

Bulletin 171

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# marine mammals

## of British Columbia

G. C. Pike

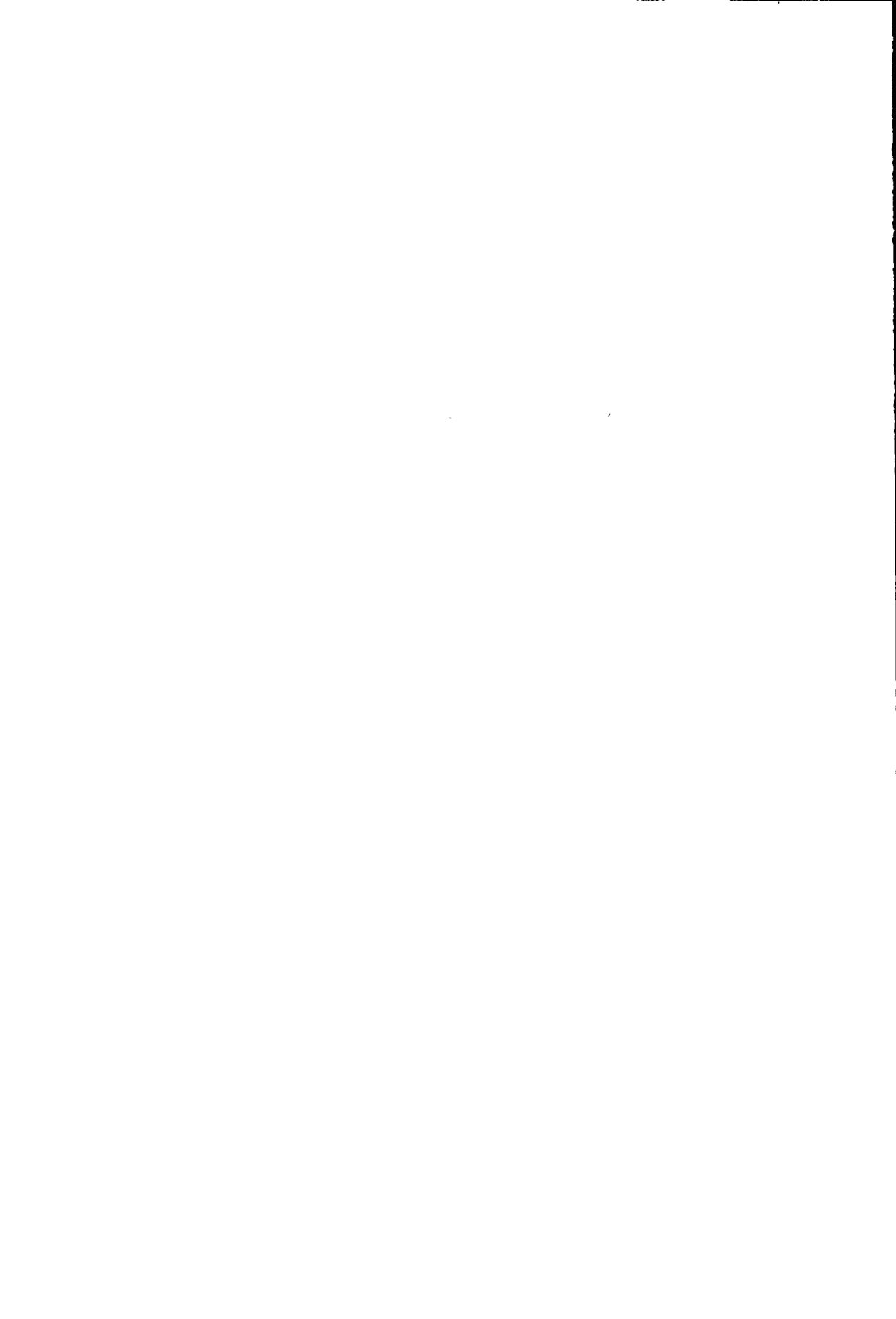
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Fisheries Research Board of Canada Ottawa 1969



MARINE MAMMALS OF BRITISH COLUMBIA



BULLETIN 171

# **Marine Mammals of British Columbia**

by G. C. Pike†

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## ABSTRACT

Records of cetaceans and pinnipeds in British Columbia waters up to 1967 were compiled from published and unpublished records.

Cetaceans previously known from British Columbia by published records of strandings and captured specimens include: *Ziphius cavirostris*, *Mesoplodon stejnegeri*, *Delphinus delphis*, *Lagenorhynchus obliquidens*, *Grampus griseus*, *Orcinus orca*, *Phocoena phocoena*, *Phocoenoides dalli*, and *Balaenoptera acutorostrata*. Those known mainly from commercial whale catches include: *Balaenoptera physalus*, *Balaenoptera borealis*, *Balaenoptera musculus*, *Megaptera novaeangliae*, *Physeter catodon*, *Berardius bairdi*, *Eschrichtius gibbosus*, and *Balaena glacialis*.

Specimen records, previously unpublished, are given for two cetaceans new to the area: *Stenella* sp. and *Mesoplodon carlhubbsi*. Sight records, previously unpublished, from logbooks of ships at sea and lighthouses are given for three species new to the offshore waters: *Globicephala macrorhyncha*, *Grampus griseus*, and *Lissodelphis borealis*. Occurrence of *Globicephala macrorhyncha* is authenticated by photographs of a specimen captured at 50°N, 145°W. Identifications of two specimens of *Lissodelphis borealis* sighted at 50°N, 135°W, and of 16 *Grampus griseus* at 50°N, 145°W, extend the known ranges of these species. External measurements, previously unpublished, are given for 11 *Berardius bairdi*, 2 *Mesoplodon* sp., 1 *Ziphius cavirostris*, 1 *Orcinus orca*, 5 *Phocoenoides dalli*, 1 *Stenella* sp., 11 *Eschrichtius gibbosus*, and 2 *Balaenoptera acutorostrata*. Sight records of *Phocoenoides dalli*, *Lagenorhynchus obliquidens*, *Physeter catodon*, and *Globicephala macrorhyncha* extend the known distributions of these species in waters off British Columbia.

Whale catches from 1910 to 1966 are tabulated by species; results of biological studies on large whales from the study area are summarized.

The pinnipeds *Callorhinus ursinus*, *Eumetopias jubatus*, and *Phoca vitulina* are common in British Columbia, the first species as a transient and the other two as resident breeding populations. A few *Zalophus californianus* are seen every year but the species does not breed on this coast. Solitary individuals of *Mirounga angustirostris* are frequently seen. *Eumetopias jubatus* and *Phoca vitulina* are taken by commercial hunters.

## INTRODUCTION

This Bulletin brings together published and unpublished records up to 1967 of marine mammals from inshore and offshore waters of British Columbia. The systematic account of species of cetaceans and pinnipeds follows chiefly the nomenclature used by Rice and Scheffer (1968) and Hershkovitz (1966). Special note is made wherever the scientific name of a species does not conform to either of these authorities. Common names may differ from ones used by these authorities, to conform to names considered more appropriate by the authors or names which are popular locally.

Abbreviations used throughout the text are as follows: *BCPM* — British Columbia Provincial Museum; *FRB* — Fisheries Research Board of Canada; *UBC* — University of British Columbia.

This paper was originally prepared as part of a symposium on strandings of marine mammals along the coast of North America. The symposium was sponsored by the Marine Mammal Committee of the American Society of Mammalogists and was coordinated by Dr Joseph Curtis Moore.

## SOURCES OF INFORMATION AND ACKNOWLEDGMENTS

Observations and sight records supplementing published records for each species listed in the systematic account were compiled from a variety of sources by the authors and their associates while employed by the Fisheries Research Board of Canada Biological Station, Nanaimo, B.C.

A large and valuable fund of information on marine mammals from British Columbia has been accumulating since 1957 in cooperation with various organizations. Observations on the animals are recorded aboard fisheries patrol, oceanographic, and Canadian navy vessels, the weathership at Ocean Station P, and at strategically located lighthouses, in logbooks provided by the Fisheries Research Board. This material, which is still accumulating and has not yet been completely analysed, forms the basis for a large part of the original material described here. Many individuals contribute to this project.

Of special importance in this compilation are records provided by personnel aboard fisheries patrol vessels. Logbooks are carried aboard 30 vessels of the Department of Fisheries of Canada and the data obtained provide extensive coverage of coastal waters. Lightkeepers also contribute generously, especially those at Eastpoint, Addenbroke, Race Rocks, Langara, Kains Island, and Lennard Island.

Offshore records were provided by personnel aboard the *Swiftsure* and *Columbia* lightships under supervision of the 13th U.S. Coast Guard District Command, and by personnel aboard the weatherships CGS *Stonetown* and *St. Catherines* stationed

at 50°N, 145°W, under the supervision of the Canada Department of Transport. Information from several Canadian navy vessels cooperating with the Pacific Oceanographic Group of the Fisheries Research Board was particularly valuable in revealing offshore distribution of cetaceans and fur seals. Information on both offshore and coastal distributions of cetaceans and pinnipeds was contributed by personnel aboard research vessels under supervision of the Fisheries Research Board. These include the motor vessels *G. B. Reed*, *Fort Ross*, *Key West*, *Pacific Ocean*, and *T. W. Islander*.

Reference material for identifying cetacean species accompanies each logbook in the form of a booklet illustrating and describing individual species (Pike, 1956).

Special thanks are tendered to each individual who has contributed so generously in observing and recording sightings of marine mammals on this coast. The authors appreciate that many of these observations are made and recorded, whether at light stations or on vessels at sea, under adversity. Publication of this Bulletin gives assurance that the individual contributions are of value in enhancing knowledge of the marine mammals frequenting these waters.

Dr G. C. Carl, Director of the British Columbia Provincial Museum, and Dr I. McTaggart Cowan, now Dean of Graduate Students at the University of British Columbia, each contributed data and kindly gave permission for their publication. They also provided lists of marine mammal specimens in the collections of the institutions they represent.

The information on commercial cetaceans is based almost entirely upon whale catches during the 18-year term of the whaling station located at Coal Harbour on Vancouver Island, from 1948 through 1959 and from 1962 through 1967. The collection of certain data, which include the total length (tip of snout to tail notch), sex, and species for each whale caught, is mandatory according to terms of the International Whaling Agreements; these are published annually in "International Whaling Statistics" (Committee for Whaling Statistics, 1942-68). A fund of information, much of it unpublished, was accumulated at the station by the Fisheries Research Board. Cooperation of the operators of the station, British Columbia Packers, Ltd., and Western Canada Whaling Co., in providing facilities for biological studies on whales is gratefully acknowledged.

The information on the northern fur seal is based largely upon results of pelagic research now being conducted, according to terms of the Interim Convention on Conservation of North Pacific Fur Seals, by the Fisheries Research Board of Canada in cooperation with scientists of the USSR, the United States, and Japan.

