Status of the Northern Right Whale Dolphin, *Lissodelphis borealis*, in Canada*

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The Northern Right Whale Dolphin, *Lissodelphis borealis*, is one of the most abundant oceanic dolphins in its range in the North Pacific, but little is known about its biology or distribution. The biology and management of this species are summarized with special reference to its status in Canadian waters. Seventeen occurences of the Northern Right Whale Dolphin from within the Canadian 320 km (200 mi) extended economic zone are presented; only one occurrence has been previously published. Seven of these records are of animals killed in a Canadian experimental Flying Squid (*Ommastrephes bartrami*) driftnet fishery in 1986 and 1987, which has since been discontinued. Lack of comprehensive recording of sightings, strandings and incidental catches render the exact status of this species in Canadian waters unclear. Based on the best available information, the Northern Right Whale Dolphin is rare in Canadian waters, where it is in the outermost limits of its normal distribution.

Le dauphin à dos lisse, *Lissodelphis borealis*, est l'un des dauphins océaniques les plus commans dans le Pacifique Nord, mais on connaît très mal sa biologie et sa répartition géographique. Ce rapport résume la situation, la biologie et la gestion de l'espèce, en insistant particulièrement sur son statut dans les eaux canadiennes. Il présente une observation publiée et dix-sept observations inédites, provenant de la zone exclusivement économique du Canada (ZEE) qui s'étend jusqu'à 320 km (200 milles) des côtes. Sept d'entre elles concernent des animaux tués au cours de pêches expérimentales de l'Encornet volant (*Ommastrephes bartrami*) aux filets dérivants en 1986 et 1987, auxquelles ont a mis fin depuis. Bien que la situation du Dauphin à dos lisse dans les eaux canadiennes soit encore mal connue vu l'absence de rapports complets sur les observations, les échouages et les prises accidentelles, les meilleures données accessibles indiquent que cette espèce est rare dans ces eaux situées à l'extrême limite de son aire de répartition.

Key Words: Northern Right Whale Dolphin, Dauphin à dos lisse, *Lissodelphis borealis*, Canada, cetacean status, North Pacific.

This report reviews the status, biology and management of the Northern Right Whale Dolphin, *Lissodelphis borealis* (Peale 1848), with particular reference to its status in Canada.

The Northern Right Whale Dolphin is a small dolphin, distinguished primarily by its elongate streamlined body and lack of a dorsal fin. It is the only finless delphinid in the North Pacific (Figure 1). The flippers and flukes are narrow and pointed. Maximum length is at least 3.1 m in males, and 2.3 m in females. The coloration is largely black, with a clearly demarked white ventral marking extending forward as a narrow band from the caudal peduncle, expanding into a wide thoracic patch. In females this white band is wider in the genital area than in males. A small white patch usually is present slightly posterior to the tip of the lower jaw (Figure 2). The dorsal surface of the flukes is mostly light grey, while the ventral surface is largely white except at the tail stock. Calves are much lighter dorsally than adults, ranging in colour from cream to a light grey (Leatherwood and Walker 1979). Variations in the location and extent of white markings have been noted off California and Japan (Nishiwaki 1972; Leatherwood and Walker 1979). Nishiwaki (1972) classified these two colour forms as subspecies (*L. b. borealis* and *L. b. albiventris*) with *L. b. borealis* having the typical coloration and *L. b. albiventris* having expanded white ventral markings. However, these subspecies designations have not been generally accepted (Leatherwood and Walker 1979). Individuals with the anomalous coloration are not uncommon among herds of normally coloured individuals (Leatherwood et al. 1982).

Distribution

The Northern Right Whale Dolphin is endemic to the North Pacific Ocean. It ranges from Alaska to Baja California in the eastern Pacific, and from Japan to the Aleutians in the western Pacific (Leatherwood and Walker 1979; Kajimura and

