

## MARINE MAMMALS

Marine mammals are among the most iconic marine species in the North Pacific, and the world. They include whales (cetaceans), some species of which filter-feed directly on zooplankton and small fishes whereas other species feed high in the food web (e.g. killer whales), and seals/sea lions (pinnipeds), which tend to be high in the food web and feed on fish. We do not expect to find new marine mammal species in the North Pacific, although the existing species vary greatly in their abundances. Determining how many individuals there are of a particular species is difficult for whales, considering their wide-ranging open ocean lifestyle, but somewhat easier for pinnipeds as many species spend time on rookeries where they reproduce.

PICES sub-region	Code	Area (km <sup>2</sup> )	Number of marine mammal species	Number of marine mammal species with abundance estimates	% species covered	Estimated abundance of marine mammals (number)
Eastern Bering Sea Shelf	BSC	1,021,950	22	7	32	Insufficient data
Western Bering Sea and Basin	BSP	1,357,655	20	6	30	494,000
Gulf of Alaska	ASK	428,520	18	5	28	Insufficient data
California Current, North	CAN	166,456	16	4	25	Insufficient data
Eastern Sub-Arctic	ESA	3,621,580	13	0	0	Insufficient data
Western Sub-Arctic	WSA	2,168,315	14	1	7	2,323
Kamchatka and Kurile Islands	KM/KL	111,570	19	7	37	3,724,341
Sea of Okhotsk	OKH	1,599,225	19	11	58	1,178,269
California Current, South	CAS	128,620	30	17	57	Insufficient data
Eastern Transition Zone	ETZ	7,808,530	27	6	22	Insufficient data
Western Transition Zone	WTZ	6,337,700	27	11	41	4,619,545
Kuroshio/Oyashio Current Zone	KR/OY	348,455	33	6	18	114,513
Sea of Japan	SJP	1,006,455	16	2	13	3,500
East China Sea	ECS	435,235	14	0	0	Insufficient data
<b>TOTAL</b>						<b>10,136,491</b>

## Marine mammal abundance in PICES marine ecosystems

Species	BSC	BSP	ASK	CAN	ESA	WSA	KM/KL	OKH	CAS	ETZ	WTZ	KR/OY
Steller sea lion	9930	1500	39800	13800		?	5100	1500	9350			-
Northern fur seal	1002500	200000	?	?	?	?	45000	56000	?	?	190000	-
Harbor seal	13300	?	66600				3400		75200			?
Spotted seal	?	13000						130000				?
Bearded seal	?	180000						200000				
Ringed seal	?	86500						86500				
Ribbon seal	?	13000						130000				
Walrus	46100											
Polar bear	0											
Sea otter	?	?	?	?			?		2539			
Beluga whale: E. Bering Sea & Bristol Bay	18800											
Beluga whale: Beaufort and Chuckchi	0											
Killer whale	?	?	?	1078	?		?	?	843	?	?	?
Pac.white-sided dolphin	?											
Harbor porpoise	10900	?	18800	10301			?	?	47661			?
Dalls porpoise	?		?	?	?				169350	?		
Gray whale	25235		100	150			?	<200	150	?		
Humpback whale	?	?	?	?	?	?	?	?	597	597		
Fin whale	?	?	?	?	?	?	?	?	?	?	?	?
Minke whale	?	?	?	?	?	?	5841	19,209+	201		?	?
Northern right whale	?	?	?	?	?		?	922			?	?
Bowhead whale	0	?						?				
Blue whale		?				?	?		1785	1785	?	?
Dall's porpoise		?				?	(1925000) <sup>1</sup>	554000			(1,925,000) <sup>1</sup>	?
Sei whale		?				?	?		?	?	?	?
Sperm whale		?	?	?	?	2,323+	?		?	?	17,128++	1,137++
Ziphiids		?				?	?	?			?	?
Northern elephant seal			?	?	?				?	?		
Beluga whale			834									
Pacific white-sided dolphin			?		?	?	(1000000) <sup>1</sup>	?			(1,000,000) <sup>1</sup>	50818
Baird=s beaked whale			?		?							
Cuvier=s beaked whale			?		?							
Pac. white-sided dolphin				?					121693			
Cuvier's beaked whale				?					?	?		

