 4.4 Analyses/development of techniques

None.

#### 5. POLLUTION STUDIES (2008)

None.



## 6. STATISTICS FOR LARGE CETACEANS

### 6.1 Corrections to earlier years' statistics for large whales

None.

### 6.2 Direct catches of large whales (commercial, aboriginal and scientific permits) for the calendar year 2008

None.

### 6.3 Anthropogenic mortality of large whales for the calendar year 2006

#### 6.3.1 Observed or reported ship strikes of large whales (including non-fatal events)

Whale species	Sex	No	Date	Location	Vessel type	Speed	Fate	How observed	Contact person/ institute and refs
North Atlantic Right whale	M	1	10/1/06	Jacksonville, Florida	unk	unk	D	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 09-04
North Atlantic Right	M	1	11/3/06	Off Cumberland Island, Georgia	unk	unk	I	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 09-04
North Atlantic Right	F	1	24/7/06	Campobello Island, New Brunswick	unk	unk	D	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 09-04 Ref. Doc. 08-04
North Atlantic Right	F	1	24/8/06	Roseway Basin, Nova Scotia	unk	unk	D	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 09-04
North Atlantic Right	M	1	30/12/06	Off Brunswick Georgia	unk	unk	D	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 09-04
Humpback whale	F	1	9/1/06	Off Charleston, South Carolina	unk	unk	D	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 08-04
Humpback whale	F	1	17/3/06	Virginia Beach, Virginia	unk	unk	D	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 08-04
Humpback whale	F	1	15/10/06	Off Fenwick Island, Delaware	unk	unk	D	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 08-04
Sei whale	M	1	17/4/06	Baltimore, MD	Container ship	unk	D	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 08-04

#### 6.3.2 Fishery bycatch of large whales

Whale species	Sex	No	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
North Atlantic right whale	U	1	22/1/06	Off Ponte Vedra Beach, Florida	D	unk	unk	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 09-04
Humpback whale	U	1	25/3/06	Flagler Beach, Florida	I	American lobster	FPO	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 09-04
Humpback whale	U	1	6/8/06	Georges Bank	I	unk	unk	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 09-04
Humpback whale	U	1	23/8/06	Great South Channel	I	unk	unk	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 09-04
Humpback whale	U	1	6/09/06	East of Cape Cod, Massachusetts	D	unk	unk	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 09-04

Humpback whale*	F	1	15/10/06	Off Fenwick Island, Delaware	D	unk	unk	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 09-04
Fin whale	U	1	17/9/06	Off Mt. Desert Rock, Maine	I	unk	unk	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 09-04
Sei whale	U	1	16/9/06	Jeffreys ledge	I	unk	unk	DA	Tim Cole/NEFSC/NEFSC Ref. Doc. 09-04
* primary cause of death was ship strike, but this animal also had signs of entanglement									

## 7. STATISTICS FOR SMALL CETACEANS

### 7.1 Corrections to earlier years' statistics for small cetaceans

None.

### 7.2 Direct catches of small cetaceans for the calendar year 2007

None.

### 7.3 Anthropogenic mortality of small cetaceans for the calendar year 2006

#### 7.3.1 Observed or reported ship strikes of small cetaceans (including non fatal events)

##### NEFSC

Species	Sex	No.	Date	Location	Vessel type	Speed	Fate	How observed	Contact person/ institute and refs
Harbour porpoise	F	1	8/3/06	Sewaren, New Jersey	U	U	D	DA	Mendy.Garron@noaa.gov
Bottlenose dolphin	F	1	11/8/06	Rehoboth, Delaware	U	U	D	DA	Mendy.Garron@noaa.gov
Bottlenose dolphin	U	1	4/1/06	Villas, New Jersey	U	U	D	DA	Mendy.Garron@noaa.gov

##### SEFSC

Species	Sex	No.	Date	Location	Vessel type	Speed	Fate	How observed	Contact person/ institute and refs
Striped Dolphin	M	1	6/2006	Gulf of Mexico	U	U	D	Post-mortem	Blair Mase, SEFSC
Bottlenose dolphin	F	1	4/2006	Gulf of Mexico	U	U	D	Post-mortem	Blair Mase, SEFSC
Bottlenose dolphin	M	1	9/2006	Gulf of Mexico	U	U	D	Post-mortem	Blair Mase, SEFSC
Bottlenose dolphin	F	1	7/2006	Southeast U.S. Atlantic	U	U	D	Post-mortem	Blair Mase, SEFSC
Bottlenose dolphin	F	1	9/2006	Southeast U.S. Atlantic	U	U	D	Post-mortem	Blair Mase, SEFSC
Bottlenose dolphin	M	1	12/2006	Southeast U.S. Atlantic	U	U	D	Post-mortem	Blair Mase, SEFSC
Bottlenose dolphin	F	1	12/2006	Southeast U.S. Atlantic	U	U	D	Post-mortem	Blair Mase, SEFSC

## 7.3.2 Fishery bycatch of small cetaceans 2006

## NEFSC

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Whitesided dolphin	F	1	1-3/2006	GOM	D	Unk. Groundfish	TBB	F	Amy VanAtten/NEFSC
Whitesided dolphin	U	1	1-3/2006	GOM	D	Monkfish	TBB	F	Amy VanAtten/NEFSC
Whitesided dolphin	U	1	1-3/2006	GOM	D	Atlantic cod	TBB	F	Amy VanAtten/NEFSC
Whitesided dolphin	M	1	1-3/2006	SNE	D	Atlantic mackerel	PTM	F	Amy VanAtten/NEFSC
Whitesided dolphin	F	1	1-3/2006	SNE	D	Atlantic mackerel	PTM	F	Amy VanAtten/NEFSC
Whitesided dolphin	U	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Whitesided dolphin	F	1	7-9/2006	GOM	D	Pollock	TBB	F	Amy VanAtten/NEFSC
Whitesided dolphin	U	1	7-9/2006	GB	D	Witch flounder, American plaice	TBB	F	Amy VanAtten/NEFSC
Whitesided dolphin	M	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Whitesided dolphin	M	1	1-3/2006	GOM	D	Monkfish	TBB	F	Amy VanAtten/NEFSC
Whitesided dolphin	U	1	1-3/2006	SNE	D	Atlantic mackerel	PTM	F	Amy VanAtten/NEFSC
Common dolphin	U	1	1-3/2006	SNE	D	Summer flounder	TBB	F	Amy VanAtten/NEFSC
Common dolphin	U	1	1-3/2006	MAB	D	Atl. long-fin squid	TBB	F	Amy VanAtten/NEFSC
Common dolphin	U	1	1-3/2006	MAB	D	Atl. long-fin squid	TBB	F	Amy VanAtten/NEFSC
Common dolphin	M	1	1-3/2006	SNE	R	Atl. long-fin squid	TBB	F	Amy VanAtten/NEFSC
Common dolphin	M	1	1-3/2006	SNE	R	Atl. long-fin squid	TBB	F	Amy VanAtten/NEFSC
Common dolphin	F	1	1-3/2006	MAB	D	Atl. long-fin squid	TBB	F	Amy VanAtten/NEFSC
Common dolphin	M	1	1-3/2006	MAB	D	Atl. long-fin squid	TBB	F	Amy VanAtten/NEFSC
Common dolphin	M	1	1-3/2006	MAB	D	Atl. long-fin squid	TBB	F	Amy VanAtten/NEFSC
Common dolphin	M	1	1-3/2006	MAB	D	Atl. long-fin squid	TBB	F	Amy VanAtten/NEFSC
Common dolphin	M	1	1-3/2006	MAB	D	Atl. long-fin squid	TBB	F	Amy VanAtten/NEFSC
Common dolphin	M	1	1-3/2006	MAB	D	Atl. long-fin squid	TBB	F	Amy VanAtten/NEFSC
Common dolphin	M	1	10-12/2006	SNE	D	Scup	TBB	F	Amy VanAtten/NEFSC
Common dolphin	U	1	7-9/2006	GOM	D	Unk. Flounder/monkfish	TBB	F	Amy VanAtten/NEFSC
Common dolphin	M	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC

Common dolphin	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Common dolphin	U	1	1-3/2006	MAB	D	Atl. long-fin squid	TBB	F	Amy VanAtten/NEFSC
Common dolphin	M	1	1-3/2006	MAB	D	Atl. long-fin squid	TBB	F	Amy VanAtten/NEFSC
Bottlenose dolphin	U	1	10-12/2006	SAB	R	King mackerel	GND	F	Amy VanAtten/NEFSC
Bottlenose dolphin	U	1	7-9/2006	SAB	R	Spanish mackerel	GND	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	GB	D	Yellowtail flounder	TBB	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	M	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	GOM	D	Yellowtail flounder	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	M	1	1-3/2006	GOM	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	GOM	D	Atlantic cod	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	GOM	D	Atlantic cod	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	R	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	F	1	4-6/2006	GOM	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	F	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	M	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	M	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	M	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	M	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC

Harbour porpoise	U	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	GOM	D	Atlantic cod	TBB	F	Amy VanAtten/NEFSC
Harbour porpoise	M	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	F	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	M	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	F	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	M	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	F	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	F	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	M	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	F	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	M	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	F	1	10-12/2006	GOM	D	Pollock	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	7-9/2006	GOM	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	10-12/2006	GOM	D	Atlantic cod	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	4-6/2006	GB	D	Unk. Groundfish	TBB	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	4-6/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	F	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC

Harbour porpoise	M	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	M	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	U	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Harbour porpoise	M	1	1-3/2006	SNE	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Unk. Toothed whale	U	1	10-12/2006	GB	D	Monkfish	TBB	F	Amy VanAtten/NEFSC
Pilot whale	U	1	1-3/2006	SNE	R	Summer flounder	TBB	F	Amy VanAtten/NEFSC
Pilot whale	M	1	7-9/2006	GOM	D	Monkfish	TBB	F	Amy VanAtten/NEFSC
Pilot whale	U	1	1-3/2006	GOM	D	Unk. Flounder/monkfish	TBB	F	Amy VanAtten/NEFSC
Unk. Dolphin	U	1	1-3/2006	MAB	D	Atl. long-fin squid	TBB	F	Amy VanAtten/NEFSC
Unk. Dolphin/porpoise	U	1	1-3/2006	GOM	D	Witch flounder, American plaice	TBB	F	Amy VanAtten/NEFSC
Unk. Dolphin/porpoise	U	1	4-6/2006	GOM	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Unk. Dolphin/porpoise	U	1	10-12/2006	GOM	D	Monkfish	GNS	F	Amy VanAtten/NEFSC
Unk. Whale	U	1	7-9/2006	GOM	D	Atlantic cod	TBB	F	Amy VanAtten/NEFSC
Unk. Whale	U	1	10-12/2006	GB	D	Monkfish	TBB	F	Amy VanAtten/NEFSC

\* GOM= Gulf of Maine, GB= George's Bank, SNE= Southern New England, MAB= mid-Atlantic Bight

### SEFSC

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Pilot Whale	U	1	1/2006	Southeast U.S. Atlantic	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC
Pilot Whale	U	2	1/2006	Southeast U.S. Atlantic	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC
Pilot Whale	U	1	1/2006	Southeast U.S. Atlantic	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	1/2006	Southeast U.S. Atlantic	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	3/2006	Southeast U.S. Atlantic	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	3/2006	Southeast U.S. Atlantic	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	7/2006	Southeast U.S. Atlantic	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	8/2006	Northeast U.S. Atlantic	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	2	8/2006	Southeast U.S. Atlantic	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	10/2006	Southeast U.S. Atlantic	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	10/2006	Southeast U.S. Atlantic	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC

Pilot whale	U	4	10/2006	Southeast U.S. Atlantic	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	11/2006	Southeast U.S. Atlantic	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC
Pilot whale	U	1	4/2006	Gulf of Mexico	R	Swordfish/Tuna	LLD	F	L. Garrison, SEFSC

Reference: Fairfield Walsh and Garrison (2007)

## 8. STRANDINGS 2007

### NEFSC

The United States Northeast Regional Stranding network consists of local and regional responders who live and operate from Maine to North Carolina. A NMFS letter of agreement permits these individuals and organizations to approach, handle, and collect stranded, sick, dead, injured and alive marine mammals from both offshore and onshore waters on a year round basis. These permitted individuals and organizations submit a Level A response letter in a timely manner. This Level A report informs NMFS to the level of response, number of animals, number of species involved and collectively assists NMFS in determining any unusual marine mammal mortality events.

Species	No. strandings	No. post mortems	Contact person(s)/ Institute(s)	Contact email address(es)
Atlantic white-sided dolphin	24	8	See above	See above
Bottlenose dolphin	97	61	See above	See above
Fin whale	6	2	See above	See above
Gervais' beaked whale	1	1	See above	See above
Harbor porpoise	59	27	See above	See above
Humpback whale	15	4	See above	See above
Long-finned pilot whale	10	3	See above	See above
Minke whale	14	2	See above	See above
Pygmy sperm whale	13	9	See above	See above
Risso's dolphin	7	6	See above	See above
Sei whale	1	1	See above	See above
Common dolphin	101	48	See above	See above
Sperm whale	2	1	See above	See above
Striped dolphin	12	7	See above	See above
True's beaked whale	2	2	See above	See above
Unidentified whale	5	0	See above	See above
Unidentified cetacean	9	1	See above	See above
Unidentified dolphin	5	0	See above	See above
Unidentified fin/sei	1	0	See above	See above
Unidentified Kogia (dwarf/pygmy sperm) whale	1	0	See above	See above
Unidentified marine animal	5	0	See above	See above
Unidentified beaked whale	2	1	See above	See above
White-beaked dolphin	2	1	See above	See above

**SEFSC**

The southeast region marine mammal stranding network consists of numerous private and public agencies throughout the southeastern United States from Texas to North Carolina. The Southeast Fisheries Science Center coordinates the activities of these groups, provides training, and manages data from all reported strandings data for the region.

Species	No. strandings	No. post mortems	Contact person(s)/ Institute(s)	Contact email address(es)
Atlantic spotted dolphin	11	5	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Atlantic white-sided dolphin	1	1	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Blainville's beaked whale	2	2	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Bottlenose dolphin	451	286	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Cuvier's beaked whale	3	3	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Gervais' beaked whale	1	1	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Dwarf sperm whale	13	13	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Pygmy sperm whale	15	13	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Harbor porpoise	20	11	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Humpback whale	5	3	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Melon-headed whale	3	3	Blair Mase, SEFSC	Blair.Mase@noaa.gov
North Atlantic right whale	2	2	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Pygmy killer whale	3	3	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Risso's dolphin	7	3	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Rough-toothed dolphin	1	1	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Sperm whale	2	1	Blair Mase, SEFSC	Blair.Mase@noaa.gov
Striped dolphin	5	4	Blair Mase, SEFSC	Blair.Mase@noaa.gov

**9. OTHER STUDIES AND ANALYSES 2008****NEFSC**

In late 2007 we began a three-year project in the Stellwagen Bank National Marine Sanctuary continuing efforts to characterize the underwater acoustic environment of the sanctuary and further examining the effects of noise on resident marine animals. This project is a collaboration with NOAA Sanctuaries, Cornell University and Marine Acoustics Inc. ([http://stellwagen.noaa.gov/science/passive\\_acoustics\\_current.html](http://stellwagen.noaa.gov/science/passive_acoustics_current.html)). [Marine autonomous recording units](#) (MARUs) have been deployed in the sanctuary to record low-frequency underwater sound and will be used to gather acoustic data in the sanctuary over a continuous 30 month period. Information regarding the distribution of anthropogenic and natural sources of underwater noise (including vocally-active whales and fish) and information from ongoing whale tagging efforts are being used to better understand whether and how animals change their behaviors in noisy environments.