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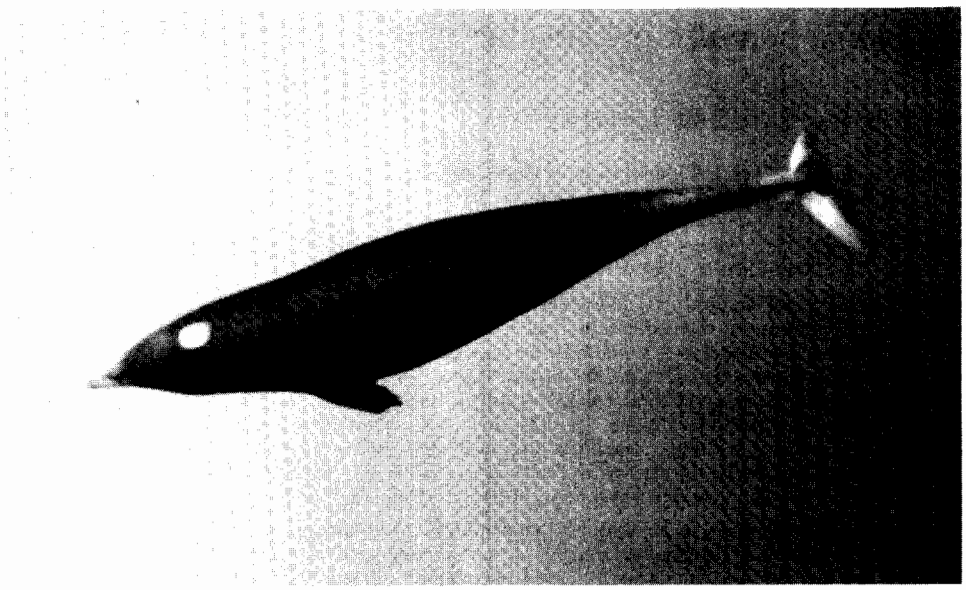

FIGURE 1. A Northern Right Whale Dolphin riding a vessel's bow wave off California, showing elongate streamlined body lacking a dorsal fin. Photo by Steve Cooper.

FIGURE 2. Northern Right Whale Dolphins riding a vessel's bow wave off California, showing white coloration on ventral surface. Photo by Tom Jefferson.

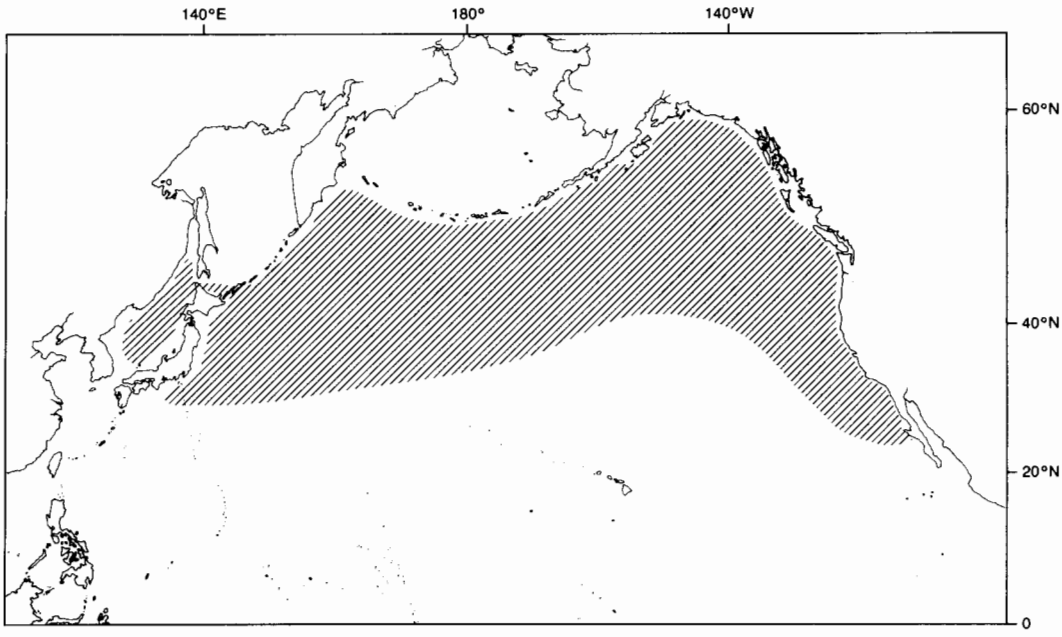

FIGURE 3. Approximate range of the Northern Right Whale Dolphin. There are only a few published records from the western Pacific and effort in pelagic waters is limited, so actual range may differ from that shown.

Loughlin 1988; Figure 3). A few sightings have been reported from the Gulf of Alaska north of 55°N, and there is one record from the central Aleutian Islands (Kajimura and Loughlin 1988). Pike and MacAskie (1969) and Leatherwood and Walker (1979) each presented a record from international waters offshore of British Columbia.