Species	BSC	BSP	ASK	CAN	ESA	WSA	KM/KL	OKH	CAS	ETZ	WTZ	KR/OY
Stejneger's beaked whale					?							
Northern right whale dolphin							(740000) <sup>1</sup>				(740,000) <sup>1</sup>	?
Baird's beaked whale							?	660				4200
White whale								?				
California sea lion									177500			
Guadalupe fur seal									?			
Risso's dolphin									?	?	93000	?
Bottlenose dolphin									2695	2695	156000	?
Striped dolphin									?	?	(568000) <sup>2</sup>	?
Short-beaked com. dolphin									?	?		
Long-beaked com.dolphin									8980			
N. right whale dolphin									21332			
Pygmy/dwarf sperm whales									?	?		
Short-finned pilot whale									1004	1004		
Baird's beaked whale									380	380		
Mesoplodont beaked whales									?	?		
Bryde's whale									?	?	7,417+	58+
Hawaiian monk seal										1238		
Rough-toothed dolphin										?		?
Pantropical spotted dolphin										?		
Spinner dolphin										?		?
Melon-headed whale										?		
Pygmy killer whale										?	?	?
False killer whale										?	?	?
Commom dolphin											?	
Dwarf sperm whale											?	?
Fraser's dolphin											?	?
Pygmy sperm whale											?	?
Rough-toothed dolphine											?	
Short-finned pilot whale-N											?	5300
Short-finned pilot whale-S											53000	53000
Spinner dolphine											?	
Spotted dolphin											438000	?
Common dolphin												?
Finless porpoise												?

<sup>1</sup> combined estimate for areas WTZ+WSA+ESA+ETZ

<sup>2</sup> combined estimate for areas WTZ+KROY

## Yellow Sea / East China Sea

A total of 16 cetacean species have been recorded in the East China Sea and Yellow Sea region. Amongst them, fin whale (*Balaenoptera physalus*), minke whale (*Balaenoptera acutrostrata*), killer whale (*Orcinus orca*), Blainville's beaked whale (*Mesoplodon densirostris*), and finless porpoise (*Neophocaena phocaenoides*) have commonly been observed. Catching whales was banned in Korea in 1986 and some of the whale populations have increased. In the Changjiang river estuary, two endangered migratory freshwater cetaceans can be found, baiji (*Lipotes vexillifer*) and finless porpoise. The former, listed as a critically endangered species in IUCN Red Book, lives only in China. Larga seals, *Phoca larga*, inhabit many coastal areas of the Yellow Sea. Since the 1960s, populations have been decreasing due to heavy catch and habitat destruction and only small groups can now be found. Both in China and Korea, larga seals are designated as protected animals.

## Sea of Okhotsk

**PINNIPEDS** In the Okhotsk Sea there are 4 species of the true seal (Phocidae): ringed seal (*Pusa hispida*), ribbon seal (*Histiophoca fasciata*), bearded seal (*Erignatus barbatus*), larga (*Phoca largha*); and two species of eared seal: northern fur seal (*Callorhinus ursinus*) and Steller sea lion (*Eumetopias jubatus*). The Kuril Islands are inhabited by the island form of the common seal, the antour (*Phoca vitulina stejnegeri*). On the whole, fin-footed resources in the Okhotsk Sea and the Kurils make up 1.8 million animals; 90% of them are the true seals while the rest are eared seals. Among the former, ringed seal and ribbon seal are the most numerous, amounting to 40 % and 20 %, respectively, of all seals in the region. Bearded seal and larga have equal abundance at 12% each. The true seals were commercially harvested in the past. Before 1968 sealing was not regulated, with annual catch of 66,000-102,000 animals that resulted in harsh population declines. Due to a reduction in total sealing (down to 38,000-47,500 animals) the seal stock is being restored.