## OCEANOGRAPHY AND GEOGRAPHY OF THE AREA

Most of the mammals described in this Bulletin are recorded from the American Coastal Region as defined by Fleming (1955), or the Coastal Domain as defined by Dodimead et al. (1963). The American Coastal Region, a temperate faunistic province, extends from the middle of Baja California into the Bering Sea. According to Fleming's concept, prevailing westerly winds drive mixed waters from the Kuroshio and the

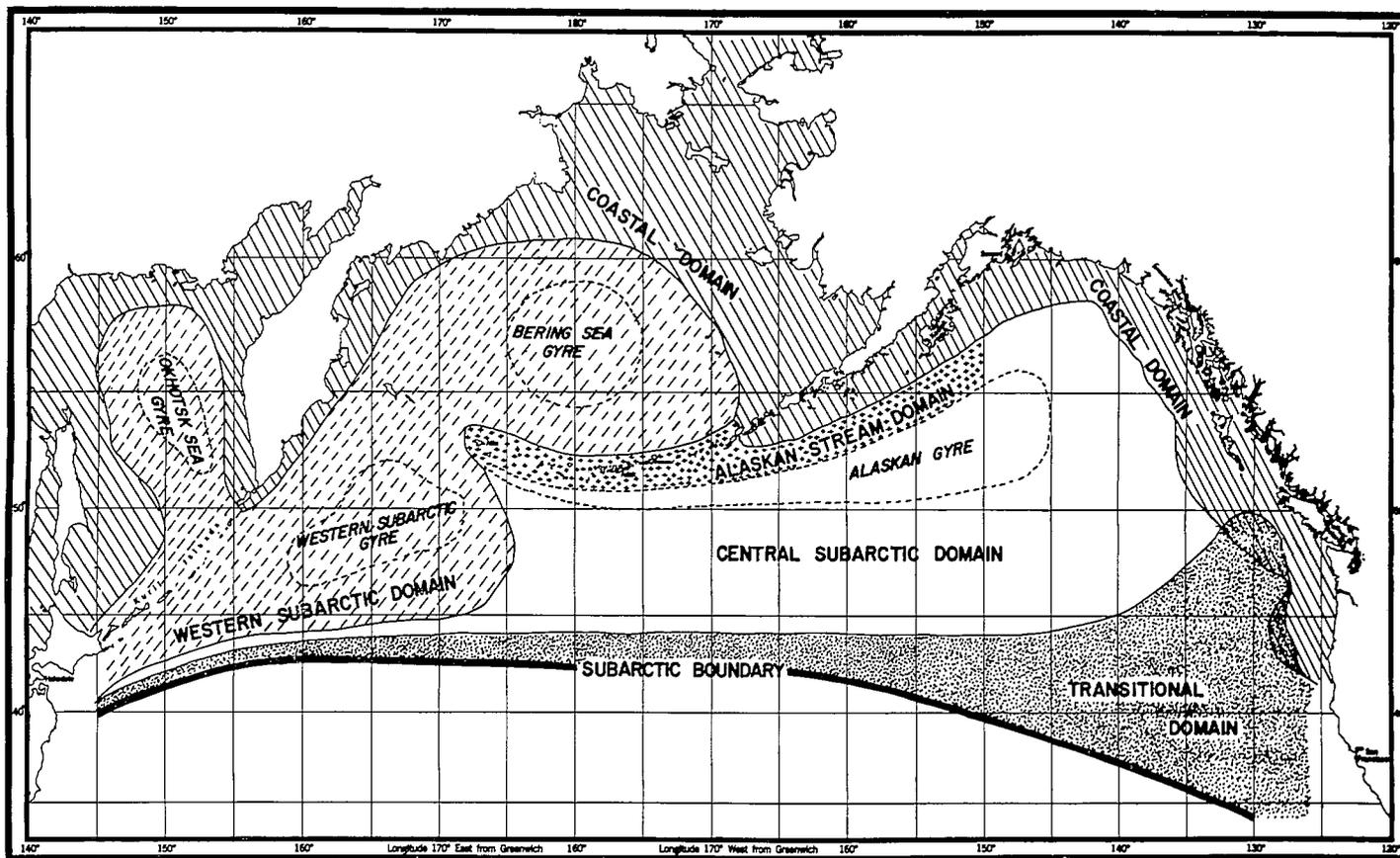


FIG. 1. Schematic diagram of upper zone domains in the Subarctic Region of the North Pacific.

Oyashio eastward from Japan across the North Pacific Ocean. This drift current divides in the vicinity of Vancouver Island, about 400 miles offshore, part turning northward to carry a mild climate far into the Gulf of Alaska and part turning southward to form the California Current.

Since 1955, extensive oceanographic surveys of the Subarctic Region of the North Pacific have led to the concept of domains (Dodimead et al., 1963) in place of the classic concept of water masses. Domains are considered as areas that are consistent in all aspects of the oceanography, rather than in the properties of the water only. The upper-zone (above the halocline or approximately from 100 m to the surface) domains in the Subarctic Region are illustrated in Fig. 1. Boundaries of the domains vary according to season and year. The most variable of the domains is the Coastal Domain. Its oceanographic features vary markedly because of local variations in runoff, heating, cooling, winds, tides, and advection; also, strong currents may cause considerable mixing, and upwelling may occur when winds are suitable. Like most coastal areas in other parts of the world, the Coastal Domain is not wholly dominated by oceanic influences. The boundary between the Alaskan Gyre and the California Current is continually shifting. In summer a surface lens of dilute water from the Coastal Domain extends seaward into adjacent oceanic areas and the surface boundary moves seaward.

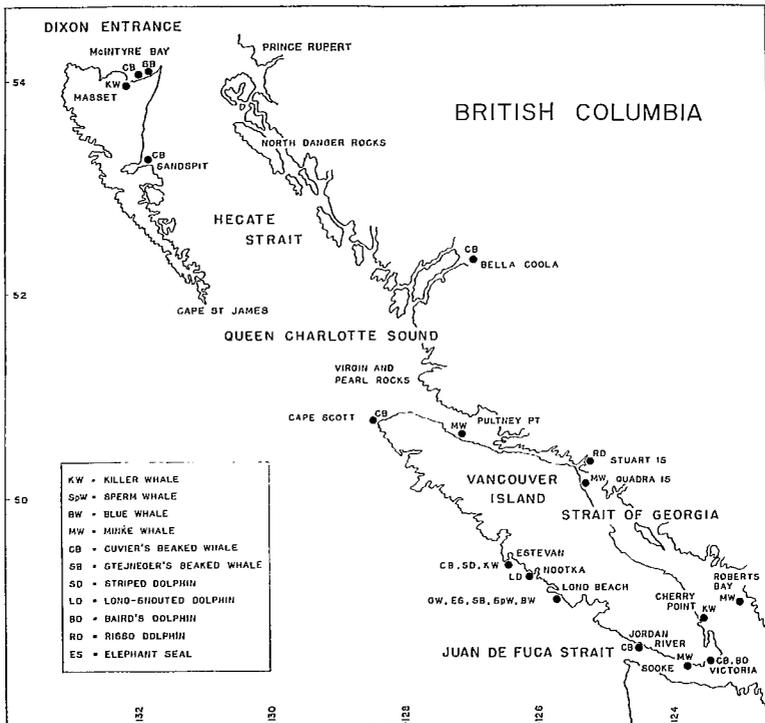


FIG. 2. Geographical locations of selected place names mentioned in text, including those of strandings.

The distributions of marine mammals off British Columbia are described in terms of three domains: (1) the Coastal Domain, (2) the Transitional Domain, and (3) the Central Subarctic Domain.

Geographic features of the British Columbia coastline and the locations of strandings are shown in Fig. 2. Within the framework of numerous islands, wide channels, and deep inlets, are the following: shorelines bordering open ocean, such as the west coasts of Vancouver and Queen Charlotte islands; exposed coastal areas, such as Hecate Strait and Queen Charlotte Sound; protected coastal seas, such as the Strait of Georgia; and turbulent channels or seaways, such as Juan de Fuca and Johnstone straits. Entrance to coastal seas is provided by three major seaways: Juan de Fuca Strait, Queen Charlotte Sound, and Dixon Entrance. These entrances are broadly open to the exposed ocean and provide access to inshore waters for oceanic organisms. Juan de Fuca Strait provides access to Georgia Strait and Puget Sound, two expansive protected coastal seas which intrude on the most heavily populated region in the Pacific Northwest. Queen Charlotte Sound and Dixon Entrance bracket the Queen Charlotte Islands and provide access to Hecate Strait, an exposed coastal sea sparsely inhabited along its shores. A network of islands lying along the eastern shore of Hecate Strait is interwoven by a complex system of open channels. Eastward of the island chain numerous broad and deep fjords with shorelines rising abruptly from the water's edge encroach upon the mainland. Some of these fjords extend nearly 100 miles inland.

Surface water temperatures vary widely from year to year. The monthly means range from 5 C in January, February, and March to 13 C in August and September, both in oceanic waters near the coast and at Station P.

## ORDER CETACEA

### Family ZIPHIIDAE—Beaked Whales

#### *Berardius bairdi* Stejneger 1883—Baird's beaked whale

This species was first recorded from the coast of British Columbia on the basis of two specimens taken in whale catches off the west coast of Vancouver Island in 1950 and 1951 (Pike, 1953c). It is also known from Washington (Scheffer and Slipp, 1948; Slipp and Wilke, 1953) and from Alaska (Scheffer, 1949b). Whale catch statistics for the Pacific coast of North America since 1948 list 23 Baird's beaked whales from British Columbia and 13 from California (Committee for Whaling Statistics, 1942-68). The statistics for the same locality before 1948 list a number of "bottlenose" whales: 8 from Washington, 10 from British Columbia, and 1 from Alaska. These are probably all referable to the species *B. bairdi*.

Baird's beaked whales are frequently seen by whalers operating off the west coast of Vancouver Island during all months of the whaling season, which lasts from May through September. Most are seen, and most taken, in August. Schools usually

number 10–20 individuals and comprise mostly males as indicated by the catch. Twenty-three of the 25 caught from 1950 to 1966 were males; all but one were sexually mature. Lengths of mature males ranged from 32 through 36 feet (9.8–11.0 m) (Fig. 3). One female was 29 feet (8.8 m) long and immature; the other was 37 feet (11.3 m) long, lactating, and multiparous.



FIG. 3. A 32-foot male *Berardius bairdi* taken at the Coal Harbour whaling station. (Photographs by G. C. Pike.)

In Table 1 are presented body measurements and other data for 13 Baird's whales processed at Coal Harbour from 1950 to 1958. Means and variations of these body measurements are similar to those for specimens of *B. bairdi* taken off Japan. Included in this table are data on testes weights, ovary weights, and stomach contents. All 13 stomachs were examined. Three were empty. Stomach contents included squid (7 stomachs), fish bones mostly from small rockfish (7 stomachs), and skate egg-cases (2 stomachs). Collected specimens include two skulls, which are listed in Appendix II.