Another passive acoustics project initiated in 2008 at the NEFSC is aimed at validating passive acoustic techniques. This project is a collaboration with the Massachusetts Division of Marine Fisheries and Cornell University. The objective of the program is to understand the acoustic ecology of the marine animal species in the NE region and how animals use sound over different time and regional scales, seasons, individual, sex and behavioral contexts. Aerial and visual survey data is being used to validate and confirm acoustic events, as well as to model and predict call patterns and usage. This information will then be integrated into available sensor capacities including fixed and mobile acoustic sensors which report either in an archival or real time fashion. The last step will allow us to improve management and monitoring sampling regimes so as to utilize passive acoustics to its best capacity.

**SEFSC**



*Gulf of Mexico:*

Approximately monthly visual assessment and photo-identification surveys of a group of dolphins occupying Lake Ponchartrain, Louisiana were conducted throughout 2008. A focal group of approximately 30 animals has been occupying this very low salinity freshwater lake for at least 18 months and are documented to have skin lesions likely associated with exposure to freshwater. This ongoing monitoring is being conducted to document the health and activities of this out-of-habitat group of dolphins and to study the effects of extended fresh-water exposure (Contact: K. Mullin, SEFSC).

*Northwest Atlantic:*

The ongoing photo-identification study of bottlenose dolphins in Biscayne Bay, Florida was conducted in four intensive seasonal surveys during 2008. During each seasonal survey, two small vessels systematically surveyed Biscayne Bay, photographing all bottlenose dolphins encountered. The photo-identification component of this survey and the associated photographic catalogue has been ongoing for more than ten years. (Contact: L. Garrison, SEFSC).

**10. LITERATURE CITED**

Glass A.H., Cole T.V.N., Garron M. 2009. Mortality and serious injury determinations for baleen whale stocks along the United States eastern seaboard and adjacent Canadian Maritimes, 2003-2007. Northeast Fish Sci Cent Ref Doc. 09-04; 19 p.

Fairfield Walsh, C. and Garrison, L.P. 2007. Estimated bycatch of marine mammals and turtles in the U.S. Atlantic pelagic longline fleet during 2006. NOAA Tech. Memo. NMFS-SEFSC-560, 54pp

**11. PUBLICATIONS****11.1 Published or 'In Press' papers only****NEFSC**

Baumgartner, M., S. Van Parijs, F. W. Wenzel, C. Tremblay, H. Esch, and A. Warde. 2008. Low frequency vocalizations produced by sei whales (*Balaenoptera borealis*). *J. Acoust. Soc. Am.* 124:1339-1349

Bisack, Kathryn D. 2008. Integrating Porpoise and Cod Management: A comparison of Days-at-Sea, ITQs and Closures. *Marine Resource Economics* 23(3):359-376.

Delarue, J. Todd, S., Van Parijs, S. M. 2009. Geographic variations in northwest Atlantic fin whale (*Balaenoptera physalus*) song: Implications for stock structure assessment. *J. Acoust. Soc. Am.* 125, 1774-1782

Glass A.H., Cole T.V.N., Garron M. 2009. Mortality and serious injury determinations for baleen whale stocks along the United States eastern seaboard and adjacent Canadian Maritimes, 2003-2007. Northeast Fish Sci Cent Ref Doc. 09-04; 19 p.

Khan C., Cole T.V.N., Duley P., Glass A.H., Niemeyer M., Christman C. 2009. North Atlantic Right Whale Sighting Survey (NARWSS) and Right Whale Sighting Advisory System (RWSAS) 2008 Results Summary. US Northeast Fish Sci Cent Ref Doc. 09-05; 7 p.

Link, J., Col, L., Guida, V., Dow, D., O'Reilly, J., Green, J., Overholtz, W., Palka, D., Legault, C., Vitaliano, J., Griswold, C., Fogarty, M., Friedland, K. 2009. Response of balanced network models to large-scale perturbation: Implications for evaluating the role of small pelagics in the Gulf of Maine. *Ecological Modelling* 220: 351-369.

Link, J., Overholtz, W., O'Reilly, J., Green, J., Dow, D., Palka, D., Legault, C., Vitaliano, J., Guida, V., Fogarty, M., Brodziak, J., Methratta, L., Stockhausen, W., Col, L., Griswold, C. 2008. The Northeast U.S. continental shelf Energy Modeling and Analysis exercise (EMAX): Ecological network model development and basic ecosystem metrics. *J. of Marine System* 74: 453-474.

Merrick, R. 2008. Development of Quantitative Listing Criteria Under the U.S. Endangered Species Act. In (J. Rice and H. Powles, ed.) *Assessing marine fish species: Relating approaches based on reference points with approaches based on risk-of extinction criteria. A Workshop Organized by COSEWIC (Committee on Status of Endangered Wildlife in Canada) and DFO (Department of Fisheries and Oceans).* March 20-22, 2007 University of Ottawa, Ottawa, Ontario, Canada

Merrick, R., G. Silber, D. Demaster, and J. Reynolds. 2009. Endangered Species. p. 368-374 In B. Wursig (ed.) *Encyclopedia of Marine Mammals*. Academic Press, Amsterdam.

Orphanides CD, Palka DL. 2008. Bycatch of harbor porpoises in three U.S. gillnet management areas: Southern Mid-Atlantic, Offshore, and Western Gulf of Maine. *Northeast Fish Sci Cent Ref Doc.* 08-09; 8 p.

Pace, R. and R. Merrick. 2008. Northeastern US Atlantic Ocean habitats important to the conservation of North Atlantic Right Whales (*Eubalaena glacialis*). *Northeast Fish. Sci. Cent. Ref. Doc.* 08-07; 34 pp. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026.

Palka, D., M. Rossman, A. VanAtten, and C. Orphanides. 2008. Effect of Pingers on Harbour Porpoise Bycatch in the US Northeast Gillnet Fishery. *J. cetacean res. Manage.* In Press.

Palka DL, Orphanides CD. 2008. Harbor porpoise bycatch rates that indicate compliance with pinger regulations for the Northeast gillnet fishery. *Northeast Fish Sci Cent Ref Doc.* 08-10; 13 p.

Palka, D.L.; Orphanides, C.D. 2008. Predicted harbour porpoise bycatch under potential mitigation measure scenarios. *Northeast Fish Sci Cent Ref Dec.* 08-13.

Palka, D.L.; Orphanides, C.D. 2008. Predicted bycatch of harbour porpoises under various alternatives to reduce bycatch in the US Northeast and Mid-Atlantic gillnet fisheries. *Northeast Fish Sci Cent Ref Dec.* 08-14.

Pendleton, D.E., Pershing, A.J., Brown, M.W., Mayo, C.A., Kenney, R.D., Record, N.R., and Cole, T.V.N, 2009. Regional-scale mean copepod concentration indicates relative abundance of North Atlantic right whales *Mar. Ecol. Prog. Ser.* 378: 211–225

Pershing, A.J., Record, N.R., Monger, B.C., Mayo, C.A., Brown, M.W., Cole, T.V.N, Kenney, R.D., Pendleton, D.E., Woodard, L.A., 2009. Model-based estimates of right whale habitat use in the Gulf of Maine. *Mar. Ecol. Prog. Ser.* 378: 245–257

Regan, T., B. Taylor, G. Thompson, J. Cochrane, R. Merrick, M. Nammack, S. Rumsey, K. Ralls, and M. Runge. 2009. Developing A Structure For Quantitative Listing Criteria For The U.S. Endangered Species Act Using Performance Testing Phase 1 Report. NOAA Tech. Memo NMFS-SWFSC-437. 167 pp.

Schofield, T.D., Early, G., Wenzel, F.W., Matassa, K. Perry, C. Beekman, G., Whitaker, B., Gebhard, E., Walton, W., and Swing, M., 2008. Rehabilitation and Homing Behavior of a Satellite-Tracked Harbor Porpoise (*Phocoena phocoena*) *Aquatic Mammals* 2008, 34(1), 1-8

Van Opzeeland, Ilse; Kindermann, Lars; Boebel, Olaf; Van Parijs, Sofie. 2009. Insights into the acoustic behaviour of polar pinnipeds - current knowledge and emerging techniques of study. *Chapter in Nova* edited collection on Animal Behaviour: New Research. pp 133 - 162.

Warden, M.L. and C.D. Orphanides 2008. Preparation of the Northeast Fisheries Observer Program gillnet data for use in bycatch analyses of protected species. *Northeast Fish. Sci. Cent. Ref. Doc.* 08-17. 44 pp. <http://www.nefsc.noaa.gov/publications/crd/crd0817/>

Waring G.T., Josephson E., Fairfield-Walsh C.P., Maze-Foley K., editors. 2009. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments -- 2008. NOAA Tech Memo NMFS NE 210; 440 p.

Whitehead, H. and Van Parijs S. M. 2009. Studying marine mammal social systems. Chapter 12 of *Marine Mammal Ecology and Conservation: A Handbook of Techniques* edited by Boyd, Bowen and Iverson.

## SEFSC

Fairfield, C. P. and L. P. Garrison. 2008. Estimated bycatch of marine mammals and turtles in the U.S. Atlantic pelagic longline fleet during 2007. NOAA Tech. Memo. NOAA NMFS-SEFSC-572, 62 pp.

Fonnesbeck, C. J., Garrison, L. P., Ward-Geiger, L. and Bumstark, R. 2008. A Bayesian hierarchical model for evaluating the risk of vessel strikes on North Atlantic right whales in the southeastern United States. *Endangered Species Research* 6: 87-94.

Gorgone, A. M., P. A. Haase, E. S. Griffith and A. A. Hohn. 2008. Modeling response of target and non-target dolphins to biopsy darting. *Journal of Wildlife Management* 72(4): 926-932.

McFee, W. E., J. H. Schwacke, L. H. Schwacke, M. K. Stolen and K. D. Mullin. In press. Investigation of growth phases for bottlenose dolphins using a Bayesian modeling approach. *Marine Mammal Science*.

Wells, R. S., C. A. Manire, L. Byrd, D. R. Smith, J. G. Gannon, D. Fauquier and K. D. Mullin. In press. Movements and dive patterns of a rehabilitated Risso's dolphin, *Marine Mammal Science*

**11.2 Unpublished literature**  
**SEFSC**

Barry, K. P., A. M. Gorgone and B. Mase. 2008. Lake Pontchartrain, Louisiana bottlenose dolphin survey summary. Protected Resources and Biodiversity Division Contribution PRBD—08/09-01. Southeast Fisheries Science Center, National Marine Fisheries Service, NOAA, 75 Virginia Beach Dr., Miami, FL 33149.

Garrison, L. P. 2008. Estimated marine mammal and turtle bycatch in shark gillnet fisheries along the southeast U.S. Atlantic coast: 2000-2006. PRD Contribution #PRD-07/08-02. Southeast Fisheries Science Center, National Marine Fisheries Service, NOAA, 75 Virginia Beach Dr., Miami, FL 33149.

Garrison, L. P. and L. Stokes. 2008. Preliminary estimates of protected species bycatch rates in the U.S. Atlantic pelagic longline fishery between 1 April and 30 June, 2008. PRD Contribution #PRD-07/08-14, Southeast Fisheries Science Center, National Marine Fisheries Service, NOAA, 75 Virginia Beach Dr., Miami, FL 33149

Garrison, L. P. 2008. Protected species habitat modeling in the Eglin Gulf Test and Training Range. Final Report. Department of Defense Legacy Resource Management Program. Project #05-270, 176 pp.

## USA - PACIFIC WATERS

### 1. SPECIES AND STOCKS STUDIED

IWC common name	IWC recommended scientific name	Area/stock(s)	Items referred to
Baird's beaked whale	<i>Berardius bairdii</i>	Eastern Bering Sea Shelf, West Coast US	2.1.1, 4.1
Beluga whale	<i>Delphinapterus leucas</i>	Chukchi / Beaufort Seas; Cook Inlet, AK	2.11; 4.1; 4.2, 3.13
Blanville's beaked whale	<i>Mesoplodon densirostris</i>	Hawaii	2.1, 3.1.3, 9
Blue whale	<i>Balaenoptera musculus</i>	West Coast US	2.1.1, 4.1
Bottlenose dolphin	<i>Tursiops truncatus</i>	Captive, West Coast US, Palmyra, Hawaii	2.1.1, 3.1, 4.1, 4.3, 5, 8
Bowhead whale	<i>Balaena mysticetus</i>	Chukchi /Alaskan Beaufort Sea	2.11, 9
Bryde's whale	<i>Balaenoptera edeni</i>	West Coast US, Hawaii	2.1.1
Common dolphin	<i>Delphinus</i> spp.	West Coast US	2.1.1, 4.1
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	Hawaii, Eastern North Pacific, West Coast US	2.1.1, 3.1.3, 9
Dall's porpoise	<i>Phocoenoides dalli</i>	Eastern Bering Sea Shelf, West Coast US	2.1.1, 7
False killer whale	<i>Pseudorca crassidens</i>	Hawaii, West Coast US	2.1, 3.1.3, 4.1, 5, 9
Fin whale	<i>Balaenoptera physalus</i>	Eastern Bering Sea Shelf / Beaufort Sea, West Coast US	2.1.1, 2.12, 3.11, 4.1, 6.3.2, 8
Gray whale	<i>Eschrichtius robustus</i>	Eastern Bering Sea Shelf / Chukchi/Beaufort Sea / Eastern N. Pacific, West Coast US	2.1.1, 2.1.2, 4.1
Harbour porpoise	<i>Phocoena phocoena</i>	Eastern Bering Sea Shelf, Eastern North Pacific, West Coast US	2.1.1, 4.3
Humpback whale	<i>Megaptera novaeangliae</i>	Eastern Bering Sea Shelf, Eastern North Pacific, West Coast US, Hawaii	2.1.1, 2.1.2, 3.11, 3.13, 4.1, 5
Killer whale	<i>Orcinus orca</i>	Eastern Bering Sea Shelf, Eastern North Pacific (California Current), Hawaii, West Coast US	2.1.1, 3.1.3, 4.1, 4.3, 5, 9
Long-beaked common dolphin	<i>Delphinus capensis</i>	West Coast US	2.1.1, 4.1, 4.2, 4.3, 8
Melon headed whale	<i>Peponocephala electra</i>	Hawaii, Palmyra	2.1.1, 3.1.3, 4.1, 9
Minke whale	<i>Balaenoptera acutorostrata</i>	Eastern Bering Sea Shelf, Eastern North Pacific, West Coast US, Hawaii	2.1.1, 3.1.3, 4.1, 9
North Pacific right whale	<i>Eubalaena japonica</i>	Southeastern Bering Sea, West Coast US	2.11, 4.1, 4.3
Pacific white-sided dolphin	<i>Lagenorhynchus obliquidens</i>	Bering Sea, West Coast US	2.11, 4.1, 4.3
Pygmy killer whale	<i>Feresa attenuata</i>	Hawaii	2.1, 3.1.3, 4.1, 9
Pygmy sperm whale	<i>Kogia</i> spp.	West Coast US	2.1.1
Risso's dolphin	<i>Grampus griseus</i>	West Coast US	2.1.1, 4.1, 4.3, 8
Rough-toothed dolphin	<i>Steno bredanensis</i>	Hawaii	2.1, 3.1
Sei whale	<i>Balaenoptera borealis</i>	Eastern Bering Sea Shelf, West Coast US	2.1.1
Short-beaked common dolphin	<i>Delphinus delphis</i>	West Coast US	2.1.1, 4.1, 4.2, 4.3, 7.3, 8
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	Hawaii, West Coast US	2.1, 3.1.3, 4.1, 4.3, 9