Within the Canadian 320 km (200 mile) extended economic zone (EEZ) the only previously published occurrence is of a single animal collected from a school of about 200 individuals sighted in 1970 (Guiguet and Schick 1970). We have treated this occurrence as two separate records in Table 1 to distinguish between sighting and the collection. A total of 17 unpublished records were compiled from a variety of sources and are also presented in Table 1. In one other case an occurrence was again classified as two records (incidental catch - died, incidental catch — released alive) giving 19 records and 17 separate occurrences of the Northern Right Whale Dolphin in Canadian waters (Figure 4). In their sighting map for this species, Kajimura and Loughlin (1988) show a summer record off Vancouver Island prior to 1982 obtained through the U.S. National Marine Mammal Laboratory (NMML) Platforms of Opportunity Program, but present no details. Based on the source of the record, the season, locality, and date, this record most likely corresponds to our record of 15 September 1978 (*see* Table 1). All of the British Columbia records are from the southern half of the waters under consideration. One sighting record is from shallow water off the west coast of Vancouver Island, but no other documented inshore sighting records exist from either British Columbia or Washington. There is one unverified report of a group of five individuals in Puget Sound, Washington in 1977 (Osborne et al. 1988) and there are several stranding records on the outer Washington coast (Scheffer and Slipp 1948). No strandings had been recorded in British Columbia up to 1989. Eight of the records were collected during a Canadian experimental driftnet fishery for Flying Squid, *Ommastrephes bartrami*, (Jamieson and Heritage 1987, 1988).

The large number of records in recent years either indicates an unusual extension into northern waters, or reflects the circumstances of the experimental squid fishery and other increases in sighting effort, allowing for better recording of actual numbers in offshore Canadian waters. Until recently, there have been only a few cetacean sighting records compiled from offshore waters in British Columbia by Canadian authorities or researchers. A lack of experienced observers also contributes to the scant knowledge of distribution and abundance. Reporting of records of species like the Northern Right Whale Dolphin, which are not actively being studied, is very poor in British Columbia. As well, because records are not

TABLE 1. Records of the Northern Right Whale Dolphin within the Canadian 320km (200 mi) extended economic zone.

Date	Location	Number	Type[a]	Source[b]
13 February 1970	48°23'N, 126°52'W	200 ±	1[c]	1
13 February 1970	48°23'N, 126°52'W	1	2[c,d]	1
15 September 1978	49°49'N, 128°22'W	5 ± 1	1	2
21 July 1982	48°36'N, 126°45'W	unknown	1	3
20 July 1983	50°45'N, 132°30'W	3	1	2
28 March 1984	49°01'N, 125°41'W	2	1	2
21 November 1984	48°N, 127°W	unknown	1	3
24 July 1986	48°29'N, 129°32'W	1	3	4
25 July 1986	48°24'N, 129°39'W	1	3	4
14 August 1986	50°37'N, 131°12'W	1	3	4
14 August 1986	50°25'N, 132°20'W	1	3	4
17 September 1986	48°01'N, 128°42'W	6	1	3
15 October 1986	48°36'N, 126°21'W	4	1	3
12 July 1987	47°31'N, 130°01'W	1	3	4
27 July 1987	48°30'N, 120°31'W	1	3	4
28 July 1987	48°36'N, 129°35'W	1	3[c]	4
28 July 1987	48°36'N, 129°35'W	1	4[c]	3
24 September 1987	48°40'N, 127°04'W	10	1	3
30 August 1988	48°05'N, 120°10'W	5	1	5

[a]Type of Record: (1) Sighting; (2) Collection; (3) Incidental catch, died; (4) Incidental catch, released alive.

[b]Source of Data: (1) Guiguet and Schick 1970; (2) NMML Platforms of Opportunity Program, Seattle, Washington; (3) Crew of the CSS Parizeau, courtesy M. A. Bigg, Pacific Biological Station, Nanaimo, British Columbia; (4) G. D. Heritage, personal communication, Pacific Biological Station; (5) K. Morgan, personal communication, Canadian Wildlife Service, Sidney, British Columbia.

[c]For the purposes of discriminating between type of record (ie., Sighting; collection; incidental catch, died; incidental catch, released alive); there are two records for this occurrence, but in determining the number of occurrences of this species in British Columbia waters, these are combined and considered only once.

[d]This appears to be the only specimen record from British Columbia, held at the Royal British Columbia Museum, Victoria (BCPM 6982).

compiled in one central facility, it is likely that other unpublished records exist but were not available to us. However, based on the available information, the scarcity of records in Canadian waters and the increasing frequency of records progressively southward suggest that Northern Right Whale Dolphins are in the outermost limits of their normal distribution in Canadian waters.

