

First Records of False Killer Whales, *Pseudorca crassidens*, in Canada

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A stranding of an adult male False Killer Whale (*Pseudorca crassidens*) on Denman Island, British Columbia, on 3 May 1987, was the first record for Canada. Stomach content analysis revealed small numbers of parasites (*Anisakis* sp.) and recent predation on salmon (*Oncorhynchus* sp.) and squid (either *Beryteuthis magister* or *Gonatopsis borealis*). Osteological evidence and tooth dentine-layer counts (26 growth layer groups) indicate an individual of advanced age. Tissue analysis for heavy metals and pesticides revealed very high levels of mercury (liver, 728 ppm wet weight) and DDE (blubber, 1400 ppm wet weight). A group of at least 12 other *P. crassidens* remained in the inshore waters of Puget Sound, Washington from 3 May 1987 to 2 July 1987, one of which stranded and died. A single individual *P. crassidens* was photographed in Johnstone Strait, B.C., on 22 June 1987, and a different individual *P. crassidens* live-stranded in Ucluelet, B.C., on 28 July 1987, and was returned to the water.

Un mâle adulte pseudorque (*Pseudorca crassidens*) échoué sur la côte de Denman Is., Colombie britannique, le 3 mai 1987 constitue le premier record de cette espèce pour le Canada. L'analyse des contenus stomacaux a révélé un petit nombre de parasites (*Anisakis* sp.), du saumon (*Oncorhynchus* sp.) et du calmar (*Beryteuthis magister* ou *Gonatopsis borealis*). D'après l'évidence ostéologique et des comptes de couche de dentine (26 groupes de couches de croissance), l'individu en question avait atteint un âge avancé. L'analyse des tissus pour les métaux lourds et les pesticides a révélé de très hauts niveaux de mercure (foie, 728 ppm, poids humide) et de DDE (couche grasseuse, 1400 ppm, poids humide). Un groupe d'au moins 12 autres *P. crassidens* fréquentait les eaux de Puget Sound, Washington, du 3 mai 1987 au 2 juillet 1987 et un de leur membres s'échoua et mourut. Un spécimen de *P. crassidens* fut photographié dans le détroit de Johnstone, C.B. le 22 juillet 1987 et un individu différent s'échoua à Ucluelet, C.B. le 28 juillet 1987, mais fut retourné à l'eau encore vivant.

Key Words: False Killer Whale, *Pseudorca crassidens*, first records, stranding, Canada, British Columbia, toxicology.

False Killer Whales (*Pseudorca crassidens*) are highly social odontocetes, widely distributed in tropical and semitropical waters around the world (Sergeant 1982). In the Pacific they frequent waters south of southern California (in the east), and south of northern Japan (in the west; Leatherwood and Reeves 1983). There are several records in the temperate eastern North Pacific south of Washington State, and one animal was collected in Puget Sound, Washington, in 1937 (Scheffer and Slipp 1948). There is also a reported sighting from Prince William Sound, Alaska (Matkin in Leatherwood et al. 1982), of a single animal in 1976, but it was not well documented. Some authors (Purves and Pilleri 1978) show a record from Davis Strait off Baffin Island, presumably from True (1889); however, this record is not substantiated (Miller 1920). There are no records from British Columbian waters (Pike and MacAskie 1969) or from the east coast of Canada (Leatherwood et al. 1976). Herein we describe the first records of *P. crassidens* in Canada.

On 8 May 1987, we were informed of a stranded whale on Denman Island, British Columbia

(49° 27'N, 124° 41'W). The whale was first discovered by a Denman Island resident on 3 May 1987 and was later identified as a male *P. crassidens* (Figure 1).

Body and cranial characters were measured according to Norris (1961) and Ross (1984), and a gross post mortem examination was performed. Selected body measurements (linear measurements in cm) were: total length, 462; tip of upper jaw to tip of dorsal fin, 195.5; anterior insertion of flipper to tip, 61; axilla to tip of flipper, 42; dorsal fin base width, 33; flipper width (maximum), 23; flukes (tip to tip), 96.5; dorsal fin height, 33; girth on a transverse plane intersecting axilla, 99; maximum girth, 127; girth on a transverse plane intersecting anus, 79. Selected cranial measurements (in mm) were: condylobasal length, 595; rostrum length, 297; basal width of rostrum, 208; number of teeth, upper right, 8; number of teeth, upper left, 8; length of tooth row, upper right, 229; length of tooth row, upper left, 233; number of teeth, lower right, 9; number of teeth, lower left, 8; length of tooth row, lower right, 242; length of tooth row, lower left, 224; length of mandible, 501;