Sperm whale	<i>Physeter macrocephalus</i>	Eastern Bering Sea Shelf, Eastern North Pacific, West Coast US, Hawaii	2.1.1, 3.1.3, 6.3.2, 9
Spinner dolphin	<i>Stenella longirostris</i>	Palmyra, Hawaii	2.1.1, 3.1
Spotted dolphin	<i>Stenella attenuata</i>	West Coast US, Hawaii	2.1, 4.1
Striped dolphin	<i>Stenella coeruleoalba</i>	West Coast US, Hawaii	2.1.1
Unidentified beaked whale	Ziiphid whale	West Coast US	2.1.1
Unidentified beaked whale	Mesoplodon sp.	West Coast US	2.1.1
White whale	<i>Delphinapterus leucas</i>	Cook Inlet, Alaska	7.2, 9

## 2. SIGHTINGS DATA

### 2.1 Field work

#### 2.1.1 Systematic

##### AFSC

*Aerial Surveys of Beluga Whales in Cook Inlet, Alaska, June, August, September and October 2008* - The National Marine Fisheries Service (NMFS) conducted surveys of the beluga population in Cook Inlet, Alaska, 2-13 June 2008 (47.7 hr), 2-4 August 2008 (16 hr), 19-20 September 2008 (8.9 hr) and 22 October 2008 (3.5 hr). The aerial surveys were flown at 244 m altitude and 185 km/hr, consistent with NMFS' surveys of Cook Inlet conducted each year since 1993. As in most years an AeroCommander 680 aircraft was used.

The study in June 2008 included one or more surveys of coastal areas (flown 1.4 km offshore) around most of the Inlet and 1,776 km of transects across the inlet, effectively searching 34% of Cook Inlet and 100% of the coastline. Paired, independent observers searched on the coastal side of the plane where virtually all beluga sightings occur, while a single observer and computer operator/data recorder searched on the offshore side of the plane. After finding belugas, multiple passes were made with paired observers counting each beluga group independently for at least four good quality passes. Daily median counts made on seven different days ranged from 34 to 103 belugas in the Susitna delta (between the Beluga and Little Susitna rivers), and 5 to 33 belugas in Chickaloon Bay. Belugas were not observed in lower Cook Inlet, which is typical of annual surveys in recent years. In June 2008, the highest daily median estimate, used here as an index for relative abundance (not corrected for effort nor for estimates of missed whales), was 126 belugas. This is below index counts for all previous survey years (305 belugas in 1993, 281 in 1994, 324 in 1995, 307 in 1996, and 264 in 1997, 193 in 1998, 217 in 1999, 184 in 2000, 211 in 2001, 192 in 2002, 174 in 2003, 187 in 2004, 192 in 2005, 153 in 2006, and 224 in 2007).

The study in August 2008 continued the time series of upper inlet age structure studies started in 2005. Surveys covered coastal areas (survey track 1.4 km offshore) and some offshore waters north of Moose Point and the Native Village of Tyonek. The intent of the surveys was to obtain high-resolution video of each beluga group to determine age structure (white relative to gray individuals and dark gray calves) and number of calves. The September and October studies focused on seasonal distribution of belugas in upper and lower Cook Inlet. In addition, in September, video cameras used during past surveys (1999-2001 and 2002-2005) were paired with the high-definition video camera used in 2006-2008 in order to account for differences in video quality across years. (K. Shelden, NMFS/AFSC/NMML)

Target species	Date	Area	No. of sightings	Contact person/institute and references
Beluga whale	2-13/06/08	Cook Inlet, Alaska	16	Kim Shelden, NMFS/AFSC/NMML
Beluga whale	2-4/08/08	Cook Inlet, Alaska	10	Kim Shelden, NMFS/AFSC/NMML
Beluga whale	19-20/09/08	Cook Inlet, Alaska	7	Kim Shelden, NMFS/AFSC/NMML
Beluga whale	22/10/08	Cook Inlet, Alaska	0	Kim Shelden, NMFS/AFSC/NMML

#### NOAA AIRCRAFT TWIN OTTER - MARINE MAMMAL SURVEYS

Chukchi Offshore Monitoring in Drilling Area (COMIDA): 16 June – 07 July, 3-26 August, and 21 October-10 November 2008

Bowhead Whale Aerial Survey Program (BWASP): 31 August – 20 October 2008

Bowhead Whale Feeding Ecology Study (BOWFEST); 25 August- 19 September 2008

COMIDA surveys, funded by Minerals Management Service (MMS), are designed to document marine mammal distribution during the open-water (ice-free) months. The surveys take place in the northeastern Chukchi Sea, specifically in the Chukchi Sea Planning Area (CSPA), from the coast out to 169° W, and 68° N to 72° N. The goal of COMIDA is to augment scientific knowledge about the distribution and abundance of marine mammals in the CSPA. Emphasis is placed on surveys during the open-water months (mid-June to early November) when various species are making seasonal migrations through the CSPA and when industrial activities are more likely to occur. Surveys are flown in a Twin Otter at a target altitude of 366 m. The intent of this research is to develop information that will facilitate mitigation related to oil and gas development.

In 2007, NMML received funds from MMS to begin overseeing the BWASP (Bowhead Whale Aerial Survey Project), a survey which has been conducted for approximately 30 years. This study involves north-south transects in survey blocks across the US Beaufort Sea from 157° W to 140° W and from the coast to 72° N. Objectives include monitoring temporal and spatial trends in distribution, abundance, habitat and behaviors of endangered whales, including long term trends and inter-year differences, particularly in relation to offshore oil and gas exploration and production areas. The survey is designed to overlap with the expected migration of bowheads through the Western Beaufort Sea, generally occurring in September and the first half of October. Surveys are flown in a Twin Otter at a target altitude of 458 m.

Target species	Date	Area	No. of sightings Chukchi/Beaufort	Contact person/institute and references
Bowhead Whale	6/16/08-11/10/08	Chukchi /Beaufort Seas	3/127	Laura Morse/Dave Rugh , NMFS/AFSC/NMML
Gray Whale	6/16/08-11/10/08	Chukchi /Beaufort Seas	99/2	Laura Morse/Dave Rugh , NMFS/AFSC/NMML
Beluga Whale	6/16/08-11/10/08	Chukchi /Beaufort Seas	28/5	Laura Morse/Dave Rugh , NMFS/AFSC/NMML
Fin Whale	6/16/08-11/10/08	Chukchi /Beaufort Seas	1/0	Laura Morse/Dave Rugh , NMFS/AFSC/NMML

Table of sightings made during COMIDA and BWASP surveys of the NE Chukchi and Western Beaufort Seas.

Starting in 2007, MMS provided NMML funds to conduct a feeding ecology of bowhead whales near Barrow, AK (BOWFEST). The study is in some ways a continuation with NSF-funded ecology studies in the same area in 2005-2006. The program includes oceanography (via Woods Hole Oceanographic Inst, Univ. of Alaska Fairbanks, and the Univ. of Rhode Island), tagging (WHOI), aerial surveys for whale distribution (NMML and NOAA's Aircraft Operation Center), aerial photography (NMML and LGL), acoustics (NMML, Univ. of Washington, and Oregon State Univ.), boat-based surveys (North Slope Borough Dept of Wildlife Management), and examination of stomach samples from whales taken in the subsistent hunt (NSB). Bowhead whales were documented feeding and migrating through the study area NE of Barrow (north to 72° N).

Target species	Date	Area	Sightings	Contact person/institute and references
Bowhead whale	8/25/2008-9/19/2008	W Beaufort Sea	56	Dave Rugh , NMFS/AFSC/NMML

Table of bowhead sightings made during aerial surveys in the bowhead feeding ecology study (BOWFEST) Aug/Sept 2008.

*NOAA RESEARCH VESSEL R/V OSCAR DYSON-BSIERP SURVEY  
8 MAY – 11 JUNE 2007 (AL07-04)*

As one component of the Bering Sea Integrated Ecosystem Research Program (BSIERP), three marine mammal observers conducted visual surveys along transect lines sampled during the AFSC/NOAA walleye pollock (*Theragra chalcogramma*) acoustic stock assessment survey, from 1 June to 30 July 2008. The survey covered 2,680.5 nm on effort with total on-effort and off-effort sightings of fin (78), humpback (46), minke (7), sei (1), gray (1), sperm (4), killer (35), and Baird's beaked (2) as well as harbor (56) and Dall's (171) porpoise. The acoustic survey was an interdisciplinary survey this year including cetacean, seabird, fish, macrozooplankton and oceanographic sampling. Data from this survey will be used to estimate abundance and combined with oceanographic and prey data to analyze habitat selection. A follow-up survey is planned for 2010. (Contact: N. Friday, AFSC)

Target species	Date	Area	No. of sightings	Contact person/institute and references
Fin whale	1/6-30/7/08	Eastern Bering Sea Shelf	78	N. Friday/AFSC
Humpback whale	1/6-30/7/08	Eastern Bering Sea Shelf	46	N. Friday/AFSC
Minke whale	1/6-30/7/08	Eastern Bering Sea Shelf	7	N. Friday/AFSC
Sei whale	1/6-30/7/08	Eastern Bering Sea Shelf	1	N. Friday/AFSC
Gray whale	1/6-30/7/08	Eastern Bering Sea Shelf	1	N. Friday/AFSC
Sperm whale	1/6-30/7/08	Eastern Bering Sea Shelf	4	N. Friday/AFSC
Killer whale	1/6-30/7/08	Eastern Bering Sea Shelf	35	N. Friday/AFSC
Baird's beaked whale	1/6-30/7/08	Eastern Bering Sea Shelf	2	N. Friday/AFSC
Harbor porpoise	1/6-30/7/08	Eastern Bering Sea Shelf	56	N. Friday/AFSC
Dall's porpoise	1/6-30/7/08	Eastern Bering Sea Shelf	171	N. Friday/AFSC

*Bering Sea Right Whale Cruise* - As part of an inter-agency agreement between the National Marine Mammal Laboratory and the Minerals Management Service, a ship-based and an aerial survey of the North Aleutian Basin and southeastern Bering Sea was conducted from 2 August to 12 September and 22 July to 31 August 2008, respectively. The ship-based survey was conducted from a 155-foot chartered crab boat, the Ocean Olympic, and the aerial survey was conducted on an *Aerocommander* charter aircraft. The primary objectives of this survey were to document the occurrence and distribution of North Pacific right whales in the region, and to photo-identify, biopsy-sample and satellite-tag right whales as well as humpback whales. Standard line-transect methods were used together with passive acoustic monitoring using DIFAR sonobuoys. Oceanographic data was collected and 1 suction cup tag was deployed for the foraging ecology component of this study.

During the study period, the ship-based survey covered a total of 1200 nautical miles (2222 km) of trackline. A total of 179 sightings (440 individuals) of 8 confirmed marine mammal species were recorded including right whales, humpback whales, killer whales, Dall's porpoise, harbour porpoise, northern fur seals, Stellar sea lions and Pacific white-sided dolphins. The aerial survey covered a total of 5821 nautical miles (10,782 km) on effort. A survey total of 263 sightings (755 individuals) of 11 confirmed marine mammal species were recorded. Species sighted from the plane included right, humpback, fin and sei whales as well as killer whales, Dall's and harbour porpoise, Pacific white-sided dolphins, fur seals, sea lions, walrus and sea otters.

During the aerial and vessel surveys a total of 10 (12 individuals) and 22 (34 individuals) sightings of right whales were recorded. All records occurred within the recently established NPRW critical habitat in the Bering Sea. An Argos PTT satellite transmitter was deployed in one individual on 21 August 2008 using an air rocket transmit system (ARTS). This whale was monitored for 58 days, a period in which it remained in a relatively small area within the middle shelf of the Eastern BS, just to the North of the NAB. A total of 9-11 individuals were individually identified during the 2008 field season. Five individuals were previously photographed in the BS in 1996-2002, and in 2004. One of these individuals was a whale tagged in 2004. The 303 sonobuoys deployed during the vessel survey recorded two types of calls: "upsweeps" and "gun shots". Acoustic moorings were deployed to investigate seasonal distribution of whales within the NAB lease area. Preliminary results confirm the hypothesis that the remnant NPRW population in the Bering Sea has a limited range during the summer season.

A total of 53 humpback whales were photo-identified. Three humpback whales were satellite tagged. Two on 26 August and another on 11 September 2008. Maximum tag transmission was 66 days.

Migratory routes and wintering destinations have not yet been established for the North Pacific right whale. Further studies planned for upcoming years should provide a better understanding of the ecology and status of this endangered population. (Contact: P. Clapham, AFSC)

*Kodiak Tagging Cruise* – As part of a collaborative study between the National Marine Mammal Laboratory and the Kodiak National Wildlife Refuge, a humpback whale tagging study was conducted from 7-18 July 2008. During the study period, a total of 17 humpback whales and 20 fin whales were photo-documented and 5 humpback whales were tagged with Argos PTT satellite transmitters deployed by a pole. One of the whales lost its tag within 4 days. The other 4 tags transmitted from 10 to 40 days and showed marked differences in feeding patterns. Seven humpback whales, including three of the tagged whales, had prior sighting histories in Kodiak. (Contact: S. Mizroch, AFSC).