Protection

International

Regulation of international trade between members of the Convention on International Trade in Endangered Species of Wild Fauna and Flora 1973 (CITES), and between non-members and Convention members, has been established by listing the Northern Right Whale Dolphin under Appendix II of the Convention (see Birnie 1982). The International Whaling Commission (IWC) regulates the taking of whales in accordance with the current Schedule provisions, but this regulation may not apply to the Northern Right Whale Dolphin as members of this Convention are divided as to whether "whale" refers to all cetaceans, or only to some species (Klinowska 1987).

National

Canada: The 1982 Cetacean Protection Regulations of the Fisheries Act of Canada 1867 (as amended to date) prohibit hunting of this and other species (except by aboriginal peoples who are allowed to take whales for subsistence purposes). "Hunting" is defined as to "chase, shoot at, harpoon, take, kill, attempt to take or kill, or to harass cetaceans in any manner", and may only be undertaken under permit from the Minister of the Department of Fisheries and Oceans.

United States: All cetaceans are protected under the Marine Mammal Protection Act of 1972, as well as through the Packwood-Magnuson Amendment of the Fisheries and Conservation Act and the Pelly Amendment of the Fisherman's Protective Act.

Population Size and Trends

Nishiwaki (1972) suggested that the world population for this species was over 10 000

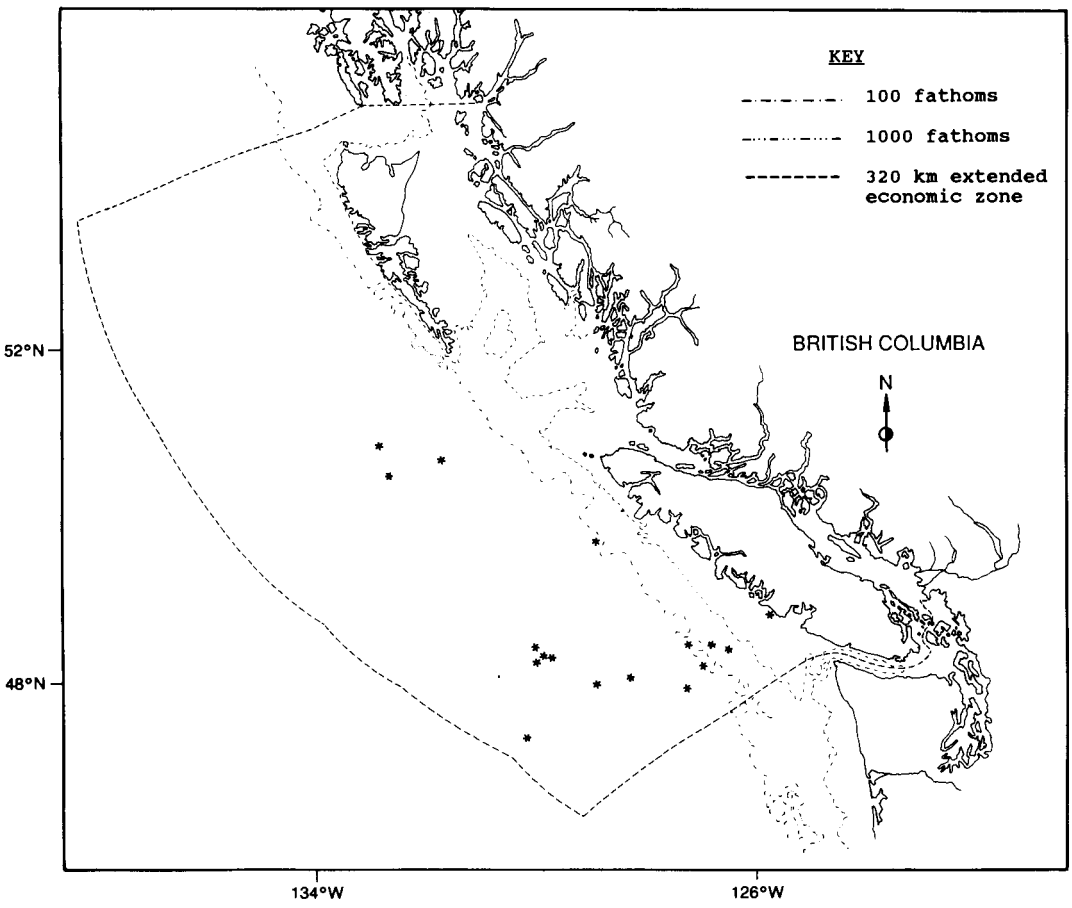

FIGURE 4. Records of the Northern Right Whale Dolphin in the Canadian 320 km (200 mi) extended economic zone.

individuals, but Leatherwood and Walker (1979) gave a tentative estimate of 17 800 individuals for a 20 000 square mile area off southern California. No recent estimate of total population size exists, but Northern Right Whale Dolphins appear to be among the most abundant of the oceanic dolphins that inhabit the temperate North Pacific (Leatherwood and Reeves 1983). Present population trends are unknown due to scarcity of reported sightings and lack of distributional surveys.