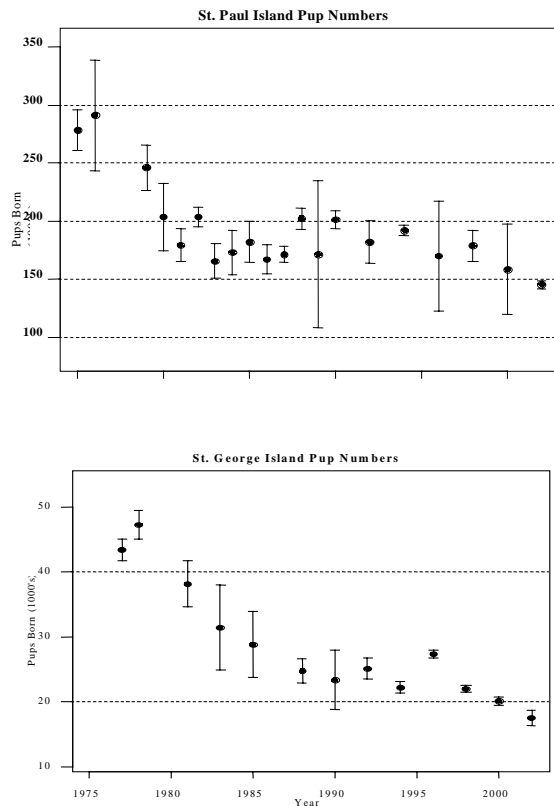
Steller sea lions in the Okhotsk Sea have several rookeries, bachelor haul-out sites and places for juveniles. The most numerous group of Steller sea lions inhabits the Kuril Islands. The total number of sea lions inhabiting the Kurils is a little more than 5,000 individuals. A rather numerous group of Steller sea lions is situated on the Iona Islands, where 952 pups were born in 2001, and the registered number of adult individuals exceeded 1,500.<sup>1</sup> At Tyuleniy (Robben) Island in 2002, the number of adult Steller sea lions was close to 1,500, with more than 400 pups. In the Iamskiy Islands in 2001 the number of newborns totaled 360, and the number of adults exceeded 900 animals. On the Lisianskiy Peninsula there lay a little more than 200 adults and two dozens newborns in 2000. There is one (not large) bachelor haul-out here too. On the Zavyalova Island there was a juvenile haul-out site with a total of about 100-130 individuals.<sup>1</sup> One bachelor haul-out with unsteady number (200-500 animals) is at the Opasnostiy Rock in the LaPerouse Strait, and another is at the Sivuchiy Cape (Western Kamchatka), where the number of individuals ranges from a few dozens to 2,500 in winter and in March. In summary, the number of Steller sea lions on the Kuril Islands has been in steady state after the depression of 1970-90s, while on the rookeries of other parts of the Sea of Okhotsk it is increasing each year.

The number of northern fur seals at the Tyuleniy (Robben) Island has been increasing steadily since 1993, and on the Kurils it has apparently remained constant since 1988.

**CETACEANS** There was a significant increase in the number of Minke whales and Dall's porpoise observed in the northern Okhotsk Sea in 1997. The Minke whale abundance was previously estimated at 25,000 specimens in the Okhotsk Sea and adjacent waters. Total dolphin numbers were estimated at more than 100,000 specimens.

## Eastern Bering Sea

**PINNIPEDS** Steller sea lions live predominantly along the Aleutian island archipelago, but some also occur in the Bering Sea. Through the 1990s the abundance of this species has been declining by 2-8% per year, and the cause is the subject of intense investigation. Northern fur seals (*Callorhinus ursinus*) are found throughout the northern North Pacific but breed mainly at the Commander and Pribilof Islands. Seventy-four percent of the world population breeds on the Pribilof Islands. The number of northern fur seal pups has been declining since 1975 (Figure 1).



**FIGURE 1** COUNTS (MEAN AND STANDARD ERROR) OF NORTHERN FUR SEAL PUPS AT ROOKERIES ON ST. PAUL (UPPER PANEL) AND ST. GEORGE (LOWER PANEL) ISLANDS, PRIBILOF ISLANDS<sup>2</sup>. NOTE RAPID DECLINES BETWEEN 1976 AND 1984

## Gulf of Alaska

At least 18 species of marine mammals use the shelf and offshore habitats of the Gulf of Alaska. Marine mammal populations during the summer include an estimated 126,000 individuals of Steller sea lions, harbor seals and harbor porpoise. Two species of marine mammals are regularly surveyed in the Gulf of Alaska, Steller sea lions, *Eumetopias jubatus*, and harbor seals, *Phoca vitulina*, and both have declined significantly over the past three decades. Causes for the decline remain controversial and are likely due to a combination of various factors, including the reorganization of the ecosystem after the 1976/77 regime shift, predation by killer whales and sharks, harvests and incidental catches, diseases, parasites, and contaminants. A recent review identified nutritional stress as a result of the reduced availability of suitable prey as a likely cause for the observed declines in Steller sea lions. Current population sizes are only a fraction of the historical maximum.

Harbor seals at Tugidak Island provide an index of regional abundance.<sup>3</sup> The population declined from 1976 to the late 1980s, stabilized during the early to mid-1990s, and has increased since then. However, the population remains well below that of the 1970s. The recent increasing trend is confirmed by aerial surveys in the Kodiak Island region, which estimated a 5.6% annual increase from 1993 to 1999. Aerial surveys in Southeast Alaska suggest increasing trends in harbor seal abundance from the early 1980s to 1998.

## California Current

**PINNIPEDS** The Steller sea lion population along the west coast of North America (excluding Alaska) is estimated to be about 39,000 individuals, which is less than 50% of the 1956-1960 population estimate. This species is now listed in the United States as endangered.