Target species	Date	Area	No. of sightings	Contact person/institute and references
North Pacific right whale	2/08/08-12/9/08	Southeastern Bering Sea	9-11	P.J. Clapham (AFSC/NMML)
Humpback whale	2/08/08-12/9/08	Southeastern Bering Sea	53	B.K. Rone (AFSC/NMML)
Humpback whale	7-18 July 2008	Kodiak	37	S.A. Mizroch (AFSC/NMML)

### NWFSC

Target species	Date	Area	No. of sightings	Contact person/institute and references
Southern Resident killer whale	17-25/3/08	West Coast US/Canada	1	Brad Hanson, NWFSC

### PIFSC

#### *NOAA RESEARCH VESSEL OSCAR ELTON SETTE-HAWAII DTAG CRUISE*

*10-30 JULY 2008 (OES-0806)*

The primary objective of the study was to deploy DTAGs on deep diving cetaceans including pilot, melon-headed, and beaked whales in Hawaiian waters. The study areas were in the waters of leeward sides of the main Hawaiian Islands and included Kauai (11-13 July), Penguin Banks (14 July) and the Big Island of Hawaii (15-29 July). An effort was made to deploy tags in areas nearby known naval RIMPAC exercises. In addition to deploying tags, data were collected on all cetacean species encountered. Visual observations were conducted from sunrise to sunset. Photographs and biopsy samples were taken for species conformation and individual identification. Oceanographic data were also collected during XBT casts and CTD stations. Fisheries acoustic backscatter transects were conducted during daylight hours and after sunrise to look at movement of prey fields.

#### *NOAA RESEARCH VESSEL OSCAR ELTON SETTE-MAIN HAWAIIAN ISLANDS CETACEAN SURVEY*

*5-27 FEBRUARY 2009 (OES-0901)*

Standard line-transect visual and acoustic surveys were conducted within the Hawaiian EEZ waters surrounding the main Hawaiian Islands. The objectives included 1) collect photographic and biopsy data on all cetacean species encountered (except humpback whales), 2) collect acoustic data continuously during daylight hours, 3) collect oceanographic data (CTD & XBT), 4) collect fisheries acoustic backscatter data.

Target species	Date	Area	Methods/effort	Parameters/ factors measured	Contact person/institute; refs
Spotted dolphin	15-28/07/2008 5-27/02/2009	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0806, OES-0901
Spinner dolphin	15-28/07/2008	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0806
Striped dolphin	5-27/02/2009	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0901
Rough-toothed dolphin	15-28/07/2008 5-27/02/2009	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0806, OES-0901



Bottlenose dolphin	15-28/07/2008 5-27/02/2009	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0806, OES-0901
Melon-headed whale	15-28/07/2008 5-27/02/2009	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0806, OES-0901
False killer whale	15-28/07/2008 5-27/02/2009	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0806, OES-0901
Pygmy killer whale	5-27/02/2009	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0901
Short-finned pilot whale	15-28/07/2008 5-27/02/2009	Hawaii	Line transect survey/DTAG	Distribution; sighting frequency; dive depth; acoustics, pitch, roll	E. Oleson/PIFSC; OES-0806, OES-0901
Blainville's beaked whale	15-28/07/2008	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0806
Cuvier's beaked whale	5-27/02/2009	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0901
Sperm whale	15-28/07/2008	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0806
Minke whale	5-27/02/2009	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0901
Bryde's whale	5-27/02/2009	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0901
Humpback whale	5-27/02/2009	Hawaii	Line transect survey	Distribution; sighting frequency	E. Oleson/PIFSC; OES-0901

## SWFSC

*Oregon, California, and Washington Line-Transect and Ecosystem survey- (ORCAWALE)* – In 2008, SWFSC conducted a marine mammal assessment survey of the U.S. West Coast waters out to a distance of approximately 300 nautical miles. The primary objectives of the ORCAWALE cruise were to estimate the abundance and to understand the distribution of dolphins and whales which are commonly found off of the west coast. A secondary objective was to characterize the pelagic ecosystem within the study area, through the collection of underway and station-based physical and biological oceanographic sampling, studies of mid-trophic level organisms (using net sampling and acoustic backscatter methods) and research on non-protected apex predators (seabirds). A final objective was to conduct biopsy sampling and photo-identification studies of cetacean species of special interest.

*California Coastal Tursiops Project-* The goal of this project is to measure baseline level of contaminants (persistent organic pollutants and mercury) and then analyze the relationship between the levels of these contaminants and the likelihood of reproductive success. Researchers from SWFSC approach groups of coastal bottlenose dolphins for biopsy sampling from a small boat platform. The area covered for this study ranges from Encinitas, CA down to San Diego, CA.

*Palmyra: attempted sampling of beaked whales-* The intent of this short project was to biopsy sample an unidentified and potentially new species of beaked whale. The effort was unsuccessful, but samples were obtained from resident delphinids. Palmyra is isolated and the resident dolphin populations could also be genetically isolated; understanding how these populations interact with other insular populations or populations that occur on the open ocean is important for monitoring the health of these populations and in understanding their vulnerability to stressors like longline by-catch mortality.

Target species	Date	Area	No. of sightings	Contact person/institute and references
Balaenoptera acutorostrata	7/25-12/1/08	West Coast, US	67	Lisa Ballance
Balaenoptera borealis	7/25-12/1/08	West Coast, US	12	
Balaenoptera	7/25-12/1/08	West Coast, US	4	

edeni				
Balaenoptera musculus	7/25-12/1/08	West Coast, US	43	
Balaenoptera physalus	7/25-12/1/08	West Coast, US	163	
Berardius bairdii	7/25-12/1/08	West Coast, US	99	
Delphinus delphis	7/25-12/1/08	West Coast, US	24790	
Delphinus spp.	7/25-12/1/08	West Coast, US	2831	
Delphinus capensis	7/25-12/1/08	West Coast, US	3795	
Eschrichtius robustus	7/25-12/31/08	West Coast, US	2	
Globicephala macrorhynchus	7/25-12/1/08	West Coast, US	66	
Grampus griseus	7/25-12/1/08	West Coast, US	224	
Kogia spp.	7/25-12/1/08	West Coast, US	2	
Lagenorhynchus obliquidens	7/25-12/31/08	West Coast, US	2946	
Lissodelphis borealis	7/25-12/1/08	West Coast, US	650	
Megaptera novaeangliae	7/25-12/1/08	West Coast, US	156	
Mesoplodon sp.	7/25-12/1/08	West Coast, US	1	
Orcinus orca	7/25-12/1/08	West Coast, US	64	
Peponocephala electra	7/1- 7/30/08	Palmyra	17	
Phocoena phocoena	7/25-12/1/08	West Coast, US	24	
Phocoenoides dalli	7/25-12/1/08	West Coast, US	393	
Physeter macrocephalus	7/25-12/1/08	West Coast, US	72	
Stenella coeruleoalba	7/25-12/1/08	West Coast, US	285	
Stenella longirostris	7/1/ - 7/30-08	Palmyra	26	
Tursiops truncatus	7/25-12/31/08	West Coast, US	169	
Tursiops truncatus	7/1/ -7/30/08	Palmyra	20	
Ziiphid whale	7/25-12/1/08	West Coast, US	9	
Ziphius cavirostris	7/25-12/1/08	West Coast, US	15	

### 2.1.2 Opportunistic, platforms of opportunity

The following U.S. organizations reported using "platforms of opportunity" to collect cetacean data in 2008. This is a conservative list of organizations using such platforms in U.S. waters.

<i>NORTH PACIFIC</i>						
Institution	US region	Species*	Platform type	Data type**	Collected by	Regional Archive***
Birch Aquarium/Scripps Inst. of Oceanography	SW	ABW	Whale watch	1,3	Naturalist	No

Channel Island National Marine Sanctuary Naturalist Corps, CA	SW	ABCEFHMOP QSWZ	Whale watch	1,2,3,4,5	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
The Whale Museum, WA	NW	S	Whale watch	1,3,4	Naturalist, captain, crew	No
Univ. of Alaska SE, AK	NW	ABCKSW	Fishing vessels, Boaters	1,4,5	Captain, crew	Yes
Maui-Molokai'i Sea Cruises	HI	A	Whale watch	1,2,3,4	Naturalist, videographer	No
Wild Whale Research Foundation, HI	HI	JMUVXY	Whale watch	1,4	Vessel captain/ researcher	Yes
<p>*Species codes: A) <i>Megaptera novaeangliae</i>, B) <i>Balaenoptera physalus</i>, C) <i>Balaenoptera acutorostris</i>, D) <i>Eubalaena glacialis</i>, E) <i>Balenoptera 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>, Q) <i>Lissodelphis borealis</i>, R) unspecified odontocete species, S) <i>Orcinus orca</i>, T) <i>Stenella coeruleoalba</i>, U) <i>Globicephala macrorhynchus</i>, V) <i>Feresa attenuata</i>, W) <i>Eschrichtius robustus</i>, X) <i>Steno bredanensis</i> Y) <i>Pseudorca crassidens</i>, Z) <i>Lagenorhynchus obliquidens</i></p> <p>**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</p> <p>***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: CASCADIA RESEARCH (WA), NATIONAL BIOLOGICAL INFORMATION INFRASTRUCTURE, NATIONAL MARINE MAMMAL LABORATORY (WA), SCRIPPS INSTITUTE OF OCEANOGRAPHY (CA)</p> <p>****Reported by Cascadia Research</p>						

## AFSC

### Gray Whales off the Washington Coast

From 20 February to 10 December, 2008, vessel surveys for gray whales were conducted along the northern Washington coast and western Strait of Juan de Fuca. The surveys covered 482 nautical miles and represented 35 hours of survey effort. During these surveys 139 gray whales were sighted and 114 were photographed for identification. Thirty-two gray whales were sighted along the northern Washington coast and 107 were sighted in the western Strait of Juan de Fuca.

### Gray Whales off the Oregon Coast

Two surveys were conducted off the Oregon coast on 26 April and 26 July 2008 from the Rogue River jetty to Cape Blanco. The surveys covered 81 nautical miles and required a little over four hours of survey effort. During these surveys, 24 gray whales were sighted and 17 were photographed for future identification. (Contact: M. Gosho, AFSC)

Primary species	Area	Data type/method	Collected by	Platform	Location of archive (if applicable)	Contact person/institute and refs
Gray whale	Washington & Oregon coast (US)	Photo-ID; sightings	crew	Survey vessel	NMFS, AFSC, NMML	M. Gosho, NMML

## 2.2 Analyses/development of techniques

### AFSC

Target species	Date	Area	Methods/effort	Parameters/ factors	Contact
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				measured	person/institute; refs
North Pacific right whale	2/8/08-12/9/08	Southeastern Bering Sea	Systematic line-transect, photo-identification, satellite tagging, foraging ecology	Distribution, movements and habitat use	B.K. Rone (AFSC/NMML)
Humpback whale	2/8/08-12/9/08	Southeastern Bering Sea	Photo-identification, satellite tagging	Distribution, movements and habitat use	B.K. Rone (AFSC/NMML)
Humpback whale	7-18 July 2008	Kodiak	Photo-identification, satellite tagging of 5 humpback whales	Distribution, movements and habitat use	S.A. Mizroch (AFSC/NMML)

**NWFSC, PIFSC, SWFSC**

None.

**3. MARKING DATA****3.1 Field work***3.1.1 Natural marking data***AFSC**

Species	Feature	Area/stock	No. photo-id'd	Catalogue (Y/N)	Catalogue total	Contact person/institute; refs
North Pacific right whale	Head	Southeastern Bering Sea	9	Y	44	A.S Kennedy (AFSC/NMML)
North Pacific right whale	Fluke	Southeastern Bering Sea	2	N	44	A.S. Kennedy (AFSC/NMML)
Humpback whale	Fluke	Southeastern Bering Sea	45	Y	NA	B.K. Rone (AFSC/NMML)
Humpback whale	Dorsal fin	Southeastern Bering Sea	8	Y	NA	B.K. Rone (AFSC/NMML)
Humpback whale	Fluke	Kodiak	16	Y	>3,300	S. A. Mizroch (AFSC/NMML)
Humpback whale	Dorsal fin	Kodiak	17	Y	NA	S. A. Mizroch (AFSC/NMML)
Fin whale	Dorsal fin	Kodiak	20	Y	NA	S. A. Mizroch (AFSC/NMML)
Gray whale	Dorsal hump	Eastern North Pacific	114	Y	NA	M. Goshop (AFSC/NMML)

**PIFSC**

Species	Feature	Area/stock	No. photo-id'd	Catalogue (Y/N)	Catalogue total	Contact person/institute; refs
Spinner dolphin	Dorsal fin	Hawaii	51	Y	83	E. Oleson/PIFSC
Rough-toothed dolphin	Dorsal fin	Hawaii	57	N		E. Oleson/PIFSC
Bottlenose dolphin	Dorsal fin	Hawaii	6	N		E. Oleson/PIFSC
Melon-headed whale	Dorsal fin	Hawaii	53	N		E. Oleson/PIFSC
False killer whale	Dorsal fin	Hawaii	5	N		E. Oleson/PIFSC
Pygmy killer whale	Dorsal fin	Hawaii	11	N		E. Oleson/PIFSC

Pilot whale	Dorsal fin	Hawaii	109	N		E. Oleson/PIFSC
Blainville's beaked whale	Dorsal fin	Hawaii	1	N		E. Oleson/PIFSC
Sperm whale	Flukes	Hawaii	1	N		E. Oleson/PIFSC

**NWFSC, SWFSC**

None.

*3.1.2. Artificial marking data*

None.

*3.1.3 Telemetry data***AFSC**

Species	Tag type	No. successfully deployed	Maximum time transmitting	Contact person/institute; refs
White whale	Satellite	18	9 months	Hobbs/NMML
North Pacific right whale	Satellite	1	58 days	A. Zerbini (AFSC/NMML)
Humpback whale	Satellite	2	66 days	A. Zerbini (AFSC/NMML)
Humpback whale	Satellite	5	40 days	S. Mizroch (AFSC/NMML)

**NWFSC**

Species	Tag type	No. successfully deployed	Maximum time transmitting	Contact person/institute; refs
Globicephala macrorhynchus	Satellite	18	72 days	Brad Hanson, NWFSC
Mesoplodon densirostris	Satellite	5	71 days	Brad Hanson, NWFSC
Ziphius cavirostris	Satellite	4	121 days	Brad Hanson, NWFSC
Feresa attenuata	Satellite	2	10 days	Brad Hanson, NWFSC
Balaenoptera physalus	Satellite	3	86 days	Brad Hanson, NWFSC
Orcinus orca	Satellite	3	94 days	Brad Hanson, NWFSC
Balaenoptera acutorostrata	Satellite	1	26 days	Brad Hanson, NWFSC
Peponocephala electra	Satellite	12	25 days	Brad Hanson, NWFSC
Pseudorca crassidens	Satellite	9	76 days	Brad Hanson, NWFSC
Physeter macrocephalus	Satellite	6	33 days	Brad Hanson, NWFSC

**PIFSC, SWFSC**

None.