Specimens from British Columbia show extreme variability in the size and shape of throat grooves, dorsal fin and flukes, and colour (Pike, 1953c). A median groove lies between the two usual V-shaped throat grooves in some specimens. The dorsal fin is usually straight and vertical along its hind margin, but is sometimes recurved. The

TABLE 1. Measurements and other data from 13 Baird's beaked whales processed at the Coal Harbour Whaling Station, British Columbia, 1950-1958. Measurements are given in centimetres and as percentages of total lengths (in parentheses).

Specimen no.:	581	1234	2729	2730	2847	2918	3901	3902	4167	4547	5052	6097	6098
Date:	6/7/50	20/8/50	24/6/53	24/6/53	28/7/53	20/8/53	13/8/53	13/8/54	13/8/54	5/6/55	16/5/56	11/5/57	11/5/57
Sex:	M	F	M	M	M	M	M	M	M	M	F	M	M
1. Total length from tip of snout to median margin of flukes	1015 (100.0)	893 (100.0)	1082 (100.0)	1010 (100.0)	962 (100.0)	991 (100.0)	1030 (100.0)	1052 (100.0)	1045 (100.0)	1042 (100.0)	1134 (100.0)	1049 (100.0)	1113 (100.0)
3. Tip of snout to blowhole	108 (11.0)	109 (12.2)	118 (10.9)	105 (10.4)	095 (9.9)	100 (10.1)	122 (11.8)	120 (11.4)	- -	112 (10.7)	130 (11.5)	118 (11.2)	125 (11.2)
4. Tip of snout to angle of gape	62 (6.3)	66 (7.4)	70 (6.5)	65 (6.4)	- -	60 (6.1)	65 (6.3)	65 (6.2)	64 (6.1)	- -	- -	60 (5.7)	70 (6.3)
5. Tip of snout to centre of eye	103 (10.5)	109 (12.2)	110 (10.2)	100 (9.9)	83 (8.6)	106 (10.7)	92 (8.9)	110 (10.4)	110 (10.5)	105 (10.1)	120 (10.6)	105 (10.0)	120 (10.8)
6. Tip of snout to tip of flipper	308 (31.3)	283 (31.6)	320 (29.6)	315 (31.2)	253 (26.3)	310 (31.3)	320 (31.0)	280 (26.6)	323 (30.9)	- -	350 (30.8)	320 (30.5)	345 (30.9)
8. Hind margin of flukes to posterior emargination of dorsal fin	308 (31.3)	290 (32.5)	335 (31.0)	300 (29.7)	270 (28.1)	310 (31.3)	317 (30.8)	320 (30.4)	314 (30.0)	332 (30.9)	335 (29.5)	320 (30.5)	322 (29.8)
9. Width of flukes at insertion	82 (8.3)	69 (7.7)	80 (7.4)	70 (6.9)	- -	57 (5.8)	66 (6.4)	80 (7.6)	70 (6.7)	- -	84 (7.4)	- -	78 (7.0)
10. Hind margin of flukes to anus	302 (30.6)	277 (30.8)	327 (30.2)	280 (29.8)	255 (26.5)	310 (31.3)	290 (28.2)	310 (29.5)	276 (26.4)	324 (31.1)	325 (28.6)	310 (29.5)	313 (29.0)
11. Hind margin of flukes to umbilicus	577 (58.6)	525 (58.7)	635 (58.7)	580 (57.5)	545 (51.6)	587 (59.3)	595 (57.7)	610 (58.0)	564 (54.0)	- -	660 (58.1)	600 (57.1)	640 (57.5)
13. Centre of reproductive aperture to centre of anus	74 (7.5)	- -	- -	- -	- -	77 (7.8)	65 (6.3)	77 (7.3)	77 (6.9)	- -	- -	- -	- -

(Continued)

TABLE 1. Measurements and other data from 13 Baird's beaked whales processed at the Coal Harbour Whaling Station, British Columbia, 1950-1958. Measurements are given in centimetres and as percentages of total lengths (in parentheses).—(Concluded)

Specimen no.:	581	1234	2729	2730	2847	2918	3901	3902	4167	4547	5052	6097	6098
Date:	6/7/50	20/8/50	24/6/53	24/6/53	28/7/53	20/8/53	13/8/53	13/8/54	13/8/54	5/6/55	16/5/56	11/5/57	11/5/57
Sex:	M	F	M	M	M	M	M	M	M	M	F	M	M
14. Height of dorsal fin	23 (2.3)	24 (2.6)	28 (2.6)	— —	— —	30 (3.0)	30 (2.9)	32 (3.0)	28 (2.7)	— —	— —	— —	— —
15. Length of base of dorsal fin	67 (6.8)	66 (7.4)	60 (5.6)	— —	— —	— —	63 (6.1)	70 (6.7)	— —	— —	— —	— —	— —
16. Axilla to tip of flipper	82 (8.3)	76 (8.5)	90 (8.3)	— —	75 (7.8)	90 (9.1)	95 (9.2)	90 (8.6)	— —	— —	— —	— —	— —
17. Tip to anterior end of lower border of flipper	128 (13.0)	108 (12.0)	130 (12.0)	120 (11.9)	103 (10.7)	130 (14.5)	130 (12.6)	126 (12.0)	— —	— —	— —	— —	— —
19. Greatest width of flipper	42 (4.3)	40 (4.5)	45 (4.2)	35 (3.5)	40 (4.2)	50 (5.0)	46 (4.5)	42 (4.0)	46 (4.5)	— —	— —	— —	— —
22. Length of severed head from condyle to tip	141 (14.3)	141 (15.7)	137 (12.7)	— —	— —	— —	135 (13.1)	— —	149 (14.3)	— —	170 (15.0)	— —	— —
24. Depth of body at dorsal fin	185 (18.8)	132 (14.5)	200 (18.5)	— —	150 (15.6)	— —	— —	— —	— —	— —	— —	— —	— —
26. Total spread of flukes	282 (28.6)	— —	260 (24.0)	265 (26.2)	260 (27.0)	— —	— —	— —	— —	260 (25.1)	— —	— —	— —
Weight of ovaries or testes (g)	—	30;30	950;950	—	500;600	750;700	600;600	580;580	660;640	680;650	310;—	560;490	740;600

hind margin of the flukes is usually marked by a shallow concavity near the midline, but in some cases it is notched at the midline. The overall colour is from slate-black to pure black, but the dorsal surface sometimes appears lighter because of numerous scratches and abrasions. A white umbilical splash is apparent in most specimens, and some have white patches on the chest between the flippers. In one specimen, the white ventral midline splash was a continuous irregular white streak extending from the penis to a point between the insertions of the flippers. Scratch marks from teeth are found on both males and females.

### *Mesoplodon* spp.

There are two published records of *Mesoplodon* specimens from the coast of British Columbia. The first specimen (UBC 4501) is a beach-worn partial cranium from Port McNeill on the east coast of Vancouver Island found in August 1953 (Cowan and Guiguet, 1965). The second specimen (UBC 4733) is the complete skeleton of an adult female stranded near Tofino on Long Beach, Vancouver Island, in May 1959. Moore (1963) studied the skulls of these two specimens and confirmed the identity as *M. stejnegeri* True 1885.

The Tofino specimen, an adult female 12.5 feet (381 cm) long, was first reported to the Nanaimo Station by Mr George Hillier of Ucluelet, B.C. The University of British Columbia was informed of the stranding and flew two men to the scene. Measurements, photographs, and a complete skeleton were obtained but these have not yet been reported on in detail. Moore (1963) described the skull, mandibles, and teeth of this specimen and recorded a few important body measurements.

A third record of *Mesoplodon* is based upon photographs and measurements of a juvenile male, 15.5 feet (472 cm) long, which drifted ashore in Prince Rupert Harbour, where it was tied up to the float at Cow Bay on December 16, 1962. The Department of Fisheries of Canada was subsequently notified. On December 20, Fisheries Officer V. H. B. Giraud had the whale towed to a nearby beach. There he examined, photographed, and measured the carcass (Table 2), which, by this time, had been dead for about 2 weeks. The colour of the decomposed carcass was dark gray dorsally, shading to light gray ventrally. No teeth were apparent. The lower jaw did not project beyond the upper jaw. No specimens were collected.

The Prince Rupert whale was originally taken to be a newborn *Berardius*, the body measurements according reasonably well. More critical comparison of measurements and photographs with published descriptions of ziphiids, however, convinced us that the specimen was a species of *Mesoplodon*. By comparison with *Berardius*, this specimen, in common with published descriptions of *Mesoplodon* spp. from the North Pacific, has a relatively higher fin situated more anteriorly, and has shorter and narrower flippers, which are more pointed at the tips. Photographs of the specimen suggest an upsweep of the lower jaw about midway along its length, whereas the jaw of *Berardius* is thickened near the tip where the anterior pair of teeth insert.

A fourth record of *Mesoplodon* from British Columbia is a juvenile male, 9 feet (274 cm) long, which washed ashore on Long Beach on the west coast of Vancouver Island in July 1963. The whale was first reported by Mr George Hillier on July 3.

Mrs P. Whittington of Long Beach took some measurements and photographs. Messrs I. B. MacAskie and C. J. Morley of the Nanaimo Station examined, measured, and photographed the whale on July 4. Measurements are presented in Table 2. A drawing of the specimen by Mr MacAskie from his original observations and measurements is presented in Fig. 4. The weight was estimated at about 400 lb (180 kg).

When first examined, the Long Beach whale had suffered from sand abrasion and exposure, the body had been eviscerated, and the dorsal fin removed. The colour was light gray on the sides between the flippers and the caudal peduncle, shading dorsally to a uniform dark slate and ventrally to a dull yellow-white, which terminated near the apex of the V-shaped throat grooves; the head, flukes, and flippers were entirely dark slate. A pair of sharp teeth were found buried in the gum of the lower jaw 3 inches (7.6 cm) from the tip. After rough cleaning the complete skeleton was

TABLE 2. Measurements in centimetres (after Norris, 1961) of two stranded male specimens of *Mesoplodon* sp. Specimen no. 1 is from Wickaninnish Bay, Vancouver Island, July 3, 1966; no. 2 is from Prince Rupert, Dec. 16, 1962.