Leatherwood and Walker (1979) analyzed all known records from the eastern Pacific. Prior to their work, there had only been 33 published records from the eastern Pacific since the species was originally described in 1848. Of the 184 records where herd sizes were noted, the number of individuals ranged from one to 2000 with a mean group size of 110 individuals (Leatherwood and Walker 1979). Large herds of up to 3000 individuals have been reported, and herds of 1000 animals or more are often seen (Leatherwood et al. 1987). Of the eight sightings in British Columbia waters for which group size information is available (Table 1) the mean was approximately 29 individuals, with a range from two to 200. However seven of the eight records are of 10 or fewer individuals; excluding the single record of 200 gives a mean of five individuals. Leatherwood and Walker (1979) noted that there were no significant differences between herd sizes north and south of Point Conception, California, or between those over and off the continental shelf.

Habitat

In the eastern North Pacific, Northern Right Whale Dolphins have been recorded from waters ranging in temperature from 7.8 to 18.9°C (Leatherwood and Walker 1979). Water temperatures were available from nine British Columbia records and ranged from 13.5 to 16°C (temperatures from Jamieson and Heritage 1987, 1988;

NMML Platforms of Opportunity Program; K. Morgan, personal communication). This range is biased as all records were from either July or August.

Northern Right Whale Dolphins appear to favour deeper water habitats but will approach shore at the heads of deep canyons, particularly in winter (Leatherwood and Reeves 1983). Sixteen of 17 occurrences from British Columbia are from water depths of 500 fathoms or greater, with the remaining record, from March 1984, in shallow water off the west coast of Vancouver Island. The offshore habitat of the Northern Right Whale Dolphin is generally less susceptible to human impact and degradation than are coastal areas.

General Biology

Reproduction

Very little is known about the reproductive biology of this species because few specimens have been available for study from fisheries or strandings and because they have not generally survived well in captivity (Reeves and Leatherwood 1984). It appears that males are mature sexually at lengths of about 2.2 m, and females are mature at about 2.0 m (Leatherwood and Walker 1979; Bryden and Harrison 1986). Estimates of the length at birth have ranged from 60 to 100 cm. Calves are reportedly born in the early spring (Leatherwood et al. 1982). No estimates of gestation period, calving interval, or longevity have been reported. Only one of five individuals that have been taken into captivity in the United States survived for more than three weeks (Reeves and Leatherwood 1984). This individual lived for 15 months (Walker 1975).

Species Movement

Northern Right Whale Dolphins tend to move southward and inshore in late fall and northward and offshore in spring (Leatherwood et al. 1982). Based on sightings in the southern California continental borderland area, they are only seasonal visitors from October through May, with a peak in sightings in January (Leatherwood and Walker 1979). Their appearance in this area generally coincides with peaks in abundance of Market Squid (*Loligo opalescens*), a major prey item (Leatherwood and Walker 1979). Northern Right Whale Dolphins appear to move south of 30° N only during periods of intrusion of unseasonably cold waters (Leatherwood et al. 1987). No seasonal trends are apparent in British Columbia; records have been obtained from seven months of the year in all seasons (Table 1). A peak in sightings during July is probably due to an increase in effort.