**3.2 Analyses/development of techniques****4. TISSUE/BIOLOGICAL SAMPLES COLLECTED****4.1 Biopsy samples (2008)****AFSC**

Species	Area/stock	Calendar year/ season - no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Beluga whale	Bristol Bay	133	Y	0	300+	Hobbs/ NMML
Gray whale	E. North Pacific	3	Y			M. Goshu/AFSC
North Pacific right whale	Bering Sea/ eastern	1	Y	0	1	B.K. Rone (AFSC/NMML)
Humpback whale		2	Y	0	2	B.K. Rone (AFSC/NMML)

**NWFSC**

Species	Area/stock	Calendar year/ season - no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Killer whale	NE Pacific/ Southern resident	2008/summer - 12	Y	9	3	Gina Ylitalo/NWFSC
Minke whale	NE Pacific	2008/summer - 1	Y	0	1	Gina Ylitalo/NWFSC

**PIFSC**

Species	Area/stock	Calendar year/ season - no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Spotted dolphin	Hawaii	1	Y	0	1	E. Oleson/PIFSC
Bottlenose dolphin	Hawaii	4	Y	0	25	E. Oleson/PIFSC
Melon-headed whale	Hawaii	5	Y	0	5	E. Oleson/PIFSC
Pygmy killer whale	Hawaii	1	Y	0	1	E. Oleson/PIFSC
Short-finned pilot whale	Hawaii	8	Y	0	19	E. Oleson/PIFSC

**SWFSC**

Species	Area/stock	Calendar year/ season - no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Balaenoptera musculus	West Coast, US	1	Y	0	905	Kelly Robertson, SWFSC
Balaenoptera physalus	"	30	Y	30	534	
Berardius bairdii	"	1	Y	0	53	
Delphinus delphis	"	158	Y	7	1779	
Delphinus spp.	"	3	Y	0	115	
Delphinus capensis	"	22	Y	2	476	
Globicephala macrorhynchus	"	8	Y	0	552	
Grampus griseus	"	1	Y	0	134	
Lagenorhynchus obliquidens	"	27	Y	0	291	
Lissodelphis borealis	"	12	Y	0	234	
Orcinus orca	"	3	Y	0	766	
Peponocephala electra	Palmyra, Hawaii	27	Y	1	184	
Physeter macrocephalus	West Coast, US	1	Y	0	1858	
Pseudorca crassidens	"	14	Y	11	169	
Stenella attenuata	Hawaii	4	Y	0	1517	

Stenella longirostris	Palmyra	5	Y	0	157	
Steno bredanensis	West Coast, US	8	Y	0	192	
Tursiops truncatus	"	29	Y	23	2441	
Tursiops truncatus	Palmyra	10	Y	0	10	

## 4.2 Samples from directed catches

**4.2 Samples from directed catches (commercial, aboriginal and scientific permits) or bycatches 2006****AFSC**

Species	Area/stock	Tissue type(s)	No. collected	Archived (Y/N)	No. analysed	Contact person/institute
Beluga whale	Bristol Bay	Blood, gastric, fecal, skin	18	18	18	Hobbs/ NMML

**SWFSC**

Species	Area/stock	Tissue type(s)	No. collected	Archived (Y/N)	No. analysed	Contact person/institute
Long-beaked common dolphin	E. N. Pacific	Skin, blubber, muscle, gonads, teeth, head	2	Y	2	SWFSC
Short-beaked common dolphin	E. N. Pacific	Skin, blubber, muscle, gonads, teeth, head	5	Y	5	SWFSC

**NWFSC, PIFSC**

None.

**4.3 Samples from stranded animals - 2008****NWFSC**

Species	Area/stock	Tissue type(s)	No. collected	Archived (Y/N)	No. analysed	Contact person/institute
Harbor porpoise	Eastern North Pacific/ Georgia Basin	Muscle ( <i>longissimus dorsi</i> – neonate, calf, and sub-adult)/blubber, stomach, skin	3/10	Y	0	Dawn Noren, NWFSC Brad Hanson, NWFSC
Killer whale	Eastern North Pacific, Georgia Basin – West Coast Transient	Muscle ( <i>longissimus dorsi</i> – adult)/ blubber, stomach, skin	1	Y	0	Dawn Noren, NWFSC Brad Hanson, NWFSC
Killer whale	Eastern Pacific, Central California Coast – West Coast Transient	Muscle ( <i>longissimus dorsi</i> – yearling (not sure of age or stock) blubber, stomach, skin	1	Y	0	Dawn Noren, NWFSC Brad Hanson, NWFSC
Killer whale	Pacific, Hawaiian Islands – Gulf of Alaska Transient	Muscle ( <i>longissimus dorsi</i> – sub-adult?) blubber, stomach, skin	1	Y	0	Dawn Noren, NWFSC Brad Hanson, NWFSC

**SWFSC**

Species	Area/stock	Tissue type(s)	No. collected	Archived (Y/N)	No. analysed	Contact person/institute
Long-beaked common dolphin	E. N. Pacific	Skin, blubber, gonad, teeth, etc	12	Y	12	SWFSC
Short-beaked common dolphin	E. N. Pacific	Skin, blubber, gonad, teeth, etc	2	Y	2	SWFSC
Common bottlenose dolphin	E. N. Pacific	Skin, blubber, gonad, teeth, etc	5	Y	5	SWFSC
Risso's dolphin	E. N. Pacific	Skin, blubber, gonad, teeth, etc	2	Y	2	SWFSC
Pacific white-sided dolphin	E. N. Pacific	Skin, blubber, gonad, teeth, etc	3	Y	3	SWFSC
Northern right whale dolphin	E. N. Pacific	Skin, blubber, gonad, teeth, etc	1	Y	1	SWFSC
Short-finned pilot whale	E. N. Pacific	Skull and post-cranial skeleton	1	Y	1	SWFSC

**AFSC, PIFSC**

None

**4.4 Analyses/development of techniques****SWFSC**

In 2008, SWFSC researcher Nicholas Kellar completed his doctoral dissertation entitled, "Hormones and Blubber: An endocrinological approach for assessing life-history states in free-ranging cetacean populations". Two molecular assays were developed as part of this research that identify demographic and reproductive states based on steroid hormone concentrations in blubber obtained from projectile biopsy. The first measures blubber progesterone to diagnose pregnancy. The work was first published prior to the dissertation (Kellar et al. 2006) and has since been fully validated on 8 species of small delphinoids and moreover there is strong evidence that it can be used across all cetacean species, including large whales (Trego and Kellar 2009). The assay has been used to investigate the potential effects for the pursue-seine tuna fishery on reproduction of spotted dolphin in the eastern tropical Pacific (Kellar et al. 2008). The second assay uses blubber androgens as indicators of male sexual maturation and reproductive seasonality. This work is due to be published in an upcoming issue of Marine Mammal Science (Kellar et al. 2008).

.TOSSM: an R package for assessing performance of genetic analytical methods in a management context. Molecular Ecology Notes (Martien et al., in press.) This paper describes a new R package designed for use in evaluating the performance of analytical methods for defining stocks. The package can be used to run simulations in which a particular method is used to define stocks, which are then subjected to managed harvest. The package outputs can be used to evaluate the performance of the analytical method with respect to both meeting conservation goals and maximizing allowable catch.

**AFSC, NWFSC, PIFSC**

None.

**5. POLLUTION STUDIES (2008)****NWFSC***Maternal transfer of persistent organic pollutants in bottlenose dolphins*

The purpose of this study is to assess the dynamics of the transfer of persistent organic pollutants (POPs) from female delphinids to their young during gestation and lactation. These compounds, which include DDTs, PCBs, and PBDEs, have been linked to reduced immune system efficiency and reproductive failure in pinnipeds. Although the dynamics of POP transfer have been studied in some pinniped species, there have been no such studies in cetaceans. Due to the differences in life history strategies and behavior in pinnipeds compared to delphinids, a study on maternal contaminant transfer in a delphinid species is warranted. Using captive bottlenose dolphins, *Tursiops truncatus*, as a model, placenta, blood, and milk were sampled from mother/calf pairs to assess 1) contaminant levels that are mobilized from the female to the calf during gestation, 2) contaminant levels that are mobilized from the female's blubber into her blood and then into the milk during lactation, and 3) the deposition of contaminants from the female's milk to her calf during the lactation period. The relationship between female body condition (body mass, blubber thickness measured via ultrasound) and the concentrations of POPs in the blood and milk samples will also be assessed. This analysis may shed light on how nutritional status of mothers may influence levels of contaminants that are transferred to their offspring. Sampling was initiated on 4 mother/calf pairs in June 2007 within one month following birth. Additional samples were collected when the calves were approximately 6 months of age and near the time of weaning when



the calves were approximately 1 year of age. Forty-seven of sixty samples (serum, milk, placenta) collected from the dolphins were chemically analyzed to determine persistent organic pollutant (PCB, PBDE, DDT, HCH, CHLD). Thirteen samples were not analyzed because they did not directly meet the goals of the study, and the expense for the analysis of these samples is fairly high. However, we will consider running these remaining samples once the data have been statistically and graphically analyzed, and it is deemed that the data would improve the study. Capelin and herring samples from the diet of the dolphins were also chemically analyzed and a sample of squid provided will be chemically analyzed soon. No statistical or graphical analysis of the contaminant concentration or body condition data have been conducted yet. (Contact: Dawn Noren, NWFSC)

*Persistent organic pollutants in blubber of Hawaiian False killer whales (Pseudorca crassidens)*

Chemical contaminant analyses have been completed on biopsy blubber samples of nine free-ranging false killer whales (*Pseudorca crassidens*) from the insular population around the main Hawaiian Islands, collected in July 2008. Wide ranges of persistent organic pollutant (POP) concentrations were measured in these animals, with PCBs and DDTs found at the highest levels compared to other POPs. Similar to previous studies on North Pacific killer whales, we found that the mean levels of  $\Sigma$ chlordanes,  $\Sigma$ DDTs and  $\Sigma$ PCBs were significantly different among the three age classes of whales, with adult females having lower values than those measured in adult males and subadults. Interestingly, subadult false killer whales had elevated levels of summed PBDE flame retardant levels, as well as dieldrin, beta-hexachlorocyclohexane and hexachlorobenzene compared to the other sampled animals. Although the POP concentrations measured in the false killer whales in the current study were generally equal to or lower than those reported for false killer whales that stranded in British Columbia or fish-eating eastern North Pacific killer whales, some of the animals in the current study were exposed to contaminant levels that could potentially affect their health. These data were presented at the Pacific Scientific Review Group Meeting in Maui, Hawaii in November 2008. (Contact: Gina Ylitalo, NWFSC)

*Effects of age, sex and reproductive status on persistent organic pollutant concentrations in Southern Resident killer whales*

“Southern Resident” killer whales (*Orcinus orca*)—comprising three “pods” (J, K and L) that reside in Puget Sound/Georgia Basin during the spring, summer and fall—were listed as “endangered” in the U.S. and Canada following a 20% population decline between 1996 and 2001. In the current study, blubber biopsies from 12 Southern Resident killer whales from these 3 pods were analyzed for persistent organic pollutants, and skin samples from these biopsies were analyzed for stable isotopes of carbon and nitrogen. Juvenile Southern Resident killer whales had statistically higher concentrations of certain contaminants (i.e.,  $\Sigma$ PBDEs,  $\Sigma$ HCHs and HCB) than were found for adults. Furthermore, most Southern Resident killer whales studied exceeded the health-effects threshold for total PCBs in marine mammal blubber (17,000 ng/g lipid) and, most notably, four juvenile whales exceeded the threshold by factors of 2 to 3.6. Maternal transfer of contaminants to the juveniles during a period when their biological systems were undergoing rapid development may have put them at greater risk than adults for adverse health effects. A paper detailing this research has been accepted for publication in Marine Pollution Bulletin. (Contact: Peggy Krahn, NWFSC)

*Levels of persistent organic pollutants and profiles of lipid classes in tissues of a humpback whale mother and calf pair*

As part of the NWFSC’s collaboration with the US Marine Mammal Health and Stranding Response Program, blubber biopsy samples of a mother and calf pair of humpback whales (*Megaptera novaeangliae*) that had been seen lingering in the Sacramento River in May 2007 were analyzed for persistent organic pollutants and lipid classes. The lipid blubber in both animals was comprised of triglycerides. Levels of  $\Sigma$ DDTs and  $\Sigma$ PCBs in blubber of the cow and calf were similar to levels reported in the literature for these contaminants in humpback whales. A report detailing the results of this study was delivered to Teri Rowles of the US Marine Mammal Health and Stranding Response Program. (Contact: Gina Ylitalo, NWFSC)

**AFSC, PIFSC, SWFSC**

None.

## 6. STATISTICS FOR LARGE CETACEANS

### 6.1 Corrections to earlier years’ statistics for large whales

### 6.2 Direct catches of large whales (commercial, aboriginal and scientific permits) for the calendar year 2008

Species	Type of catch	Area/stock	Males	Females	Total landed	Struck and lost
Bowhead whale	Aboriginal	Alaska	18	19	38	12

**6.3 Anthropogenic mortality of large whales for the calendar year 2006***6.3.1 Observed or reported ship strikes of large whales (including non-fatal events)***PIFSC**

Whale species	Sex	No.	Date	Location	Vessel type	Speed	Fate	How observed	Contact person/ institute and refs
Humpback whale	U	1	04/01/06	Maui, Hawaii	PC	14-15 mph	U	Crew	Ed Lyman/HIHWNMS/ MMD0626Mn-27
Humpback whale	U	1	17/01/06	Kauai, Hawaii	PC	15 knots	X	Crew	Ed Lyman/HIHWNMS/ MMD0627Mn-28
Humpback whale	U	1	13/02/06	Maui, Hawaii	O	10 knots	U	U	Ed Lyman/HIHWNMS/ MMD0636Mn-40
Humpback whale	F & U calf	1-2	09/03/06	Maui, Hawaii	PC	U	I	Crew	Ed Lyman/HIHWNMS/ MMD0648Mn-54
Humpback whale	U	1	15/03/06	Maui, Hawaii	U	U	U	Crew	Ed Lyman/HIHWNMS/ MMD0649Mn-55
Humpback whale	F & U calf	1-2	25/03/06	Maui, Hawaii	PC	25 mph	X	U	Ed Lyman/HIHWNMS/ MMD0655Mn-61
Humpback whale	U	1	28/12/06	Kauai, Hawaii	PC	15 knots	X	Crew	Ed Lyman/HIHWNMS/ MMD0681Mn-96
Humpback whale	U	1	29/12/06	Maui, Hawaii	U	U	I	Not observed; reported by another vessel	Ed Lyman/HIHWNMS/ MMD0682Mn-97
Humpback whale	U	1	30/12/06	Maui, Hawaii	U	U	I	Not observed; reported by another vessel	Ed Lyman/HIHWNMS/ MMD0684Mn-99

**AFSC, NWFSC, SWFSC**

None.