**CETACEANS** The abundance of many whale species, including humpback and gray whales, is increasing and the latter was removed from the U.S. endangered species list in 1994.

Sea otter (*Enhydra lutris*) populations in the California Current system are expanding. In California, this population growth ceased during the 1997-1998 El Niño, possibly due to a reduction in food.

## Gulf of California

The Gulf of California is a region of very high marine mammal diversity (31 species; 4 pinnipeds and 27 cetaceans). Some evidence indicates that, at least in some areas within the gulf (i.e. Canal de Ballenas), the numbers of cetaceans increases during ENSO years.<sup>4</sup> Changes also occur in blue whale distribution and abundance,<sup>5</sup> but there appears to be no effect on California sea lions (*Zalophus californianus*).<sup>6,7</sup>

**PINNIPEDS** Historical time series of California sea lion reproduction (number of pups) from the large island region show a striking similarity with sardine catch tendency, probably meaning interaction between species or a common forcing source. Currently, the Gulf of California sea lion, the most abundant pinniped, has a resident population of more than 20,000 animals mostly distributed in the northern part of the Gulf.

**CETACEANS** It has been suggested that marine mammal mass mortalities are becoming more frequent. During the last 10 years there have been at least 3 major mass mortality events, most likely cause being harmful algal blooms: in 1995 367 dolphins (*Delphinus capensis*, *Tursiops truncatus* and *Stenella coeruleoalba*), 8 whales (*Balaenoptera physalus*, *B. acuterostrata* and *B. edeni*), and 51 sea lions (*Z. californianus*), in 1997 4 whales (*B. physalus*), 168 dolphins (*D. delphys* and *T. truncatus*), and 9 California sea lions, and during 1999 nearly 100 whales inside the gulf (*Balaenoptera* spp.)

## Central North Pacific Transition Zone

**TURTLES** Two species of sea turtles are common occupants of Transition Zone waters: loggerhead turtles, *Caretta caretta*, and leatherback turtles, *Dermodochelys coriacea*. Loggerheads in particular appear to exploit the TZCF as a migration pathway and as forage habitat.<sup>8</sup>

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<sup>1</sup> Zadalskiy, S.V. 2002. Status of a population and migrations of eared seals in northern part of sea of Okhotsk. Sea mammals of Golarctica. Abstract. Second International Symposium Baikal, Russia, September, 10-15, 2002, Moscow, pp. 109-111.

<sup>2</sup> National Marine Mammal Laboratory. 2002. Marine Mammals. In: Livingston, P.A. (ed) *Ecosystem Considerations for 2003*. <http://www.afsc.noaa.gov/refm/docs/2002/ecochap.pdf>.

<sup>3</sup> Small, R. J. 2001. Harbor seal investigations in Alaska Annual Report. Division of Wildlife Conservation, Alaska Department of Fish and Game.

<sup>4</sup> Tershy, B., Breese, D. and Alvarez-Borrego, S. 1991. Increase in cetacean and seabird numbers in the Canal de Ballenas during an el Niño Southern Oscillation event. *Marine Ecology Progress Series* 9, 299-302.

<sup>5</sup> Gendron, L.D. 1991. Distribución y abundancia de ballenas azules (*Balaenoptera musculus*) y el eufáusido (*Nyctyphanex simplex*) en el suroeste del Golfo de California. M.C. Thesis, Centro Interdisciplinario de Ciencias Marinas, La Paz, B.C.S., México, unpublished.

<sup>6</sup> Aurióles, G.D. and Le Bœuf, B.J. 1991. Effects of the El Niño 1983 on the California sea lion population in México. In F. Trillmich & K. Ono, *Pinnipeds and El Niño. Responses to environmental stress* (pp. 112-118). USA: Springer-Verlag.

<sup>7</sup> Samaniego, A. 2000. El efecto de El Niño (1997-1998) sobre la población de lobo marino (*Zalophus californianus* Lesson, 1828), en la Bahía de la Paz, B.C.S. México. BSc Thesis. Universidad Michoacana de San Nicolás de Hidalgo, Morelia Mich. México, unpublished.

<sup>8</sup> Polovina, J.J., Kobayashi, D.R., Parker, D.M., Seki, M.P. and Balazs, G.H. 2000. Turtles on the edge: movement of loggerhead turtles (*Caretta caretta*) along oceanic fronts, spanning longline fishing grounds in the central North Pacific, 1997-1998. *Fisheries Oceanography* 9: 71-82.