	Specimen	
	1	2
1. Length, total	274	472
2. Length, tip of upper jaw to eye	36	56
4. Length of gape	21	28
5. Length, tip of upper jaw to ear	43	—
6. Centre of eye to ear	8	—
7. Centre of eye to angle of gape	17	—
8. Centre of eye to blowholes	20	—
9. Length, tip of upper jaw to blowholes	45	56
10. Length, tip of upper jaw to insertion of flipper	63	104
11. Length, tip of upper jaw to tip of fin	—	300
13. Length, tip of upper jaw to genital aperture	—	292
14. Length, tip of upper jaw to anus	—	333
15. Projection of lower jaw	0	—
17. Thickness of blubber, middorsal	4	—
18. Thickness of blubber, midlateral	3	—
20. Length, throat creases, minimum	ca.17	—
21. Girth, transverse at axilla	132	274
22. Girth, maximum, 206 cm from snout	—	300
24. Dimensions of eye	2-2.5	—
26. Length, genital slit	—	20
27. Dimensions of blowhole	3-7	—
29. Length, flipper (insertion to tip)	29	53
30. Length, flipper (axilla to tip)	23	—
31. Width, flipper	9	—
32. Height, dorsal fin	—	25
33. Length, dorsal fin base	ca.21	29
34. Width, flukes (tip to tip)	59	124

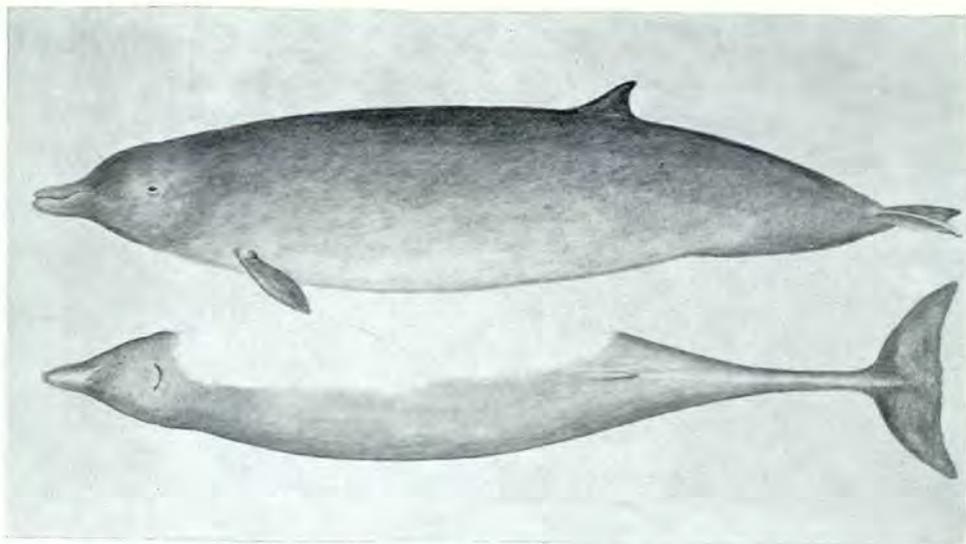


FIG. 4. Sketch of a 9-foot juvenile male *Mesoplodon* sp. stranded on Long Beach, Vancouver Island, July 1963. (Drawn from the specimen by I. B. MacAskie.)

donated to the University of British Columbia (UBC 9037), where it was identified as *Mesoplodon carlhubbsi* Moore 1963. The lower jaw from a second specimen of *M. carlhubbsi* was found at Rivers Inlet in 1965 (UBC 9036). These two specimens extend the known range of the species.

On the basis of skull morphology, and geography, Moore (1963) distinguishes three species of *Mesoplodon* from the Pacific Ocean: (1) a boreal or subarctic form, *M. stejnegeri*, which has been recorded from Oregon, Washington, Alaska, the Bering Sea, and Japan; (2) a north temperate form, *M. carlhubbsi*, which has been recorded from Washington, California, and Japan; and (3) a south temperate form, *M. bowdoini* Andrews 1908, which has been recorded only from New Zealand. A fourth species, *M. ginkgodens* Nishiwaki and Kamiya 1958, probably a tropical form, was described from Japan. It is also recorded from California (Moore and Gilmore, 1965). These species cannot be separated on the basis of geographical range alone. Both the subarctic and the north temperate forms are recorded from Washington (two specimens); both forms are now recorded from British Columbia.

### *Ziphius cavirostris* G. Cuvier 1823—Cuvier's beaked whale

There are four published specimen records of this species from the coast of British Columbia. A skull (UBC 3691) was obtained near Bella Bella on the mainland about 1900 and a partial skull (BCPM 5645) was obtained during clearing operations one mile above the beach near Victoria (Cowan and Guiguet, 1952). A beach-worn skull (BCPM 4557) was obtained near Cape Scott on the north coast of Vancouver Island in 1937 (Cowan and Hatter, 1940). A beaked whale stranded near Estevan

Point on the west coast of Vancouver Island in May 1941 was erroneously identified as *Hyperoodon rostratus* (Anon., 1941). On the basis of photographs and skeletal fragments, the specimen was later identified as *Z. cavirostris* (Cowan, 1945). Photographs (Fig. 5) show the Estevan Point animal to be a male. From the original note the specimen is described as follows: "The length overall was very close to 20 or 21 ft and the colour was blue-black with slightly mottled spots on the side facing the picture; the other side was a dirty white. No teeth were noticeable."



Fig. 5. *Ziphius cavirostris* stranded near Estevan Point on the west coast of Vancouver Island, May 1941. (Photograph by Basil Robson.)

A fifth specimen of *Z. cavirostris* was obtained in January 1954, when the badly decomposed carcass of an adult male washed ashore one mile south of the mouth of Jordan River on the west coast of Vancouver Island. The specimen was first reported by Mrs H. R. Hanson of Victoria. The carcass was examined by Mr. C. J. Guiguet, who estimated the total length at 16 feet (488 cm). The skull is deposited in the British Columbia Provincial Museum (BCPM 6416). This record is published by courtesy of Dr G. C. Carl.

A sixth specimen, a male 18.5 feet (564 cm) long, was stranded near Tow Hill on the north coast of the Queen Charlotte Islands in the winter of 1959-60. Photographs were taken and the complete skeleton (UBC 7999) collected on December 16, 1960. This record is published by courtesy of Dr. I. McTaggart Cowan.

A seventh specimen, a male 18 feet (545 cm) long, was stranded near the end of the airport runway at Sandspit on the east coast of the Queen Charlotte Islands in February 1961. It was examined by Mr John Thompson of the Nanaimo Station on

February 15. Mr Thompson took photographs, collected the lower jaw, and made the following measurements: total length, 545 cm; tail to hind margin of fin, 332 cm; tip of snout to eye, 175 cm; tip of snout to anus, 155 cm; height of fin 24 cm; length of fin base, 43 cm; spread of flukes, 137 cm; width of blowhole, 13 cm. The complete skeleton (UBC 8325) was collected in September.

The four recent strandings of *Z. cavirostris* reported above for British Columbia were all males, and ranged in length from 16 to 21 feet (4.9–6.4 m); all are from exposed oceanic shores. The species has been recorded from Alaska (Scheffer, 1949b) to California (Hubbs, 1946, 1951; Houck, 1958; Norris and Prescott, 1961) along the west coast of North America. It is nearly cosmopolitan, occurring in all except polar regions. Mitchell (1967) tabulated and described previously known and new strandings from the west coast of North America.

### Family PHYSETERIDAE—Sperm Whales

#### *Physeter catodon* Linnaeus 1758—Sperm whale

The sperm whale has always been prominent in commercial whale catches from the coast of British Columbia. More than 5000 have been taken since whaling began on this coast in 1905 (Table 3). Sperm whales comprised 79% of the catch from Queen

TABLE 3. Species compositions of catches by British Columbia whalers for various periods.

Location of stations	Years	Species							Total
		Blue	Fin	Hump	Sei	Sperm	Other <sup>a</sup>		
Rose and Naden harbours	1926–30	No.	97	632	88	201	538	2B,1R	1,559
		%	6	41	6	13	34		
Rose and Naden harbours	1933–38	No.	15	250	40	3	1458		1,766
		%	1	14	2	<1	84		
Rose and Naden harbours	1939–43	No.	4	197	43	—	558		802
		%	<1	25	5	—	70		
Coal Harbour	1948–53	No.	39	929	445	70	691	6B,1R,11G	2,192
		%	2	42	20	3	32		
Coal Harbour	1954–59	No.	87	1664	287	627	1235	13 B	3,913
		%	2	43	7	16	32		
Coal Harbour	1962–66	No.	78	734	68	2065	806	5B	3,756
		%	2	20	2	57	21		
Total:		No.	320	4406	971	2966	5286	39	13,988
		%	2	31	7	21	38		

<sup>a</sup> B = Baird's beaked whale; R = Right whale; G = Gray whale.

Charlotte Islands stations from 1933 through 1943. From 1948 through 1959, catches from the Coal Harbour whaling station located on Vancouver Island were 32% sperms; from 1962 through 1965, 19%. Ninety percent of those taken in recent years were males, averaging 38–46 feet in length and mostly sexually mature.

“Harem schools,” comprising 15–30 females and young animals of both sexes accompanied by one or two large bulls, appear on the whaling grounds usually in April, May, and early June following the mating season, which is at a peak in February or March. Sometimes these schools group together in large herds of 50–150 during this period. In some years they reappear in August and early September, when pregnant females carry large, near-term fetuses.

Small males less than 38 feet and recently matured or sexually immature are taken in or near harem schools. Medium-sized males from 38 to 44 feet usually appear in loosely-formed “bachelor” schools throughout the whaling season, which lasts from May through September. The largest males, up to 56 feet long, usually occur as solitary animals or associated with harem schools.

Schools containing females are avoided by the whalers since most of the whales are smaller than the legal length limit of 35 feet imposed by International Whaling Regulations for shore stations. Females accompanied by calves are also protected by these regulations.

The commercial catch is taken from the open ocean up to 200 miles from shore. In this region sperm whales concentrate in late spring, summer, and early fall, apparently to feed (Robbins et al., 1938; Pike, 1950), as most stomachs examined contain food; the stomach contents are mainly squid, *Moroteuthis robusta* and *Gonatus* sp., ragfish, *Acrotus willoughbyi*, and rockfish *Sebastes* sp. Occasional sperm whales are found in Hecate Strait, Dixon Entrance, Queen Charlotte Sound, and broad waterways inside the chain of islands to the north of Vancouver Island, but never in large schools. In recent years large catches have been taken from harem and bachelor schools in late May and early June, well offshore and beyond the range of coastal catchers, by Soviet factory expeditions returning from the Antarctic.

Male sperm whales range northward into the Bering Sea but females are scarce in high latitudes. In exceptionally warm years such as 1958, some females range as far north as the Aleutian Islands. In normal years, however, the northern limit of females off British Columbia appears to lie south of the Central Subarctic Domain, within the oceanic region known as the upper-layer Transitional Domain, which coincides with the Westwind Drift (Dodimead et al., 1963). In summer the approximate northern boundary of the Transitional Domain lies along the 15 C surface isotherm, near 50°N. Sperm whales, singly or in twos or threes, are frequently sighted in all months from the weather ship located at 50°N, 145°W, which is well within the Central Subarctic Domain; large harem schools have not been seen at this location.

Observations from ships and from the air showed harem schools or concentrations of females and young at the following localities and times: May 31, 1963: 49°N, 137°W: many females and young; March 29, 1964: 51°N, 131°W: about 20 females and young; May 30, 1964: 45°N, 142°W: seven young; also pilot whales, Pacific striped dolphins, fur seals, and Dall porpoises.