*6.3.2 Fishery bycatch of large whales***AFSC**

Whale species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Fin whale		1	16/8/06	Area 521	D	BSAI flatfish trawl fishery	TBB	F	Perez, 2007 (unpubl.)
Sperm whale		3	26-28/8/06	Area 640	D	GOA sablefish longline fishery	LL	F	Perez, 2007 (unpubl.)

BSAI: Bering Sea and Aleutian Islands, GOA: Gulf of Alaska

**PIFSC**

Whale species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Humpback whale	U	1	19/12/06	N/A	R	Tuna	LLS	F	NMFS Observer Program

**NWFSC, SWFSC**

None.

## 7. STATISTICS FOR SMALL CETACEANS

### 7.1 Corrections to earlier years' statistics for small cetaceans

Species	Type of catch	Area/stock	2006 reported landed	2006 corrected	2007 reported landed	2007 corrected
White whale	aboriginal	E. Bering Sea			202	203
White whale	aboriginal	Kuskokwim	9	10	10	31
White whale	aboriginal	Bristol Bay	20	22	15	17

data provided by Kathy Frost, ABWC (Alaska Beluga Whale Committee)

### 7.2 Direct catches of small cetaceans for the calendar year 2008

2008-DRAFT data provided by Kathy Frost, ABWC (Alaska Beluga Whale Committee)

Species	Type of catch	Area/stock	Males	Females	Total landed	Struck and lost
White whale	aboriginal	Beaufort sea			45	NA
White whale	aboriginal	Chukchi sea			74	NA
White whale	aboriginal	E. Bering Sea			72	NA
White whale	aboriginal	Kuskokwim			0	NA
White whale	aboriginal	Bristol Bay			19	NA
White whale	aboriginal	Cook Inlet			0	0

### 7.3 Anthropogenic mortality of small cetaceans for the calendar year 2006

#### 7.3.1 Observed or reported ship strikes of small cetaceans (including non fatal events)

None.

#### 7.3.2 Fishery bycatch of small cetaceans

##### AFSC

Whale species	Sex	No	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Dall's porpoise		1	26/7/06	Area 517	D	BSAI pollock trawl fishery	TX	F	Perez, 2007 (unpubl.)

##### PIFSC

Species	Sex	No	Date	Location	Fate	Targeted fish species	Gear	Source or contact
Tursiops truncatus	U	1	12/27/2005	N/A	R	Tuna	LLD	NMFS Observers
Grampus griesus	U	1	17/2006	N/A	D	Swordfish	LLS	NMFS Observers
Globicephala macrorhynchus	U	1	1/28/2006	N/A	R	Tuna	LLD	NMFS Observers
Grampus griesus	U	1	1/25/2006	N/A	R	Swordfish	LLS	NMFS Observers
Megaptera novaeangliae	U	1	2/19/2006	N/A	R	Swordfish	LLS	NMFS Observers
Unidentified	U	1		N/A	R	Tuna	LLD	NMFS Observers
Pseudorca crassidens	U	1	2/24/2006	N/A	R	Tuna	LLD	NMFS Observers
Tursiops truncatus	U	1	3/7/2006	N/A	R	Swordfish	LLS	NMFS Observers
Unidentified	U	1	3/12/2006	N/A	R	Tuna	LLD	NMFS Observers
Globicephala macrorhynchus	U	1	4/3/2006	N/A	R	Tuna	LLD	NMFS Observers
Grampus griesus	U	1	4/6/2006	N/A	R	Tuna	LLD	NMFS Observers
Pseudorca crassidens	U	1	4/21/2006	N/A	R	Tuna	LLD	NMFS Observers
Risso/pilot	U	1	4/26/2006	N/A	R	Tuna	LLD	NMFS Observers

Pseudorca crassidens	U	1	6/26/2006	N/A	R	Tuna	LLD	NMFS Observers
Unidentified	U	1	10/24/2006	N/A	R	Tuna	LLD	NMFS Observers
Pseudorca crassidens	U	1	11/11/2006	N/A	R	Tuna	LLD	NMFS Observers
Stenella coeruleoalba	U	1	11/25/2006	N/A	D	Tuna	LLD	NMFS Observers

**SWFSC**

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Common dolphin short-beaked	F	1	8 Dec 2006	32 36.6 N 118 04.2 W	D	<i>Xiphias gladius</i>	GND	F	Jim.Carretta@noaa.gov
Common dolphin short-beaked	M	1	13 Oct 2006	32 43.2 N 117 35.1 W	D	<i>Xiphias gladius</i>	GND	F	<a href="mailto:Jim.Carretta@noaa.gov">Jim.Carretta@noaa.gov</a>
Common dolphin short-beaked	F	1	13 Oct 2006	32 43.2 N 117 35.1 W	D	<i>Xiphias gladius</i>	GND	F	<a href="mailto:Jim.Carretta@noaa.gov">Jim.Carretta@noaa.gov</a>
Common dolphin long-beaked	M	1	5 Nov 2006	33 02.5 N 117 29.6 W	D	<i>Xiphias gladius</i>	GND	F	<a href="mailto:Jim.Carretta@noaa.gov">Jim.Carretta@noaa.gov</a>
Common dolphin short-beaked	F	1	6 Nov 2006	32 44.6 N 117 30.9 W	D	<i>Xiphias Gladius</i>	GND	F	<a href="mailto:Jim.Carretta@noaa.gov">Jim.Carretta@noaa.gov</a>
Common dolphin short-beaked	F	1	19 Nov 2006	33 00.0 N 117 28.3 W	D	<i>Xiphias gladius</i>	GND	F	<a href="mailto:Jim.Carretta@noaa.gov">Jim.Carretta@noaa.gov</a>
Common dolphin short-beaked	F	1	19 Nov 2006	33 00.0 N 117 28.3 W	D	<i>Xiphias gladius</i>	GND	F	Jim.Carretta@noaa.gov

**NWFSC**

None.

**8. STRANDINGS****PIFSC**

The NOAA Fisheries Pacific Islands Regional Office's (PIRO) Protected Resources Division (PRD) guides the **Marine Mammal Response Network**, working with various partners and volunteers to respond to live and dead stranded or distressed marine mammals in the main Hawaiian Islands under the authority of the MMPA. The Response Network consists of cetacean and monk seal response in the main Hawaiian Islands, Northwest Hawaiian Islands, Guam, American Samoa, and the Northern Mariana Islands. In Hawaii, two primary entities, the Hawaii Pacific University and the University of Hawaii at Hilo, have NOAA Fisheries authorization to respond to and "take" marine mammals for rescue, rehabilitation, release of live cetaceans, and necropsy and sampling of those that wash ashore dead or those that strand alive but die or are humanely euthanized. Hawaii Pacific University is designated to respond to and sample dead stranded cetaceans. The responsibilities of the stranding network for cetaceans include but are not limited to: responses/investigations of mortality events; biomonitoring; tissue/serum banking; and analytical quality assurance.

Species	No. strandings	No. post mortems	Contact person(s)/ Institute(s)	Contact email address(es)
Humpback whale	6	5	David Schofield/NOAA PIRO	<a href="mailto:david.schofield@noaa.gov">david.schofield@noaa.gov</a>
Short-finned pilot whale	2	0	David Schofield/NOAA PIRO	<a href="mailto:david.schofield@noaa.gov">david.schofield@noaa.gov</a>
False killer whale	1	0	David Schofield/NOAA PIRO	<a href="mailto:david.schofield@noaa.gov">david.schofield@noaa.gov</a>
Spinner dolphin	4	1	David Schofield/NOAA PIRO	<a href="mailto:david.schofield@noaa.gov">david.schofield@noaa.gov</a>
Pygmy sperm whale	2	0	David Schofield/NOAA PIRO	<a href="mailto:david.schofield@noaa.gov">david.schofield@noaa.gov</a>
Cuvier's beaked whale	1	0	David Schofield/NOAA PIRO	<a href="mailto:david.schofield@noaa.gov">david.schofield@noaa.gov</a>
Risso's dolphin	1	0	David Schofield/NOAA PIRO	<a href="mailto:david.schofield@noaa.gov">david.schofield@noaa.gov</a>

**SWFSC**

Southwest Fisheries Science Center (SWFSC) responds to dead cetaceans strandings along the San Diego coastline year round, whereas Sea World responds to live pinniped and cetacean strandings. SWFSC receives samples from cetaceans that expire during rehabilitation and those are included in this summary.

Species	No. strandings	No. post mortems	Contact person(s)/ Institute(s)	Contact email address(es)
Fin whales	9	2	Liam O'Flynn, TCD	oflynn@guinness.com
Long-beaked common dolphin	17	17	Kerri Danil, SWFSC	Kerri.Danil@noaa.gov
Short-beaked common dolphin	2	2	Kerri Danil, SWFSC	Kerri.Danil@noaa.gov
Common bottlenose dolphin	2	2	Kerri Danil, SWFSC	Kerri.Danil@noaa.gov
Risso's dolphin	1	1	Kerri Danil, SWFSC	Kerri.Danil@noaa.gov

**AFSC, NWFSC**

None.

**9. OTHER STUDIES AND ANALYSES****AFSC***Bowhead Whale Aerial Survey*

Investigation into the Bowhead Whale Aerial Survey Project (BWASP) survey design and field protocols are underway and analysis of the historic time series is planned for the near future. The BWASP aerial surveys have been conducted in the Alaskan Beaufort Sea since 1979. The early years of the survey were conducted by the U.S. Bureau of Land Management. From 1982 through 2007, the U.S. Minerals Management Service (MMS) directed and funded the surveys. Beginning in 2007, MMS provided funding to the National Marine Mammal Laboratory (NMML) to continue BWASP into the future. The ongoing goals for the survey are to define the spatiotemporal distribution of the annual fall migration of bowhead whales, and to investigate variability and trends therein. To date, the BWASP time series has been used primarily for drafting Environmental Impact Statements and Environmental Assessments, although the potential applications for these data are numerous. The current and upcoming investigations into the BWASP survey design, field protocol, and historic data will: 1) identify and quantify biases in the survey design and historical data; 2) determine whether the historical data can provide unbiased information to address the survey goals, and, if so, quantify the statistical power of the analyses; and 3) determine whether changes should be made in the survey design or protocol. (Contact: M. Ferguson, AFSC)

## Arctic Issues

*Passive Acoustic IPY Research*

Three passive acoustic recorders were deployed on existing oceanographic moorings in Arctic waters, as part of an International Polar Year (IPY) collaboration with colleagues in Norway, Germany and Canada. The recorders were deployed in July (Germany – Fram Strait/east), September (Norway – Fram Strait/west) and October (Canada – Chukchi Borderland) and with the exception of the Fram Strait/east location will be recovered and re-deployed in 2009. The intent of the study is to acquire baseline data on cetacean calling behaviour, and on Arctic ambient noise budgets in advance of anticipated increases in commercial shipping and offshore industrial activities. (Contact: Sue Moore, S&T).

*Marine Mammals as Sentinels of Arctic Ecosystems in Transition*

The June 2008 publication of *Marine Mammals as Ecosystem Sentinels* (Moore 2008) precipitated invitations to provide plenary presentations at: the annual meeting of the Mexican Society of Marine Mammals (SOMMEMA, May 2008); the American Cetacean Society (ACS, November 2008); the Gordon Research Conference (GRC, March 2009); and the Arctic Science Summit Week (ASSW, March 2009). The over-arching message is that marine mammals can act as sentinels to ecosystems in transition in response to the rapid climate change now evident in the Arctic. (Contact: Sue Moore, S&T).

*Arctic Council/CAFF Circumpolar Mariner Biodiversity Monitoring Program*

Current Arctic biodiversity monitoring efforts are insufficient to provide an integrated picture of the status and trends in key species, habitat, processes and services. In response the Arctic Council/Conservation of Arctic

Flora and Fauna (CAFF) convened the first of two workshops for implementation of the Circumpolar Biodiversity Monitoring Program (CBMP) focused on marine ecosystems. The Marine Expert Monitoring Group (MEMG) met 16-18 January 2009 (Tromso, Norway) and a sub-set of the group met 20-21 April 2009 (Washington DC) pursuant to the development of an Integrated Monitoring Plan (IMP) for Arctic marine ecosystems. A second workshop is anticipated in October 2009, with completion of the IMP anticipated by December 2009. (Contact: Sue Moore, S&T).

## **NWFSC**

### *Diving physiology studies*

#### *Development of oxygen stores and diving capabilities of Pacific Ocean cetaceans*

This study is being conducted to assess the diving capabilities of cetaceans from the Pacific Ocean. Since 2005, muscle samples (*longissimus dorsi*) from stranded, freshly dead harbor porpoise (n=17), Dall's porpoise (n=1), and killer whales (n=4) of all age and sex classes in good to excellent condition have been collected to assess muscle myoglobin content and acid buffering capacity in this important swimming muscle. These data will be used to assess muscle oxygen stores, the ability of the muscle to cope with anaerobic metabolites, and diving duration capabilities. This area of research is important to gaining a better understanding of how limitations in prey availability might impact marine mammals, particularly younger individuals, who may have limited diving capacity. Samples from all age classes, including neonates and juveniles are being collected to assess how diving capabilities improve with age, as has been observed in several pinniped species and one cetacean, the bottlenose dolphin. Limitations in juvenile diving capabilities may have important implications for survival if prey resources are limited. All samples collected through 2007 have been analyzed. Samples collected in 2008 (3 harbor porpoises and 3 killer whales) will be analyzed in 2009. At this time, the harbor porpoise data set is the only one of sufficient size to permit statistical and graphical analysis. Preliminary results show that neonates and calves have reduced muscle oxygen stores and acid buffering capacity and are thus at a disadvantage for diving, compared to sub-adult and adult animals. However, harbor porpoise diving capacities do develop at a faster rate than bottlenose dolphins. Preliminary results from this work have been presented at two scientific conferences. (Contact: Dawn Noren, NWFSC)

### *Satellite tagging studies*

#### *Movements and habitat use of Pacific Northwest medium sized cetaceans*

One of the long-term objectives of our studies of killer whales in the Pacific Northwest was to better define the role of transient killer whales in Puget Sound and eastern North Pacific Ocean ecosystem. In previous years we have deployed suction-cup attached time-depth recorders on transients to better understand their localized habitat use and plan to continue this effort. In addition, understanding this ecotype's long-range movements is needed to assess their role in this ecosystem in response to the recent debate on the true role of this top predator in the North Pacific Ocean. Consequently, using a well-tested technique that has been used extensively on killer whales in Alaska and Antarctica, as well as on several species of cetaceans in Hawaii, we satellite tagged three transient killer whales in Puget Sound. We were able monitor the movements of up to one whale for up to 94 days. The whales moved as far north as southeast Alaska but most of their movements were in the coastal waters of British Columbia. In addition, we tagged a minke whale in Puget Sound. It remained in Puget Sound for the 26 days we received location data. (Contact: Brad Hanson, NWFSC)