Behaviour

Northern Right Whale Dolphins feed on a variety of cephalopods and fish (Leatherwood and Walker 1979; Clark 1986). Distinct patterns of herd configuration are described by Leatherwood and Walker (1979). Northern Right Whale Dolphins have been frequently reported in association with other species of marine mammals, including the Pacific White-sided Dolphin (*Lagenorhynchus obliquidens*), Risso's Dolphin (*Grampus griseus*), Dall's Porpoise (*Phocoenoides dalli*), Short-finned Pilot Whale (*Globicephala macrorhynchus*), Common Dolphin (*Delphinus delphis*), Bottlenose Dolphin (*Tursiops truncatus*), Baird's Beaked Whale (*Berardius bairdi*), Gray Whale (*Eschrichtius robustus*), Humpback Whale (*Megaptera novaeangliae*), Sei Whale (*Balaenoptera borealis*), Fin Whale (*Balaenoptera physalus*), and California Sea Lion (*Zalophus californianus*) [Norris and Prescott 1961; Brownell 1964; Fiscus and Niggol 1965; Leatherwood 1974; Wahl 1977; Leatherwood and Walker 1979; Braham 1983; Kruse 1987; Kajimura and Loughlin 1988]. Intermingling of species however, is relatively uncommon, apparently occurring only with Pacific White-sided Dolphins (Leatherwood and Walker 1979) and Risso's Dolphins (T.A. Jefferson, Department of Marine Biology, Texas A & M University, Galveston, Texas, personal communication). Interspecific associations were noted in four of the records from British Columbia waters, three with Pacific White-sided Dolphins, and one with both Pacific White-sided Dolphins and Short-finned Pilot Whales.

Northern Right Whale Dolphins are often wary of boats and avoid them, either by "sneaking away" with little surface disturbance, or "running" away quickly (Leatherwood and Walker 1979). Speeds of at least 33 km/h (18 knots) can be maintained for protracted periods (Leatherwood et al. 1987). They appear less shy and will more frequently approach vessels and ride their bow waves when in the company of Pacific White-sided and other dolphins (Leatherwood and Walker 1979; Leatherwood et al. 1987).

Limiting Factors

Seven Northern Right Whale Dolphins were incidentally killed in Canadian waters, and an additional six animals killed in international waters in an experimental driftnet fishery for Flying Squid in 1986 and in 1987. This fishery has since been discontinued (Jamieson and Heritage 1987, 1988). They were taken sporadically by whalers in the 19th century (Mitchell 1975). Wilke et al. (1953) note a single whaling company in Japan taking 465 of these dolphins in a two month period in 1949. More recently, and up until 1985, small numbers (less than 40) were taken yearly off Japan incidental to local fisheries (IWC 1983, 1984, 1985, 1986, 1987). The number taken each

year since then has increased with 154 taken in 1986, more than 261 in 1987, and 268 in 1988 (IWC 1988, 1989, 1990). A few have been live-captured off California for aquariums (Walker 1975; Reeves and Leatherwood 1984).

Brain lesions resulting from parasitic infestations by the tremode *Nasitrema* sp. have been found in stranded individuals, and may be a significant cause of single strandings (Dailey 1985). Other parasites have been recorded from Northern Right Whale Dolphins, including the nematodes *Crassicauda* sp. and *Anisakis* sp., and the cestode *Phyllobothrium* sp. (Dailey and Brownell 1972; Dailey 1985; Cowan et al. 1986), but little is known of the influence of these parasites on the natural mortality of the species.

Natural predators are not known, but may include the Killer Whale (*Orcinus orca*) and large sharks. Strandings are uncommon, only 35 having been recorded between 1848, when the species was described, and 1978 (Leatherwood and Walker 1979; Leatherwood et al. 1987). However in 1981, 23 strandings were recorded from south central and southern California beaches (Woodhouse et al. 1985). Mass strandings have apparently not been reported in this species, although there are two records of mass strandings in the closely related Southern Right Whale Dolphin (*Lissodelphis peroni*) in New Zealand (Fraser 1955; Cawthorn 1990). No information appears to be available on environmental contaminant levels in this species.

Special Significance of the Species

Although normally wary of boats Northern Right Whale Dolphins appear less shy, and will more frequently approach vessels and bow ride when in the company of Pacific White-sided and other dolphins (Leatherwood and Walker 1979; Leatherwood et al. 1987). This species has been successfully maintained in captivity for at least 15 months (Walker 1975), but most captured individuals have lived for much shorter periods (Reeves and Leatherwood 1984). They are not a comercially important species and except for the small whale fishery of Japan are not taken for food. Due to their offshore habitat they are rarely observed and are less susceptible to the impact of human activities.

Evaluation

Small catches incidental to Japanese coastal fisheries can be expected (Mitchell 1975). There is no evidence that this species is, or ever was, hunted in Canadian waters. Based on the small amount of data available it is impossible to determine population trends, and, in fact, based on the known lack of effort for censusing cetaceans in British Columbia, it is probable that this species occurs much more frequently than documented here. As long as incidental catches in offshore Canadian fisheries are prevented or severely limited, its status in Canadian waters should not change. Evaluated in light of the best available information, it appears that the Northern Right Whale Dolphin is rare in Canadian waters, as it is at the outermost limits of its normal distribution, but it is not particularly at risk here.

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