The *Western Crusader* reported a few sperm whales, mostly alone or in pairs, as well as many fur seals, Dall porpoises, "dolphins," and sei whales, from 51-52°N and 133-136°W in May 1964.

Harem schools move offshore and females are seldom seen on the whaling grounds after mid-June. There appears to be an important summer feeding area well off the coast of British Columbia where females wean their calves in August and September. Geographical limits of this summering population have not yet been determined.



FIG. 6. A 52-foot adult male sperm whale, *Physeter catodon*, at the Coal Harbour whaling station. (Photograph by G. C. Pike.)

Growth and body proportions of 375 sperm whales from British Columbia are similar to those from the Aleutian Islands and Japan (Fujino, 1956) and from the Antarctic (Matthews, 1938). Males larger than 33 feet and females larger than 28 feet are mostly sexually mature. Therefore, the catch on this coast consists almost entirely of sexually mature animals.

Figure 6 shows a 52-foot male sperm whale being processed at the Coal Harbour whaling station.

#### Family DELPHINIDAE—Ocean Dolphins

##### *Stenella* sp(p).

Scheffer and Rice (1963) and Hershkovitz (1966) place both *S. styx* and *S. eufrosyne* under *S. caeruleoalba* Meyen 1833. Miller and Kellogg (1955) and Hall and Kelson (1959) consider *S. styx* and *S. eufrosyne* to be synonymous. Several papers, including recent checklists, attest to the chaotic state of the taxonomy of this genus. To avoid further confusion we have chosen to omit species or subspecies names in the subsequent discussion of specimens from British Columbia.

*Stenella* sp. is known from British Columbia by three specimens, one of which was recorded in the literature. The published record was of a partial skull (UBC 2884) taken from the beach at Muchalat Arm, Nootka Sound, on the west coast of Vancouver Island, during the winter of 1948 (Cowan and Guiguet, 1952). The record

includes a note that the skull was about 20% narrower at the base of the rostrum than in other specimens but no actual measurements are given.

The second specimen is a complete skull collected by the skipper of the *Penguin II* at Campbell River in April 1961 (UBC 8011).

The third specimen comprises a skull (Fig. 7), cervical vertebrae, and eight thoracic vertebrae of a whale taken in a fishing trawl seven miles from Kyuquot on the west coast of Vancouver Island by Mr R. Pope, skipper of the *Tov II*, on April 23, 1963. The skull and skeletal fragments were sent to the Nanaimo Station by Mr R. M. Wilson. Measurements of the skull are shown below. The specimens (UBC 9236) were subsequently presented to the University of British Columbia.



FIG. 7. Skull of *Stenella euphrosyne* from Kyuquot, 1963.

Skull measurements of the 1963 Kyuquot specimen are as follows: condylobasal length, approximately 500 mm including estimated broken tip; length of rostrum, 250+ mm; width of rostrum, 60 mm; anterior to antorbital notches, 112 mm; maximum (zygomatic) width, 203 mm; width of braincase across parietals, 152 mm. An estimated 7 mm was broken off at the tip of the rostrum, and tips of the premaxillaries were slightly eroded. Length of the upper tooth row was estimated at approximately 210 mm. Numbers of teeth in the upper tooth rows were estimated at from 45 to 50 pairs.

The above skull measurements are similar to recorded measurements of two specimens of *Stenella* sp. from Washington (Kenyon and Scheffer, 1949) and two from the coast of Oregon (Kellogg and Scheffer, 1947; Scheffer, 1953). They differ from skull measurements recorded by Fraser (1953) for the euphrosyne dolphin in the North Atlantic, *Stenella (Prodelphinus) euphrosyne* (Gray), mainly in the relatively shorter length and narrower width of the rostrum.

Two sight records are reported from off the coast of British Columbia: CGS *Stonetown*—6 long-snouted dolphins at 45°N, 145°W on July 7, 1962; CNAV *Oshawa*—5–10 long-snouted dolphins at 51°45'N, 133°45'W on March 18, 1958. Accuracy of these two sightings is uncertain. Norris and Prescott (1961) note that *S. euprosyne* in San Pedro Channel, California, has been identified as “bull *Delphinus*” because of its large size and resemblances to the common dolphin.

### *Delphinus delphis* Linnaeus 1758—Pacific common dolphin

This species is known in British Columbia from one adult male specimen found dead on the beach at Victoria on April 8, 1953 (Guiguet, 1954). The published record includes body measurements and a photograph. The complete skeleton (BCPM 5792) and a life-size model of the specimen are retained at the British Columbia Provincial Museum.

Although common off California, *Delphinus* is known from the Washington coast only from a photograph of a stranded specimen (Scheffer and Slipp, 1948) and has never been recorded from Alaska. British Columbia is probably the northern limit of its range.

### *Lissodelphis borealis* (Peale 1848)—Northern right-whale dolphin

The occurrence of this species on the British Columbia coast still lacks support of specimen records, but there is little doubt that it does occur in the area. Two dolphins described as of this species were recorded by observers aboard the weathership located at 50°N, 145°W on July 2, 1959. This identification is judged to be reliable. The type specimen was taken at 46°07'N, 134°05'W, about 400 miles off the mouth of the Columbia River. Two specimens have been taken from the coast of Washington (Scheffer and Slipp, 1948); Scammon (1874) records its northern limit as the Bering Sea.

### *Lagenorhynchus obliquidens* Gill 1865—Pacific striped dolphin

A skull of this species (BCPM 4996) was found on the beach at Estevan Point, west coast of Vancouver Island, in June 1943 (Cowan and Guiguet, 1952). A pregnant female was harpooned from a school of striped dolphins off Race Rocks in Juan de Fuca Strait on September 17, 1936 (Scheffer and Slipp, 1948). These are the only published specimen records from British Columbia although the species is common here. The UBC collection includes a partial skull (UBC 287) taken from an Indian midden at Port Hardy, October 1943. Cowan and Guiguet (1965) state that it occurs regularly in small numbers in the Strait of Georgia and in Juan de Fuca Strait. Osgood (1901) records a questionable sighting in Hecate Strait. A large school numbering at least 1000 was sighted 25 miles off the northwest corner of Queen Charlotte Islands in June 1959 (Pike, 1960).

Table 4 lists 32 recent sightings of Pacific striped dolphins from British Columbia and northern Washington considered by us to be accurately identified. These sightings suggest an inshore movement in winter and an offshore movement in summer.

Large schools of 200–250 are found in inshore waters, mostly in Hecate Strait and adjoining seaways, from October through January. Schools are smaller in inside waters in spring and few sightings are recorded for summer. Within the Coastal Domain up to 300 miles from shore, sightings are recorded mostly for the months of

TABLE 4. Sight records of Pacific striped dolphins off British Columbia, 1956–62, considered by the authors to be accurately identified.

Date	Location	Number in group	Source of information	Number of miles offshore
June 1, 1956	48°00'N, 127°30'W	4	M V <i>Fort Ross</i>	110
Mar. 24, 1958	47°48'N, 128°00'W	20–30	M V <i>Pacific Ocean</i>	140
Mar. 12, 1959	off Triangle Island	5	M V <i>Pacific Ocean</i>	30
June 16, 1959	20 miles off Langara Island	1000+	M V <i>Pacific Ocean</i>	20
Aug. 4, 1959	48°00'N, 128°00'W	100	CNAV <i>Whitethroat</i>	140
Aug. 6, 1959	48°00'N, 132°00'W	12	CNAV <i>Whitethroat</i>	300
Jan. 8, 1960	Fitzhugh Sound	50–100	Addenbroke Lighthouse	inside passage
Mar. 10, 1960	Fitzhugh Sound	100	MV <i>Pacific Ocean</i>	inside passage
June 21, 1960	Fitzhugh Sound	3	Addenbroke Lighthouse	inside passage
July 20, 1960	51°48'N, 130°39'W	30–40	MV <i>Key West</i>	90
Oct. 1, 1960	Goletas Channel	200–300	Dr D. Quayle	inside passage
Nov. 6, 1960	Port Hardy	200	FPL <i>Brama</i>	inside passage
Dec. 12, 1960	Fitzhugh Sound	200–300	FPC <i>Arrow Post</i>	inside passage
May 14, 1961	Goletas Channel	30	FPL <i>Brama</i>	inside passage
May 17, 1961	Queen Charlotte Strait	10	FPL <i>Brama</i>	inside passage
May 24, 1961	Goletas Channel	6	FPL <i>Brama</i>	inside passage
June 15, 1961	48°27'N, 126°30'W	30	CNAV <i>Oshawa</i>	50
June 15, 1961	55°00'N, 134°26'W	50	MV <i>Western Crusader</i>	50
Aug. 6, 1961	Port Hardy	8	FPL <i>Brama</i>	inside passage
Aug. 4, 1961	50°N, 145°W	3	CGS <i>St. Catherines</i>	1000
Sept. 15, 1961	50°N, 145°W	5	CGS <i>St. Catherines</i>	1000
Oct. 5, 1961	50°N, 145°W	10	CGS <i>St. Catherines</i>	1000
Mar. 7, 1962	52°N, 128°W	100	FPL <i>Falcon Rock</i>	inside passage
July 7, 1962	50°N, 145°W	4	CGS <i>Stonetown</i>	1000
Nov. 20, 1962	50°N, 145°W	3	CGS <i>St. Catherines</i>	1000
Sept. 25, 1963	50°N, 145°W	7	CGS <i>St. Catherines</i>	1000
Oct. 3, 1963	50°N, 145°W	8	CGS <i>St. Catherines</i>	1000
Oct. 15, 1963	50°N, 145°W	7	CGS <i>St. Catherines</i>	1000
Oct. 17, 1963	50°N, 145°W	8	CGS <i>St. Catherines</i>	1000
May 15, 1964	51°N, 131°W	100	MV <i>T.W. Islander</i>	100
Aug. 2, 1964	49°N, 127°W	8	CNAV <i>Oshawa</i>	50
Aug. 26, 1964	50°N, 145°W	6	CGS <i>St. Catherines</i>	1000
Sept. 30, 1965	50°N, 145°W	1	CGS <i>St. Catherines</i>	1000
Oct. 1, 1965	50°N, 145°W	7	CGS <i>St. Catherines</i>	1000
Oct. 12, 1965	50°N, 145°W	4	CGS <i>St. Catherines</i>	1000

June, July, and August, and schools are usually medium-sized, numbering from 25 to 100. Eleven sightings are recorded from Station P, almost 1000 miles from shore and located within the Central Subarctic Domain. Schools were all small, numbering from 3 to 10, and were seen only from July through November, when maximum surface temperatures are 12 to 14 C.

Research vessels operating at high latitudes in the Gulf of Alaska have never reported the species; only one of the above records is from a latitude north of 52°N. It appears that the northern limit of distribution occurs in late summer near the northern boundary of the Transitional Domain of the Subarctic Region. This boundary in summer roughly corresponds with the 15 C surface isotherm and occurs offshore well south of 50°N in most years.