#### *Assessing tag attachment performance and tissue response to remotely-deployed dorsal fin mounted telemetry tags*

An important part of assessing the impact and improving a relatively new tag design that implants only the anchor darts of the tag in the dorsal fin of the whale was to monitor the attachment performance and tissue response using resight data. Sixty-four tags have been deployed since 2006 on Blainville's and Cuvier's beaked whales, as well as melon-headed, pilot, and false killer whales in Hawaii. The island association of these species and year-round good weather conditions allowed periodic resightings. The tissue response observed during the tag loss process was predictable. Inflammation, a normal wound response, was commonly observed, but there was no evidence of infection. Following tag loss the majority of healing occurred within about 3 months. Lasting evidence of the tag loss typically involved minor swelling or a slight depression, and a small area of depigmentation at the dart penetration sites. The lack of major tissue damage, and an observation of one of the whales with a calf post-tag loss, demonstrates this technique has no significant adverse long-term impact. (Contact: Brad Hanson, NWFSC)

### *Resident killer whales studies*

#### *Energetics studies*

#### *Energetic cost of performing surface active behaviors*

A study was conducted in 2005 to measure the energetic cost of surface active behaviors (breaches, tail slaps, etc.) that can be performed in response to vessel disturbance. To accomplish this, oxygen consumption of two trained bottlenose dolphins was measured using flow-through respirometry following bouts of surface active behaviors (tail slaps and breaches) that have been performed by cetaceans in response to disturbance by vessels. In order to assess how the number of successive behaviors performed in a bout affects metabolism, oxygen consumption following both low intensity bouts of breaches (n=5 breaches in a row) and high intensity bouts of breaches (n=10 breaches in a row) were measured. Data are still being analyzed. Analysis of respiration rates data in 2007 and visual inspection of the respirometry data show that bouts of breaches are energetically more expensive than bouts of tail slaps. Although tail slaps increase metabolism over resting values, these increases are not as significant as the increase in metabolism caused by breaches. These data in combination with field behavioral studies of cetacean vessel interactions (e.g., Southern Resident killer whales, see below) will allow us to assess whether cetaceans incur increased energetic costs in the presence of vessels. By knowing the metabolic cost of these behaviors, we will better understand the potential for vessel disturbance to increase energetic requirements (e.g., prey consumption) and the potential impact to individuals. An abstract describing the results of this work has been submitted to the 2009 Biennial Conference of the Society for Marine Mammalogy. (Contact: Dawn Noren, NWFSC)

#### *Cost of swimming in adult killer whales*

A study was conducted to determine the energetic cost of transport in killer whales. Data on average swimming speed and respiration rates collected from adult Northern Resident killer whales (data from Rob Williams) were used in combination with published values of oxygen consumption in captive killer whales (Kriete 1995) to determine cost of transport (COT) curves over a range of speeds (up to approximately  $3.0 \text{ ms}^{-1}$ ) for adult male and female killer whales. The results show that killer whales can swim efficiently over a range of speeds, but that the optimum travel speed, corresponding to the speed with the minimum cost of transport, ranges between  $2.6\text{-}3.0 \text{ ms}^{-1}$ . This is similar to the average travel speed ( $2.9 \text{ ms}^{-1}$ ) of Northern Resident killer whales reported by Ford (1989). Finally, females with calves aged 0-2 years old have higher respiration rates than females without calves. As a result, the calculated COT for females with calves is greater than females without calves. This result could be due to a potential higher energetic cost to females with calves travelling in echelon or it could be an artifact of females surfacing more frequently to maintain contact with their calves, which have reduced breath-hold capabilities. Publication: Williams, R. and Noren, D.P. 2009 (Published online 24 Oct. 2008). Swimming Speed, respiration rate and estimated cost of transport in adult killer whales. *Marine Mammal Science* 25(2):327-350. (Contact: Dawn Noren, NWFSC)

#### *Energetic needs and prey consumption rates of Southern Resident killer whales*

A study was conducted to determine the daily prey energetic needs for the Southern Resident killer whale population. Body mass, daily energy expenditure, and daily prey energetic needs were estimated for all age and sex-classes in the Southern Resident killer whale population. Results for the predicted daily energy expenditure in adult male and female killer whales agreed with the daily energy expenditure calculated from the energetic cost of transport at specific swimming speeds (from above study) and a daily activity budget that included average swimming speeds for various behaviours and the percentage of time engaged in the behaviours (e.g., foraging, travelling, resting, socializing, and beach-rubbing; from Ford 1989). The results from 2007 were updated to account for body growth after sexual maturity in males and females. The updated results were submitted to the NOAA Northwest Regional office to inform biological opinions on salmon fisheries, and a manuscript is being prepared for publication in a peer-reviewed journal. (Contact: Dawn Noren, NWFSC)

#### *Vessel interactions and noise effects on Southern Resident killer whales*

##### *Energetic impacts of vessel disturbance to Southern Resident killer whales*

The main goal of this study was to investigate the energetic costs to killer whales in the response to vessels. Summary statistics and some advanced statistical analysis of data from all study years (2004-2006) were completed in 2008. Preliminary results show that killer whale diving and swimming behaviors change with the number of vessels present within 1000 m. These behaviors also differ across activity states, and for many parameters, by gender. Furthermore, the behavioral changes in response to number of vessels present within 1000 m vary by gender, year, and potentially activity state. Concurrent with this study, killer whale group behavior data were collected on 2006 to examine geographic locations where different behavior states (rest, travel, forage, and socialize) occur and how the diving parameters, swim speeds, spatial arrangement (flank, linear, nonlinear), and proximity (contact, tight, loose, spread) of individual whales in a group relate to these behaviors and geographic location. GIS analyses of these data were completed in 2007, and draft papers are being prepared for submission to a scientific journal. In another study resulting from this work on energetic costs to killer whales in response to vessels, data from 2005 and 2006 were analyzed to investigate the occurrence of surface active behaviors relative to vessel distances and mode of operation. The highest frequency of surface active behaviors (SABs) occurred when the nearest vessel was within 75-99 meters and 125-149 meters of the focal whale in 2005 and 2006, respectively. In both years, approximately 70% of all SABs

occurred when the closest vessel was within 224 meters of the whale. Furthermore, the majority of SABs were performed immediately prior to or soon after the closest approach by a vessel and while the vessel was motoring. These results suggest that close approaches by vessels elicit behavioral responses in SRKW and that the minimum approach distance of 100 m in whale-watching guidelines may be insufficient in preventing behavioral responses from whales. Publication: Noren, D.P., Johnson, A., Rehder, D., and Larson, A. In press. Close approaches by vessels elicit surface active behaviors in Southern Resident killer whales. *Endangered Species Research*. (Contact: Dawn Noren, NWFSC)

#### *Investigating noise effects on the acoustic signals of Southern Resident killer whales*

The main goal of this ongoing research project is to determine the effects of sound exposure, particularly from anthropogenic sources, on Southern Resident killer whales. In 2008, vocal compensation was investigated in SRKW calls and biosonar signals to determine the degree to which whales compensate for changing levels of background noise. In addition, whale and vessel behavior data were also collected to determine what contribution vessel traffic had on background noise levels and how noise levels influenced whale behavior. Results from the 2007 season were reported by Holt et al. 2009 showing that as background noise levels increased from motorized vessel traffic so too did the call levels of Southern Resident killer whales. Acoustic data are currently being analyzed from the 2008 field season. Most data collected thus far were from J pod and field efforts will continue in 2009 to obtain more data from the other two Southern Resident pods. Publication: Holt, M.M., Noren, D., Veirs, V., Emmons, C., and Veirs, S. 2009 (Published online 22 Dec 2008). Speaking up: Killer whales (*Orcinus orca*) increase their call amplitude in response to vessel noise. *JASA Express Letters*. 125: EL27-EL32. (Contact: Marla Holt, NWFSC)

#### *Annual southern resident killer whale survey*

The annual photo-identification survey was conducted to document all individual Southern Resident killer whales present 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. Photo-ID Catalogue is updated annually. (Contact: Ken Balcolmb, Center for Whale Research)

#### *Distribution and habitat of southern resident killer whales*

Studies on winter and summer distribution of Southern Resident killer whales were continued in 2008. 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 observers and other scientists. Southern resident killer whales were sighted in California waters and off the Washington coast in 2006.

Results of passive acoustic recorders deployed in winter 2008 off the Washington coast documented the presence of southern resident killer whales in May 2008. This study continues in 2009. (Contact: Brad Hanson, NWFSC)

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

Prey remains and fecal samples were collected periodically in the summer and fall range of southern resident killer whales in 2008 in conjunction with behavioural cues of predation events. Of fish remains collected Chinook predominated. This species was also predominant in fecal material collected during this season. Genetic analyses of Chinook identified from scales and tissue were primarily from the Fraser River. (Contact: Brad Hanson, NWFSC)

#### *Genetic Studies*

A study to investigate the paternity of southern resident killer whales (*Orcinus orca*) was undertaken using biopsy samples and fecal samples from known individuals. To date, very tentative results indicate that breeding within and between pods appears to be occurring. Effective size appears to be very low (~25). Power to assign parents is relative poor. There is genetic substructure even within this small population. However, additional measures of genetic diversity will need to be developed and additional samples from the population will need to be obtained. (Contact: Mike Ford, NWFSC)

#### *Feeding ecology studies*

##### *Feeding Ecology of beluga whales in Cook Inlet and Bristol Bay Alaska*

As part of an ongoing study to describe the feeding ecology of belugas (*Delphinapterus leucas*) from Cook Inlet and Bristol Bay, Alaska, blubber/skin samples from FY06-FY07 stranded Cook Inlet Beluga whales (n=3) and FY08 capture and release Bristol Bay beluga whales (n=10) were collected by the National Marine Mammal Laboratory and analyzed at the NWFSC laboratory for 15N and 13C stable isotopes (SIs), fatty acids (FAs) and persistent organic pollutants (POPs). In addition, representative samples of some of their potential prey were also analyzed for these chemical markers; sockeye salmon (n=6), pink salmon (n=5), coho salmon (n=4), starry flounder (n=1), Pacific herring (n=12), and rainbow smelt (n=3). All of these new data were combined with



analogous results obtained for Cook Inlet beluga whales and representative samples of the putative prey from previous years (FY02-FY06) with the goal of determining the predominant diet of the stock of beluga whales in these two regions during the spring and summer months.

For the Cook Inlet population, the beluga (and prey) fatty acid and stable isotope results were combined into a single multilinear regression model and the contribution of each prey species to the diet of these whales enumerated. Among the 10 Cook Inlet prey species studied to date, salmon appear to have FA and SI combined results that are most consistent with those measured in the skin/blubber tissues of these whales with chum, sockeye, and coho being most prevalent. Results of this study were presented as a poster presentation in Silver Springs Maryland as part of a Hollings Scholarship research project requirement and also presented at the 2nd Northwest Fisheries Science Center Symposium. An abstract of the poster (filename: "NWFSC\_Poster\_Feb 2009.doc") is attached. Too few representative prey species of the Bristol Bay beluga population have been collected at present to enable an assessment of the most likely prey of these whales to be similarly identified. It is anticipated that additional prey samples will be collected from both Cook Inlet and Bristol Bay in the upcoming year and the predominant prey of these whales re-evaluated (Contact: David Herman, NWFSC).

*Variability in the prey diversity and preferred foraging habitat of resident killer whales in the Gulf of Alaska*  
Blubber/skin biopsy samples from live, free-ranging Gulf of Alaska resident killer whales (n=26) were collected in FY06/07 by the North Gulf Oceanic Society and these samples analyzed at the NWFSC laboratory for 15N and 13C stable isotopes, fatty acids, and persistent organic pollutants. These new data were combined with equivalent results obtained from Gulf of Alaska resident killer whales in previous years (FY01-FY05) for the purpose of studying the extent that prey diversity and apparent foraging habitat varies among the numerous pods and matriline that constitute this population of killer whales.

Significant differences in both skin stable isotope values and blubber fatty acids were found both among the various pods, and most interestingly, among matriline within individual pods, suggesting that matriline associations may be a more important factor in prey selection among these whales than previously known. Blubber/skin samples from additional whales biopsied in FY08 will be analyzed in FY09 and these chemical markers utilized to further assess the inter-pod, inter-matriline, and intra-matriline prey preferences and foraging habitats of these whales. This project is ongoing (Contact: David Herman and Gina Ylitalo, NWFSC).

*Feeding ecology of transient killer whales in Alaskan coastal waters (Alaska Peninsula, Aleutian Islands, and Bering Sea)*

The goal of this ongoing study is to use these chemical markers to help infer the predominant prey of these transient killer whales with emphasis on assessing extent that the prey preferences of these whales differ among the various regions in the area, specifically western Aleutian Islands, central Aleutian Islands, eastern Aleutian Islands, and the Bering Sea. Also, these data are being evaluated to determine if any of these chemical markers can be used to indicate the extent that individuals among these various regional groups migrate south to/from the North Pacific Transition Zone.

Blubber/skin biopsy samples from live, free-ranging transient killer whales (n=14) were collected in Alaskan coastal waters in FY06 by the National Marine Mammal Laboratory and these samples analyzed at the NWFSC laboratory for 15N and 13C stable isotopes, fatty acids, and persistent organic pollutants. In addition, by-catch and/or stranding event tissue samples (skin, blubber, and/or white muscle) were collected and similarly analyzed for several species of marine mammals that are believed to be potential prey of these populations of killer whales, specifically minke whales (n=2), harbor porpoises (n=2), Pacific white-sided dolphins (n=2), Steller sea lions (n=6), and ringed seals (n=2) and these tissues also analyzed for these three chemical markers. Data from these newly acquired samples were combined with results obtained from killer whale and putative prey samples collected and analyzed between FY02 and FY05 as part of North Pacific Research Board Projects #0411 and #0535.

Significant differences in stable isotope values and blubber fatty acids are observed among all of the regional groups with the largest difference being observed among the western-/central Aleutian Island group and those animals found foraging in the eastern Aleutian Islands and Bering Sea. However, additional representative marine mammal prey samples will have to be collected and analyzed from each of these regions before it can be determined if these differences can be attributed to differing prey specializations among these groups or if these differences are more attributable to differences in these chemical markers originating at the base of the food chains in these regions (Contact: David Herman and Doug Burrows, NWFSC).