FIGURE 1. Male adult *Pseudorca crassidens* stranded on Denman Island, Canada (BCPM 16149). Photo by Robin W. Baird.

height of cranium between basioccipital and the vertex, 227. The rostrum and anterior two-thirds of the mandible were removed earlier by a local resident, but were later recovered. The lungs, trachea, and major airways were all clean and air-filled with the same degree of decomposition as the rest of the body. This indicated that the whale did not drown and possibly stranded while alive. Blubber, liver, kidney, and brain samples were collected for pesticide and heavy-metal analysis (Table 1). Fecal material was collected for oocyst flotation. The right testicle was removed for weighing and measuring, and the entire skeleton was collected and deposited in the collections of the Royal British Columbia Museum (BCPM 16149). Histological examination of tissues was not possible because of the advanced decomposition.

The stomach contained a large amount of material and was removed intact for analysis. Examination of the stomach revealed several large, healing ulcers. The stomach contained 55 salmon vertebrae (*Oncorhynchus* sp.), vertebral rays, and 29 fish eye lenses. The only previous record for salmon as prey of *P. crassidens* is an undocumented report of salmon vertebrae from the stomach of a specimen from Washington State (Scheffer and Slipp 1948). Thirty squid beaks (either *Berryteuthis magister* or *Gonatopsis*

borealis) also were identified from stomach contents. The undigested condition of the salmon vertebrae indicated that the animal had been feeding within about 12 hours before stranding. Fleshy remains of squid also were present, indicating that they had been ingested shortly before death. Small numbers of larval *Anisakis* sp. (probably *A. simplex*) were identified from the stomach. *Anisakis* sp. oocysts were recovered by flotation from fecal material.

Radiographs of a pectoral flipper and the coccygeal vertebrae revealed closure of all epiphyses, indicating maturity. The pulp cavity of all teeth were completely occluded, and all teeth showed moderate amounts of wear. Heavy lingual undercutting, greater than 40% of the width of the tooth, was present in four teeth, with moderate lingual undercutting present in six others. Small amounts of wear resulting from lateral movements have been found in teeth of mature *P. crassidens*, with dentine layer counts of 18 and 13 or 14, indicating that movement causing lateral wear is relatively infrequent (Ross 1984). Dentine layer counts from the middle mandibular teeth showed at least 26 growth layer groups, with each group characterized by a broad dark layer, followed by a thin light layer. Examination of the cleaned skull and skeleton revealed extensive degenerative arthropathy of both occipital condyles and the first

TABLE 1. Tissue analysis for heavy-metals and pesticides in a False Killer Whale, *Pseudorca crassidens*, stranded 3 May 1987 on Denman Island, British Columbia.¹

Contaminant	Tissue (ppm wet weight)			
	Liver	Kidney	Brain	Blubber
Selenium	153			
Copper	15	4		
Zinc	154	21		
Iron	141	23		
Manganese	6.6	1.2		
Lead	< 1	< 1		
Cadmium	1.1	0.2		
Arsenic	< 0.5	< 0.5		
Calcium	61	55		
Magnesium	255	172		
Mercury	728	72	47	
PCB total	5.4		2.7	160
DDE	50		29	1400
DDD	3.4		0.14	4.8
Other organochlorines	< 0.05		< 0.05	< 0.05

¹Analysis by Veterinary Pathology Laboratory, Abbotsford, British Columbia.

cervical vertebra, and fusion of the humeral and ulnar bones of the flippers.

Sergeant (1982) estimated that male *P. crassidens* mature at about 500 cm in body length. The whale reported here at 462 cm is small in comparison. The testis dimensions (43 by 18 by 13 cm) and weight (4.5 kg) are small compared to those of mature specimens described by Fraser (1936), and Odell et al. (1980). However, osteological evidence suggests an individual of advanced age.

Tissue samples of blubber, liver, kidney, and brain, analyzed for heavy metals and pesticides, revealed unusually high levels of mercury and organochlorines (Table 1). According to Gaskin (1982), the highest reported mercury levels in cetacean liver were from Common Dolphins (*Delphinus delphis*) in the western Mediterranean, at levels of greater than 604 ppm wet weight. Levels of mercury in the liver, kidney, and brain in our specimen were 728, 72, and 47 ppm, respectively (wet weight).

Levels of DDE in the blubber were 1400 ppm (wet weight). Because *P. crassidens* has a semitropical distribution, and does not frequent coastal waters, one would expect that exposure to chlorinated hydrocarbons and their concentration in the tissues would be low (Gaskin 1982). Although advanced age could account for higher accumulation of organochlorines, levels in this individual were higher than values obtained for other cetaceans (Gaskin 1982; Calambokidis et al. 1984).