*Lagenorhynchus obliquidens* has been reported off California in mixed schools containing *Lissodelphis borealis* and *Grampus griseus* (Fiscus and Niggol, 1965) and *Globicephala macrorhyncha* (Norris and Prescott, 1961). These other species, although less common than *L. obliquidens* in inshore waters of British Columbia, also appear to have their northern summer limits of distribution in the Transitional Domain. They are all uncommon in Central Subarctic waters.

### *Orcinus orca* Linnaeus 1758—Killer whale

The killer whale is abundant in coastal waters of British Columbia. By reason of its temerity in frequenting productive sports and commercial salmon fishing areas, it is better known to local residents than is any other species of whale.

There are three records of mass strandings in British Columbia: 20 stranded near Estevan Point on the west coast of Vancouver Island in June 1945 (Carl, 1946a); 11 stranded near Masset on the Queen Charlotte Islands in January 1941 (Cameron, 1941); and an unstated number stranded temporarily at Cherry Point, Vancouver Island, in September 1944 (Carl, 1946a; Scheffer and Slipp, 1948). In the 1944 stranding, a newly born female 8.1 feet (246 cm) long remained trapped and was taken as a specimen (BCPM 5106).

Appendix II lists five skulls in the BCPM collection and two skulls in the UBC collection. Skull measurements have not been published.

A badly decomposed carcass of a presumed male killer whale stranded on a spit near Heriot Bay, Quadra Island, was examined by Mr C. J. Guiguet on December 10, 1949. Approximate measurements were: total length, 23 feet (700 cm); snout to eye, 2 feet (61 cm); snout to dorsal fin, 9.3 feet (285 cm); snout to insertion of flipper, 3.7 feet (112 cm); snout to vent, 13.2 feet (401 cm); length of flipper, 4.2 feet (127 cm); width of flipper, 1.8 feet (56 cm). Permission to publish this record is by courtesy of Dr G. C. Carl.

An unusual stranding of killer whales occurred in the spring of 1949, as described by Emery (1960). A very large male, a smaller male, and a female entered Von Donnop Lagoon on Cortez Island off Campbell River in March. The only entrance to this tidal lagoon is a narrow passage ranging in depth from 2 feet at low tide to 3 or 4 feet at high tide. Behaviour of the killer whales in the lagoon was witnessed

by persons from two logging camps. One of the first interesting events was the birth of two baby whales, apparently twins. Shortly afterwards the female submerged and the smaller male surfaced, carrying a newborn calf on his back. He stayed at the surface for about 5 minutes until the calf blew for the first time, then dived again and soon reappeared with a second calf on his back. Soon the cow appeared and began swimming with the calves. The first whale to die was the cow. As she lay lodged in the shallow at the edge of the lagoon, half her carcass exposed, the other whales took turns in hoisting the floating end of the cow in attempts to get her back into deep water. At regular intervals the carcass heaved spasmodically as the other whales attempted to dislodge her from below. The other whales died in turn and were washed ashore by the tides—first the two calves, then the smaller male, and finally the old bull. In turn the bloated carcasses floated out of the lagoon through the narrow passage, which they did not find or could not navigate while alive. The last to leave was the large bull, which was wedged in the narrow entrance for about 2 weeks before it floated free. Three of the carcasses drifted ashore along the beach of the adjoining inlet. Another finally washed ashore on Rebecca Spit, Quadra Island, some 30 miles away.

An adult male killer whale 24 feet (7.3 m) long was captured by a whale catcher using harpoon and rifle-fire on May 19, 1955, off the west coast of Vancouver Island and was subsequently processed at the Coal Harbour whaling station. Remains of two halibut were found in its stomach. Measurements, observations, and photographs are presented in Table 5 and Fig. 8.

Mr L. G. Smith of Kildonan relayed the following information about another stranding. Mr George Frank stated that a pregnant female killer whale, 18.5 feet (5.6 m) long, stranded on a sandbar between Opitsat Indian Reserve and Tofino on

TABLE 5. Measurements in centimetres of a 24-ft male killer whale captured by harpoon and rifle-fire off Quatsino Sound, British Columbia, May 19, 1955.

Measurements in a straight line, parallel to long axis	Measurements in a straight line, not parallel to long axis
1. Snout to tail notch, 645	11. Height of fin, 120
2. Beak: not clearly defined, —	12. Length of base of fin, 60
3. Snout to gape, 48	13. Length of flipper, 110
4. Snout to eye, 50	14. Width of flipper, 78
5. Snout to blowhole, 60	15. Spread of flukes, 215
6. Snout to anterior insertion of flipper, 95	Stomach contents: remains of two halibut
7. Tail notch to tip of fin, 390	Testes: 10 kg each in weight; mature; many spermatozoa
8. Tail notch to anus, 225	Colour: as described by Carl, 1946
9. Tail notch to genital opening, 295	Teeth: 14–14; mostly eroded to gum-line
10. Tail notch to umbilicus, 395	12–12

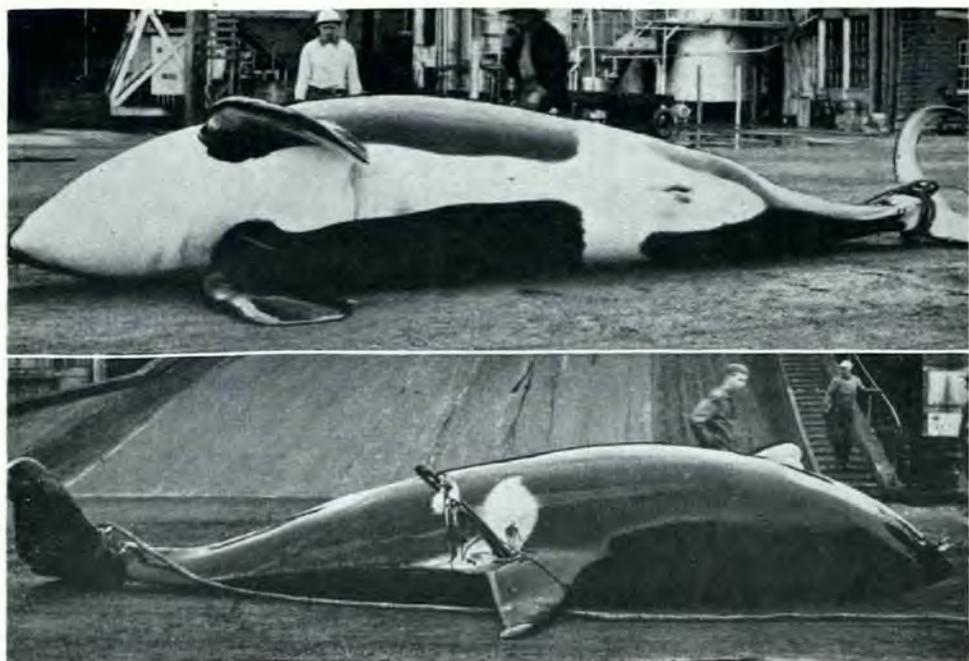


FIG. 8. A 24-foot adult male killer whale, *Orcinus orca*, at the Coal Harbour whaling station, May 1955. (Photographs by C. Diedrich.)

the west coast of Vancouver Island, in early August, 1958. The whale was alive when it stranded but was later shot. The stomach contained a harbour seal weighing approximately 70 lb (32 kg), and a medium-sized sea lion.

A 17-foot (5.2-m) juvenile male killer whale was harpooned off the south end of Saturna Island on July 16, 1963 (Newman and McGeer, 1966). The whale was towed to Vancouver, where it was displayed as Moby Doll. It died on October 9, 1963, some 3 months after its capture.

A 22-foot (6.7-m) male killer whale was accidentally netted in fishing gear with a small companion near Namu in June 1964. The small whale escaped; the larger one was towed to Seattle, Washington, where it remained for several months in captivity and on display under the name Namu.

Logbook returns record the sighting of more than 5000 killer whales on the British Columbia coast for the period 1959 through 1964. Despite this large accumulation of records, many of which contain details of size and sex composition of groups and direction of travel, it has not been possible to determine any orderly pattern of movement or migration. As would be expected, sightings are greatest in summer and least in winter (Table 6). This probably reflects only better opportunities for sighting in summer, when the weather is good and vessel activity is at a maximum. The British Columbia population of killer whales is probably resident with no great sea-

sonal variation in size. Table 6 shows great variability in the size of schools. Solitary individuals, usually males, are relatively scarce. Pairs occur mostly in winter and spring. Medium-sized and large schools (10–150 whales) occur mostly in summer and fall. There is an apparent segregation within schools according to sex and age, but details are not clear. Very small calves appear mostly in winter and early spring; by July it is difficult to distinguish the calves from juveniles and females. This suggests a winter peak in parturition. There are no records of mating in these data.

TABLE 6. Percentages of seasonal sightings of killer whales on British Columbia coast from 1959 through 1964 that belonged to various size groups. Data from logbook reports.

Size of group	Winter Dec.–Feb. (37 groups)	Spring Mar.–May (142 groups)	Summer June–Aug. (205 groups)	Fall Sept.–Nov. (142 groups)
1	16	16	18	13
2	27	18	12	11
3	11	11	9	7
4	14	6	4	6
5–9	16	23	28	20
10–19	8	20	16	22
20–49	8	6	11	15
50–99			2	4
100+			< 1	1

Information on breeding, gestation, and birth of killer whales is scarce. Dated lengths of fetuses recorded in Japan give evidence of a protracted season for conceptions and births; the principal peaks of mating may be in the period May–July and the gestation period may be 16 months (Nishiwaki and Handa, 1958). Scheffer and Slipp (1948) provide several sight records from Washington that seem to indicate that mating and parturition occur throughout the spring and summer. This implies a gestation period of approximately 1 year.

The usual diet of killer whales on the British Columbia coast is not known. The whales are known to have attacked Dall porpoises, gray whales, a fin whale, and northern sea lions, and to have fed on a deer carcass (Table 7). There is circumstantial evidence that they attack salmon and that troll catches of coho and chinook salmon drop off when killer whales enter a fishing area. Hancock (1965) describes the killing of a minke whale, *Balaenoptera acutorostrata*, by a pack of seven killer whales in Barkley Sound in May 1964.

The generic name *Grampus* used by Miller and Kellogg (1955) and Hall and Kelson (1959) has been shown by Schevill (1954) to be correctly applied to Risso's dolphin, *Grampus griseus*, and therefore should not be used for the killer whale.

TABLE 7. Logbook records on predatory activity of killer whales in British Columbia waters, 1959–1963.

	Location	Source	Remarks
May 9, 1959	Triangle Island	FPC <i>Laurier</i>	Killer whales toying with wounded sea lion
June 14, 1960	Off Marble Island	FPC <i>Sooke Post</i>	Killer whales attacking fin whale
Aug. 20, 1960	Langara Light	Lightkeeper	Several killer whales attacking sea lions
Sept. 4, 1960	Langara Light	Lightkeeper	Several killer whales attacking sea lions
Sept. 10, 1960	Langara Light	Lightkeeper	Killer whales attacking a pair of gray whales
June 2, 1961	Jackson Pass	FPL <i>North Rock</i>	Killer whales feeding on a deer carcass
May 24, 1962	48°25'N 136°40'W	CGS <i>St. Catherines</i>	Several killer whales attacking 8 Dall porpoises
May 26, 1963	48°46'N 127°40'W	CGS <i>St. Catherines</i>	12 killer whales attacking school of Dall porpoises; striking singly or in pairs; much blood in water.