*Ageing from chemical signatures in free-ranging animals*

*Age determination of humpback whales through blubber fatty acid compositions of biopsy samples.*

The goal of this ongoing project was to significantly increase the number humpback whales of known-age having had their endogenous blubber fatty acid compositions measured and use this expanded dataset to derive empirical bi-variate regression models capable of predicting the ages of these whales with sufficient precision to

be quantitatively useful. Specifically, blubber biopsy samples from known-age FY04-FY08 free-ranging humpback whales (n=18) collected by Professor Jan Straley (Univ. of Alaska – Sitka) on their feeding grounds in Southeast Alaska and on their breeding grounds in Hawaii, as well as known-age humpback whales collected by the Provincetown Center for Coastal Studies in FY04-FY07 in the Gulf of Maine (feeding grounds) and West Indies (breeding grounds), were analyzed at the NWFSC laboratory for their blubber fatty acid compositions. These new data were combined with fatty acid results obtained in the previous year for known-age humpback whales from these two populations

Although the uncertainties (standard deviations) in the fatty acid-age models derived were somewhat variable and ranged between 3.1 and 5.3 years for the specific populations modelled, the results indicate that it should be possible to estimate the age of any one individual humpback whale of unknown age from either of these two populations with better than decadal resolution from measurements of specific endogenous fatty acids in their outer-blubber layers. A manuscript describing this new method of ageing humpback whales was written and submitted for publication in Marine Ecology Progress Series in March 2009 (Contact: David Herman, NWFSC).

*Emergence of algal toxins in marine mammals as an indicator of marine climate change*

Researchers at NWFSC are currently involved in an effort to establish a baseline data set for the presence of algal toxins in marine mammals along the west coast from Alaska to California by measuring algal toxins (domoic acid and paralytic shellfish poisoning toxins) in fecal, urine and serum samples using commercially available ELISA kits for screening and LC/MS for confirmation of positive results. We receive samples from stranded/dead animals collected by members of several regional stranding networks and marine mammal centers. We are particularly interested in the emergence of domoic acid in marine mammals in Alaskan waters in the context of global climate change. The cetacean species we are most likely to receive opportunistically collected samples from include belugas, killer whales, harbor porpoises, humpback whales, and bowhead whales. Data will be made available to researchers providing samples. (Contact: Kathi Lefebvre, NWFSC)

**PIFSC, SWFSC**

None.

**10. LITERATURE CITED**

- Kellar, N. M., M. L. Trego, C. I. Marks, and A. E. Dizon. 2006. Determining pregnancy from blubber in three species of delphinids. *Marine Mammal Science* 22:1-16.
- Kellar, N. M., M. L. Trego, S. J. Chivers, and F. I. Archer. 2008. Pregnancy patterns of spotted dolphins in the eastern tropical Pacific determined from hormonal analysis of biopsies and their correlation with the purse-seine tuna fishery. Ph.D. Thesis, University of California, San Diego, La Jolla.
- Kellar, N. M., M. L. Trego, C. I. Marks, S. J. Chivers, K. Danil, and F. I. Archer. 2008. Blubber testosterone: A potential marker of male reproductive status in short-beaked common dolphins. *Marine Mammal Science*. In press.
- Martien, K.K., D. Gregovich, M.V. Bravington, A.E. Punt, A.E. Strand, D.A. Tallmon, B.L. Taylor. TOSSM: an R package for assessing performance of genetic analytical methods in a management context. *Molecular Ecology Notes*, in press.
- Moore., S.E. 2008. Marine mammals as ecosystem sentinels. *Journal of Mammalogy* 89(3): 534-540.
- Perez, M.A. 2007. Bycatch of marine mammals in the groundfish fisheries of Alaska, 2006 (Unpubl. Ms., NMML)
- Trego, M. L., and N. M. Kellar. 2009. A comparison of progesterone in the blubber of female delphinoides: *Delphinus capensis*, *Stenella attenuata*, *Stenella longirostris*, and *Phocoenoides dalli*. In prep.

**11. PUBLICATIONS**

**11.1 Published or ‘In Press’ papers only**

**AFSC**

- Dahlheim, M.E., Schulman-Janiger, A., Black, N., Ternullo, R., Ellifrit, D. and Balcomb, K.C. 2008. Eastern temperate North Pacific offshore killer whales (*Orcinus orca*): occurrence, movements, and insights into feeding ecology. *Marine Mammal Science* 24(3): 719-729.
- Dahlheim, M.E., White, P., and Waite, J.M. 2009. Cetaceans of southeast Alaska: distribution and seasonal occurrence. *Journal of Biogeography* 36(3): 410-426.
- Dalla Rosa, L., Secchi, E.R., Maia, Y.G., Zerbini, A.N. and Heide-Jørgensen, M.P. 2008. Movements of satellite-monitored humpback whales on their feeding ground along the Antarctic Peninsula. *Polar Biology* 31(7): 771-781.
- Huntington, H.P. and Moore, S.E.. 2008. Assessing the impacts of climate change on Arctic marine mammals. *Ecological Applications* 18(2 Supplement): S1-S2.
- Ivashchenko, Y., Clapham, P., and Brownell, R. (eds.). 2008. The truth about Soviet whaling: a memoir, by Alfred A. Berzin. Translated from Russian by Yulia V. Ivashchenko. *Marine Fisheries Review* 70(2): 1-59. Available online at: <http://spo.nmfs.noaa.gov/mfr702/mfr702.html>
- Moore, S.E. 2008. Marine mammals as ecosystem sentinels. *Journal of Mammalogy* 89(3): 534-540. Available online (open access) at: <http://www.bioone.org/archive/1545-1542/89/3/pdf/i1545-1542-89-3-534.pdf>
- Munger, L. M., Wiggins, S.M Moore, S.E. and Hildebrand, J.A. 2008. North Pacific right whale (*Eubalaena japonica*) seasonal and diel calling patterns from long-term acoustic recordings in the southeastern Bering Sea, 2000–2006. *Marine Mammal Science* 24(4): 795-814.
- Parsons, K. M., Balcomb III, K.C., Ford, J.K.B. and Durban, J.W.. 2009. The social dynamics of southern resident killer whales and conservation implications for this endangered population. *Animal Behaviour* 77(4): 963-971.
- Rugh, D. J., Muto, M.M., Hobbs, R.C., and Lerczak, J.A. 2008. An assessment of shore-based counts of gray whales. *Marine Mammal Science* 24(4): 864-880.
- Stafford, K.M., Moore, S.E., Laidre, K.L. and Heide-Jørgensen, M.P. 2008. Bowhead whale springtime song off West Greenland. *Journal of the Acoustical Society of America* 124(5): 3315-3323.
- Streever, B., Angliss, R.P., Suydam, R., Ahmaogak, M., Bailey, C., Blackwell, S.B., George, J.C., Greene Jr., C.R., Jakubczak, R.S., Lefevre, J., McDonald, T.L., Napageak, T. and Richardson, W.J. 2008. Progress through collaboration: a case study examining effects of industrial sounds on bowhead whales. *Bioacoustics* 17(1-3): 345-347.
- NWFSC**
- Herman, D.P., Ylitalo, G.M., Matkin, C.O., Durban, J.W., Hanson, M.B., Dahlheim, M.E., Straley, J.M., Tilbury, K.L., and Krahn, M.M. 2008. Assessing the age-distributions of killer whale (*Orcinus orca*) populations from the composition of endogenous fatty acids in their outer-blubber layers. *Marine Ecology Progress Series* 372: 289–302.
- Holt, M.M., Noren, D., Veirs, V., Emmons, C., and Veirs, S. 2009. (Published online 22 Dec 2008). Speaking up: Killer whales (*Orcinus orca*) increase their call amplitude in response to vessel noise. *JASA Express Letters* 125: EL27-EL32.
- Krahn, M.M, Hanson, M.B., Schorr, G.S., Eammons, C.K., Burrows, D.G., Bolton, J.L., Baird, R.W., and Ylitalo, G.M. In press. Effects of age, sex and reproductive status on persistent organic pollutant concentrations in “Southern Resident” killer whales from three fish-eating pods. *Marine Pollution Bulletin*
- Laake, J., Guenzel R.J., Bengtson J.L., Boveng P, Cameron M., and Hanson M.B. 2008. Coping with variation in aerial survey protocol for line-transect sampling. *Wildlife Research* 35: 289–298.
- Noren, D.P., Johnson, A., Rehder, D., and Larson, A. In press. Close approaches by vessels elicit surface active behaviors in Southern Resident killer whales. *Endangered Species Research*.
- Williams, R. and Noren, D.P. 2009 (Published online 24 Oct. 2008). Swimming Speed, respiration rate and estimated cost of transport in adult killer whales. *Marine Mammal Science* 25(2):327-350.
- PIFSC**
- Johnston, D.W., Robbins, J., Chapla M.E., Mattila, D.K., Andrews, K.R. 2008. Diversity, relative abundance and stock structure of odontocete cetaceans in the waters of American Samoa, 2003-2006. *J. Cet. Res. Man.* 10(1):59-66.

Johnston, D.W., Chapla, M.E., Williams, L.E., Mattila, D.K. 2007. Identification of humpback whale (*Megaptera novaeangliae*) wintering habitat in the Northwestern Hawaiian Islands using spatial habitat modeling. *End. Spec. Res.* 3:249-257.

### SWFSC

Bradford, A. L., D. W. Weller, P. R. Wade, A. M. Burdin, and R. L. Brownell, Jr. 2008. Population abundance and growth rate of western gray whales *Eschrichtius robustus*. *Endangered Species Research* 6:1-14.

Brownell, R. L., Jr., Nowacek, D. P., Ralls, K. 2008. Hunting cetaceans with sound: A worldwide review. *Journal of Cetacean Research and Management* 10(1):81-88.

Brownell, R. L., Jr., Ralls, K., Baumann, S., Poole, M. M. In press. Behavior of melon-headed whales, *Peponocephala electra*, near oceanic islands. *Marine Mammal Science* 25:000-000.

Carretta, J.V., Forney, K.A., Lowry, M.S., Barlow, J., Baker, J., Johnston, D., Hanson, B., Muto, M.M., Lynch, D., and Carswell, L. 2008. *U.S. Pacific Marine Mammal Stock Assessments: 2008*. NOAA-TM-NMFS-SWFSC-434. Technical Memorandum  
[http://swfsc.noaa.gov/uploadedFiles/Divisions/PRD/Programs/Coastal\\_Marine\\_Mammal/Pacific%202008%20SARs%20Final.pdf](http://swfsc.noaa.gov/uploadedFiles/Divisions/PRD/Programs/Coastal_Marine_Mammal/Pacific%202008%20SARs%20Final.pdf)

Harino, H., Ohji, M., Brownell, R. L., Arai, T. and Miyazaki, N. 2008. Concentrations of organotin compounds in the stranded killer whales from Rausu, Hokkaido, Japan. *Arch Environ Contam Toxicol* 55:137-142.

Reeves, R.R. and Brownell, R.L., Jr. (Editors). 2009. Indo-Pacific bottlenose dolphin assessment workshop report: Solomon Islands case study of *Tursiops aduncus*. *Occasional Paper of the Species Survival Commission*, No. 40, IUCN, Gland, Switzerland. 53 pp.

Urban, J. et al. 2008. Mass stranding of Baird's beaked whales at San Jose Island, Gulf of California, Mexico. *LAJAM* 6(1):83-88.

Viaud-Martinez, K. A., Brownell, R. L., Jr., Kommenou, A., and Bohonak, A. J. 2008. Genetic isolation and morphological divergence of Black Sea bottlenose dolphins. *Biological Conservation* 141:1600-1611.

Weller, D.W., A. L. Bradford, H. Kato, T. Bando, S. Ohtani, A. M. Burdin and R. L. Brownell, Jr. 2008. Photographic match of a western gray whale between Sakhalin Island, Russia, and Honshu, Japan: First link between feeding ground and migratory corridor. *Journal of Cetacean Research and Management* 10(1):89-91.

Yang, W.-C., Chou, L.-S., Jepson, P. D., Brownell, R. L., Jr., Cowan D., Chang, P.-H., Chiou, H.-I., Yao, C.-J., Yamada, T. K., Chiu, J.-T., Chin, S.-C., Wang, P.-J., Fernández, A. 2008. Unusual cetacean mortality event in Taiwan: possibly linked to naval activities? *The Veterinary Record*, in press.

### 11.2 Unpublished literature

#### AFSC

Clarke, J. 2009. Chukchi Offshore Monitoring In Drilling Area (COMIDA); Aerial survey 2008. Report submitted to Minerals Management Service, U.S. Department of the Interior, 3801 Centerpoint Drive, Suite 500, Anchorage, AK 99503-5823. 15 pp.

Hobbs, R. C., and K. E. W. Sheldon. 2008. Supplemental status review and extinction assessment of Cook Inlet belugas (*Delphinapterus leucas*). AFSC Processed Rep. 2008-08, 76 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv., 7600 Sand Point Way NE, Seattle WA 98115. Available online at :  
<http://www.fakr.noaa.gov/protectedresources/whales/beluga/research.htm#ci>

Rugh, D. (ed.) 2008. Bowhead whale abundance through photographic analysis: data analysis supported by Minerals Management Service; Final Report of OCS Study MMS 2008-002. National Marine Mammal Laboratory, Alaska Fisheries Science Center, NMFS, NOAA, 7600 Sand Point Way, NE Seattle, WA 98115-6349.

- Rugh, D. (ed.) 2009. Bowhead Whale Feeding Ecology Study (BOWFEST) in the Western Beaufort Sea; 2008 Annual Report. MMS-450000120. Produced through the National Marine Mammal Laboratory, Alaska Fisheries Science Center, NMFS, NOAA, 7600 Sand Point Way, NE Seattle, WA 98115-6349.
- Rugh, D. and National Marine Mammal Laboratory. 2008. Bowhead Whale abundance through photographic analysis: data analysis supported by Minerals Management Service: Final Report. Anchorage, AK: U.S. Department of the Interior, Minerals Management Service, Alaska Outer Continental Shelf Region. (MMS OCS Study 2008-002) v.p. Available online at:  
[http://www.mms.gov/alaska/reports/2008rpts/2008\\_002/2008\\_002.pdf](http://www.mms.gov/alaska/reports/2008rpts/2008_002/2008_002.pdf)
- Shelden, K.E.W., K.T. Goetz, C. Sims, and B.A. Mahoney. 2008. Aerial surveys of belugas in Cook Inlet, Alaska, September and October 2008. NMFS, NMML Unpublished Field Report. 8 p. Available online at :  
<http://www.fakr.noaa.gov/protectedresources/whales/beluga/research.htm#ci>
- Shelden, K.E.W., K.T. Goetz, L. Vate Brattstrom, B.A. Mahoney, M. Migura, and B.S. Stewart. 2008. Aerial surveys of belugas in Cook Inlet, Alaska, August 2008. Unpublished NMFS report. 13p. Available online at :  
<http://www.fakr.noaa.gov/protectedresources/whales/beluga/research.htm#ci>
- Shelden, K.E.W., D.J. Rugh, K.T. Goetz, L. Vate Brattstrom and B.A. Mahoney. 2008. Aerial surveys of belugas in Cook Inlet, Alaska, June 2008. Unpublished NMFS report. 18p. Available online at :  
<http://www.fakr.noaa.gov/protectedresources/whales/beluga/research.htm#ci>

**NWFSC, PIFSC, SWFSC**

None.