The stranded individual described here may have originated from a group of at least 12 *P. crassidens* that were first seen in the inshore waters of Puget Sound, Washington State on 3 May 1987, the same day its body was first discovered. The Puget Sound pod remained in the area until 2 July 1987 (Osborne et al. 1988). Another presumed member of this pod, a juvenile, stranded and died in Puget Sound on 5 May 1987.

Since the 3 May 1987 stranding, two other *P. crassidens* were sighted in British Columbia. A single individual was observed and photographed (BCPM photo 1170) in northern Johnstone Strait, B.C., (50°35'N, 126°52'W) on 22 June 1987, and a 3.5-metre individual stranded alive in shallow water in Ucluelet, B.C., (49°58'N, 125°34'W) on 28 July 1987 and was successfully returned to deeper water (BCPM photo 1174). Although both individuals had distinctive natural markings allowing for individual photo-identification (Bigg et al. 1986), comparison with photographs of the 12 *P. crassidens* from Puget Sound in May and June of 1987 revealed no matching patterns.

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Literature Cited

- Bigg, M. A., G. M. Ellis, and K. C. Balcomb. 1986. The photographic identification of individual cetaceans. *Whalewatcher* 20(2): 10-12.
- Calambokidis, J., J. Peard, G. H. Steiger, J. C. Cabbage, and R. L. DeLong. 1984. Chemical contaminants in marine mammals from Washington State. NOAA Technical Memorandum NOS OMS 6: 1-167.
- Fraser, F. C. 1936. Recent strandings of the false killer whale, *Pseudorca crassidens*, with special reference to those found at Donna Nook, Lincolnshire. *Scottish Naturalist* July-August, 1936: 105-114.

- Gaskin, D. E.** 1982. The ecology of whales and dolphins. Heinemann Educational Books, Inc., Portsmouth, New Hampshire. 459 pages.
- Leatherwood, S., D. K. Caldwell, and H. E. Winn.** 1976. Whales, dolphins and porpoises of the western North Atlantic — A guide to their identification. NOAA Technical Report, National Marine Fisheries Service Circular 396: 1-176.
- Leatherwood, S., R. R. Reeves, W. F. Perrin, and W. E. Evans.** 1982. Whales, dolphins and porpoises of the eastern North Pacific and adjacent Arctic waters — A guide to their identification. NOAA Technical Report, National Marine Fisheries Service Circular 444: 1-245.
- Leatherwood, S., and R. Reeves.** 1983. The Sierra Club handbook of whales and dolphins. Sierra Club Books, San Francisco. 302 pages.
- Miller, G. S.** 1920. American records of whales of the genus *Pseudorca*. Proceedings of the U.S. National Museum. 57(231): 205-207.
- Norris, K. S.** 1961. Standardized methods of measuring and recording data on smaller cetaceans. Journal of Mammalogy 42(4): 471-476.
- Odell, D. K., E. D. Asper, J. Baucom, and L. H. Cornell.** 1980. A recurrent mass stranding of the false killer whale, *Pseudorca crassidens*, in Florida. Fishery Bulletin 78(1): 171-176.
- Osborne, R., J. Calambokidis, and E. M. Dorsey.** 1988. A guide to marine mammals of Greater Puget Sound. Island Publishers, Anacortes. 191 pages.
- Pike, G. C., and I. B. MacAskie.** 1969. Marine mammals of British Columbia. Fisheries Research Board of Canada Bulletin 171. 54 pages.
- Purves, P. E., and G. Pilleri.** 1978. The functional anatomy and general biology of *Pseudorca crassidens* (OWEN) with a review of the hydrodynamics and acoustics in Cetacea. Investigations on Cetacea 9: 67-227.
- Ross, G. J. B.** 1984. The smaller cetaceans of the south east coast of southern Africa. Annals of the Cape Provincial Museums (Natural History) 15(2): 173-410.
- Scheffer, V. B., and J. W. Slipp.** 1948. The whales and dolphins of Washington State with a key to the cetaceans of the west coast of North America. American Midland Naturalist 39(2): 257-337.
- Sergeant, D. E.** 1982. Mass strandings of toothed whales (Odontoceti) as a population phenomenon. Scientific Reports of the Whales Research Institute 34: 1-47.
- True, F. W.** 1889. Contributions to the natural history of the cetaceans, a review of the family Delphinidae. Bulletin of the United States National Museum 36: 1-191.

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