### *Grampus griseus* (G. Cuvier 1812)—Gray grampus or Risso's dolphin

There is one published record of this species from British Columbia. An 11-foot (3.4-m) male was shot and killed in inside protected waters near Prince Rupert in May 1964 (Guiguet and Pike, 1965). This is the northernmost record for the species in the northeast Pacific. Fiscus and Niggol (1965) extended the previously known range to Crescent City, northern California, on the basis of sightings near the coast.

Logbook returns from Station P record "Risso's dolphin" on four occasions (Table 8). The remark that on October 11, 1959, six were observed "playing at the bow for 1.5 hours" indicates that close inspection was possible on this occasion and gives credence to the reliability of the identification. This weather station is located within the Central Subarctic Domain, close to the northern boundary of the Transitional Domain in late summer.

The generic name *Grampidelphis*, used by Miller and Kellog (1955) and Hall and Kelson (1959) for this species, is regarded as a synonym of *Grampus* (Schevill, 1954).

TABLE 8. Sight records, probably of *Grampus griseus*, from the weathership at Ocean Station P, 50°N 145°W, 1958–1960.

	Number in group	Water temperature (C)	Remarks
July 22, 1958	1	13	12 ft long (3.7 m)
Oct. 11, 1959	6	12	Playing at bow for 1.5 hr
Aug. 15, 1960	5	12	None
Sept. 4, 1960	4	13	None

## *Pseudorca crassidens* (Owen 1846)—False killer whale

This species has not yet been recorded from British Columbia waters. The capture of a specimen in Puget Sound in May 1937 (Scheffer and Slipp, 1948), however, attests to its occurrence in this general region.

## *Globicephala macrorhyncha* Gray 1846—Pacific pilot whale

There is one published report of a sighting of this species in British Columbia waters. Osgood (1901, p. 25) states that it is common in Hecate Strait. In our opinion this report should be discounted since the observers were apparently unfamiliar with cetaceans. Osgood (1901) fails to mention the occurrence of the killer whale and the Dall porpoise, two species that are indeed common in the waters of Hecate Strait and Queen Charlotte Sound, and the blackfish he refers to are probably killer whales. Wailes and Newcombe's (1929, p. 5) reference to the blackfish *Globicephalus pacificus* as numerous in British Columbia waters also probably concerns the killer whale rather than the Pacific pilot whale.

Pilot whales are known from Alaska (Orr, 1951) and from Washington (Scheffer and Slipp, 1948), each on the basis of a single stranded specimen. Four sight records in waters 12–32 miles off northern Washington in April are reported by Fiscus and Niggol (1965). Three juveniles were caught in a gillnet during exploratory fishing by M.V. *Fort Ross* at 50°N, 145°W on the night of June 29–30, 1957, approximately 400 miles west of Dixon Entrance. A 7-foot (2.1-m) male was shot and taken aboard; the other two, each about 5 feet (1.5 m) in length, escaped. Unfortunately one photograph (Fig. 9) is all that remains of this interesting specimen.

The colour of the specimen, not shown well in the photograph, differs from early descriptions of *G. macrorhyncha*, which describe the colour as black over all (Scammon, 1874; True, 1889; Orr, 1951). The specimen has a broad, white or gray ventral patch anterior to and between the pectorals and a streak of similar colour extending posteriorly as a thinning midventral line that terminates about half way to the tip of the flipper. This feature has recently been described for *G. macrorhyncha* (Norris and Prescott, 1961).

A photograph taken in Barkley Sound on the west coast of Vancouver Island by Dr A. S. Hourston of the Biological Station, Nanaimo, in August 1954 shows the dorsal fin of a whale identified by the senior author as the Pacific pilot whale. Other sight records are listed in Table 9. The relatively large number of sightings in 1958 may indicate a northward shift in distribution in this year, when water temperatures in the eastern Pacific were unusually high. These observations have not all been supported by photographic or other evidence, but they were made by observers who were familiar with the more common forms of cetaceans on this coast.

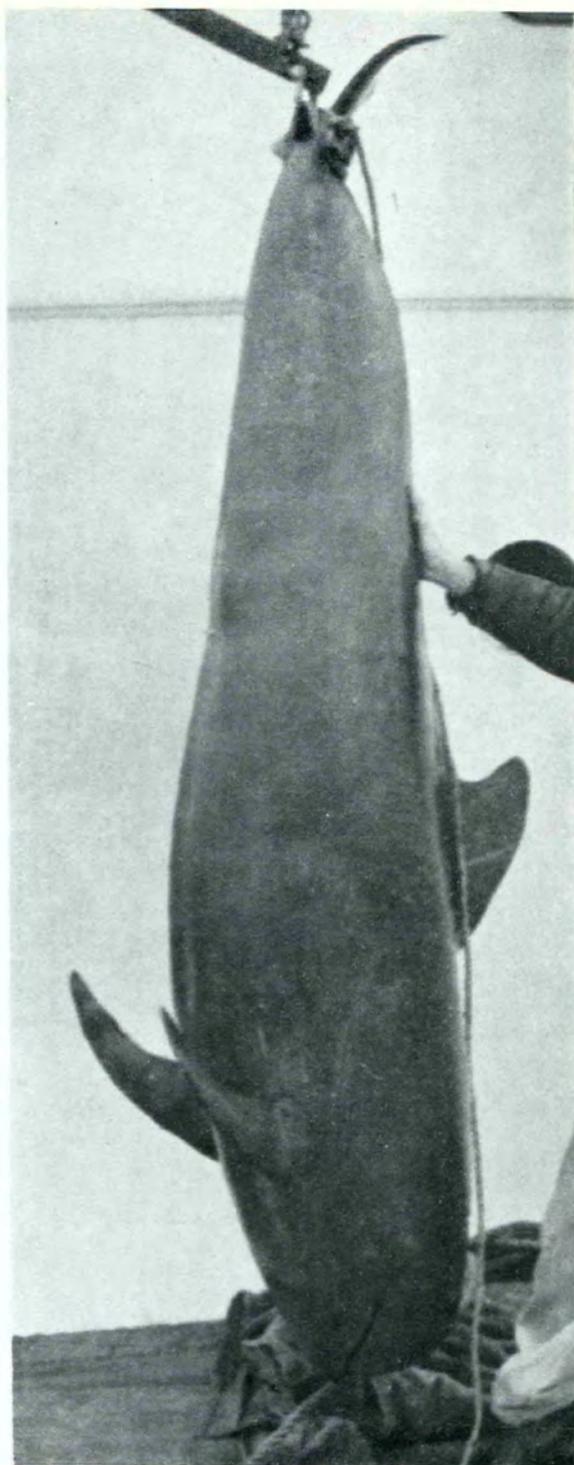


FIG. 9. A 7-foot juvenile male Pacific pilot whale, *Globicephala macrorhyncha* taken from the M.V. *Fort Ross* at 50°N, 145°W, on June 29-30, 1957.

TABLE 9. Sight records of pilot whales off British Columbia, 1957-60.

	Location	Number in group	Water temperature (C)	Source of information
June 30, 1957	50°00'N 140°00'W	3	10	MV <i>Fort Ross</i>
Aug. 23, 1957	54°48'N 143°47'W	4		MV <i>Fort Ross</i>
May 30, 1958	50°00'N 145°00'W	30	9	CGS <i>St. Catherines</i>
May 30, 1958	Swiftsure Bank	6	12	Swiftsure Lightship
May 31, 1958	50°00'N 145°00'W	20	9	CGS <i>St. Catherines</i>
June 6, 1958	Swiftsure Bank	1	14	Swiftsure Lightship
July 2, 1958	Clarke Point	1		FPC <i>Laurier</i>
July 29, 1958	Laredo Channel	3		FPC <i>Laurier</i>
June 10, 1959	Swiftsure Bank	1	12	Swiftsure Lightship
Aug. 1960	51°30'N 147°20'W	2	12	CNAV <i>Oshawa</i>
Aug. 14, 1961	5 miles west of Pachena Point	4		FPC <i>Laurier</i>
Aug. 18, 1961	50°00'N 145°00'W	20	14	CGS <i>Stonetown</i>
Aug. 24, 1961	50°00'N 145°00'W	12	14	CGS <i>Stonetown</i>
Aug. 25, 1961	50°00'N 145°00'W	12	14	CGS <i>Stonetown</i>
Sept. 21, 1962	50°00'N 145°00'W	20	13	CGS <i>Stonetown</i>
Oct. 11, 1962	50°00'N 145°00'W	4	11	CGS <i>Stonetown</i>
Oct. 19, 1962	50°00'N 145°00'W	30	11	CGS <i>Stonetown</i>
Aug. 14, 1963	50°00'N 145°00'W	15		CGS <i>Stonetown</i>

### *Phocoena phocoena* Linnaeus 1758—Pacific harbour porpoise

This species is frequently seen in bays, harbours, inshore waters, and up to 20 miles from shore along the coast of British Columbia (Cowan and Guiguet, 1965). *Phocoena vomerina* Gill 1865 is indistinguishable from *P. phocoena* of the Atlantic on

TABLE 10. Measurements in centimetres (after Norris, 1961) of a mature male harbour porpoise<sup>a</sup> caught in a gillnet in Baynes Sound on February 10, 1962.

	Measurement
1. Length, total	147
2. Length, tip of upper jaw to eye	14
4. Length of gape	10
5. Length, tip of upper jaw to ear	21
6. Centre of eye to centre of ear	6
7. Centre of eye to angle of gape	4.5
8. Centre of eye to blowholes	13
9. Length, tip of upper jaw to blowholes	12
10. Length, tip of upper jaw to insertions of flippers	31
11. Length, tip of upper jaw to tip of fin	78
12. Length, tip of upper jaw to umbilicus	58
13. Length, tip of upper jaw to genital aperture	68
14. Length, tip of upper jaw to anus	105
17. Thickness of blubber, middorsal	3.2
33. Length, dorsal fin base	25
34. Width, flukes (tip to tip)	41

<sup>a</sup>The specimen, in good condition, was collected by Mr Clifford Tarnoueski and Mr George McIndoe. Measurements and photos were taken at the Biological Station in Nanaimo, B.C., where the skull is being retained.

the basis of the original description (see Norris and McFarland, 1958). Reports of harbour porpoises from Juan de Fuca Strait and Swiftsure Bank are described by Scheffer and Slipp (1948).

A sexually mature male, 4.8 feet (147 cm) long, was caught in a gillnet in Baynes Sound on February 10, 1962, and brought to the Nanaimo Station by Fisheries Officer G. McIndoe. Examination included measurements (Table 10), photographs (Fig. 10), and study of parasites and reproductive organs. The skull has been retained at the Nanaimo Station. The stomach contained only herring.

Appendix II lists skulls, skeletons, and complete specimens in British Columbia museum collections. None of these records has been published earlier.

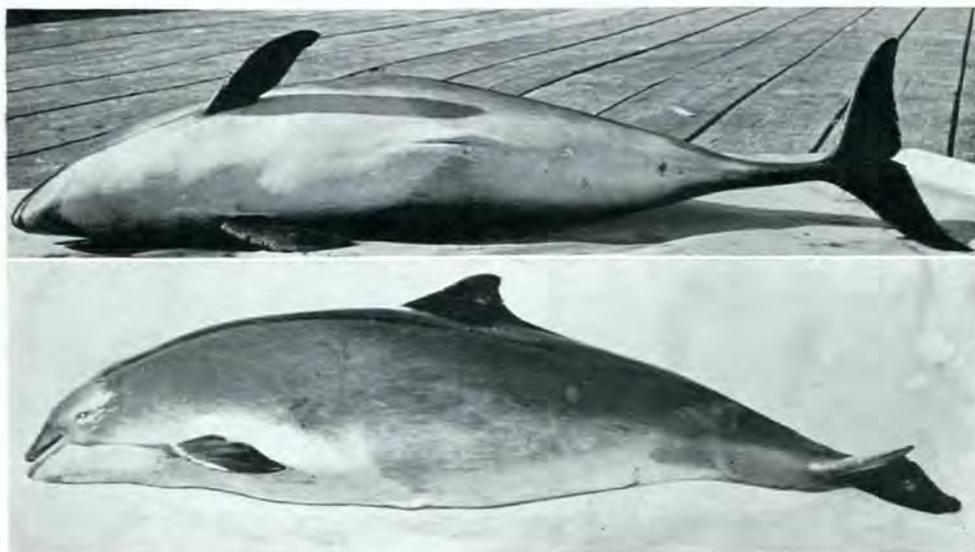


FIG. 10. A 58-inch (147-cm) male harbour porpoise, *Phocoena phocoena*, caught in a gillnet in Baynes Sound, February 10, 1962. (Photographs by G. C. Pike.)

### *Phocoenoides dalli* (True 1885)—Dall porpoise

This species is well known to mariners in the Northeast Pacific because of its abundance and its habit of playing at the bow of vessels under way. It is remarkable that there are few records from British Columbia. Cowan (1944) described variations in external and skeletal features as well as life history, stomach contents, modifications to the generic characterization of the skull, and characteristics distinguishing *P. dalli* from *P. truei* of the western Pacific. His paper is based mainly on five complete skeletons and one frozen specimen. Two additional skeletons and three skulls are retained in British Columbia Museum collections (Appendix II), but have not yet been described. Scheffer (1949a) gives body measurements of a subadult male shot in Queen Charlotte Strait, August 11, 1947.

Table 11 lists body measurements and other data on five specimens taken by harpoon and rifle-fire from 1957 to 1959 off British Columbia and Washington (Fig. 11). The length of most adult males is approximately 6 feet (2 m). Specimen number 1 is an exceptionally large male which measured 6.8 feet (208 cm) in total length, and is estimated to have weighed approximately 200 pounds (91 kg).

TABLE 11. Measurements (in centimetres) of Dall porpoises taken at sea off the coasts of Washington and British Columbia, 1957-59. Measurements for 2, 4, and 5 were made by G. C. Pike; those for 1 and 3 were made by W. F. Pinckard and F. J. Velsen while in the employ of the Biological Station, Nanaimo.

Specimen no.:	1	2	3	4	5
Sex:	M	F	M	M	F
Date:	21/7/57	3/5/58	25/6/58	20/5/59	22/6/59
Locality:	51°N 137°W	Off Nootka Sound	Off Esperanza Inlet	Off Gray's Harbour, Washington	Off Estevan Point
Source (vessel):	<i>Fort Ross</i>	<i>Pacific Ocean</i>	<i>Hillier Queen</i>	<i>Pacific Ocean</i>	<i>Pacific Ocean</i>
<b>Measurements in a straight line, parallel to long axis</b>					
1. Snout to tail notch	2080	1760	1860	1720	1680
2. Length of beak	—	13.0	12.0	—	—
3. Snout to gape	12.5	10.0	13.0	12.0	11.5
4. Snout to eye	21.5	22.0	23.5	22.0	21.5
5. Snout to blowhole	18.0	23.0	23.0	21.0	20.5
6. Snout to anterior insertion of flipper	29.0	31.0	31.0	29.0	28.0
7. Tail notch to tip of fin	123.5	100.0	—	92.0	84.0
8. Tail notch to anus	67.5	57.0	57.0	72.0	58.5
9. Tail notch to genital opening	80.0	F	75.0	77.0	F
10. Tail notch to umbilicus	127.0	95.0	98.5	96.0	96.5
<b>Measurements in a straight line, not parallel to long axis</b>					
11. Height of fin	19.0	16.0	15.0	17.0	16.5
12. Length of base of fin	42.0	27.0	—	32.0	28.0
13. Length of flipper	19.0	21.0	—	20.0	21.5
14. Width of flipper	11.0	9.5	9.5	10.0	9.5
15. Weight (kg)	—	70.9	80.9	—	70.9
16. Girth behind flippers	104.0	92.0	94.0	—	—
17. Spread of flukes	—	46.0	49.0	—	—
Stomach contents	Mostly herring (128 g)	Empty	Mostly squid (231 g)	Empty	Mostly squid (98 g)
Reproductive condition	Mature	Mature (resting)	Mature	Mature	Maturing
Testis weight (g) L	360	—	112	—	—
R	410	—	113	—	—



FIG. 11. A 92-inch (172-cm) adult male Dall porpoise, *Phocoenoides dalli*, taken off Gray's Harbour, Washington in May 1959. (Photograph by G. C. Pike.)

Table 12 gives information on sizes of groups for more than 200 sightings of Dall porpoises in British Columbia waters. Inshore sightings were mostly from Hecate Strait and Queen Charlotte Sound and from adjacent exposed seaways like Queen Charlotte Strait, Dixon Entrance, and Fitzhugh Sound. The porpoises are also abundant in Juan de Fuca Strait, but are seldom seen in protected coastal waters such as the Strait of Georgia. Offshore sightings were mostly from waters close to shore, over the continental shelf, and within the Coastal Domain. Frequent sightings were recorded, however, from waters as far as 1500 miles from the coast and well within the Central Subarctic Domain. Sightings were recorded from Station P for every season, including winter. Oceanographic and fisheries research vessels operating in the Gulf of Alaska reported Dall porpoises as "numerous" in all months from February through September; by far the largest number were reported from regions over the continental shelf in the northern reaches of the Gulf between Kodiak Island and Icy Straits.

TABLE 12. Percentages of seasonal sightings of Dall porpoises in inshore and offshore waters of British Columbia according to size groups. See text.

Number in group	Inshore					Offshore			
	Spring Mar.- May	Summer June- Aug.	Fall Sept.- Nov.	Winter Dec.- Feb.	Total	Spring Mar.- May	Summer June- Aug.	Fall Sept.- Nov.	Total
1	7				3	5	6		5
2	4	20		18	9	14	16	8	14
3	11	8	10	18	11	16	2	8	9
4	16	20	10	18	16	8	18		12
5-9	29	36	30	40	32	32	32	25	30
10-14	18	16	30	6	17	19	20	50	24
15-29	9		5		5	5	6		5
30-49	4		10		6				
50-100	2		5		2			8	1
Total:	100	100	100	100	101	99	100	99	100
No. groups:	45	25	20	17	109	37	50	12	102

The total numbers of observations of Dall porpoises for inshore and offshore waters were about equal, though the number of vessel-hours for which observations were recorded was many times greater in inshore waters. This suggests a much greater abundance offshore.

Approximately half of all sightings were for groups numbering from 5 to 14. The most frequently occurring number in both areas was six per school. Solitary individuals and pairs were relatively scarce.

Schools of 30–100 were encountered almost only in inshore waters, in spring and fall months. Only one school of 30 or more was seen offshore. The relatively small number of records in inshore waters for summer months, when opportunities for sightings are greatest, suggests that there may be an offshore movement then.

### Family ESCHRICHTIIDAE

#### *Eschrichtius gibbosus* (Erxleben 1777)—Gray whale

This species is common off British Columbia, mainly as migrants travelling between wintering grounds off California and summer breeding grounds in the Bering Sea.

The northward migration along the coasts of Washington and British Columbia begins in February, is at a peak during the first 2 weeks in April, and ends in May (Pike, 1962). The southward migration occurs in December and January, and is at a peak in late December. During the northward migration the whales travel close to shore, seldom more than 1 or 2 miles from land, except when crossing the mouths of large inlets or sounds. Strays are sometimes seen along the ocean coast or in protected inside waters from June through October, some probably remaining here throughout the summer and fall. Northward migrants stop occasionally to rest or feed, but southward migrants travel faster and apparently do not stop.

Since the 1962 paper by Pike, additional sightings have been compiled, mostly from reports by lightkeepers. These show that the northward run along the west coasts of Vancouver and the Queen Charlotte islands begins in late March, is at a peak in early April, and ends in late May or in June. Counts of northward-migrating gray whales in 1963 from Kains Island lighthouse, near the north end of Vancouver Island, were: 55 during the last 2 weeks of March, and 193 in April. For Langara lighthouse, at the northwest tip of Queen Charlotte Islands, some 300 miles farther north, counts were: 66 during the last week in March, 150 in April, and 4 in June. Pike sighted three gray whales moving northward along the east coast of Queen Charlotte Islands in March 1963. Two of these, a cow and a calf, were marked from a helicopter. In 1962 "many" gray whales were sighted from Lennard Island lighthouse, near the middle of the west coast of Vancouver Island, from March 15 to May 15 and from Langara lighthouse from March 20 to May 15. A few were seen in each location in June. Timing of the first arrival and the peak run seemed to be about 5–7 days later at Langara than at Lennard Island, suggesting a rate of travel of about 50 miles per day. Langara reported several gray whales in late August and early September, 1959 and 1960, suggesting that some gray whales summer along the British Columbia coast.

Gray whales were sighted going south in groups of four to six past Langara Island in October, November, and December 1960, with a peak in December. Twenty-two were seen moving south past Kains Island in December 1962. Gray whales were also seen feeding along Long Beach, on the west coast of Vancouver Island, by one of the authors from April 15 to 30, 1960. The run along Vancouver Island appeared to occur later in 1959 (last week in April) than in 1960, 1962, 1963, or 1964 (first fortnight of April). The run was earlier in 1958 with a peak in late March at Long Beach and Kains Island. The southward run in 1958 was protracted from October to February off Langara.

Gray whales are protected by the International Whaling Agreements. One was taken in error by a commercial whale catcher off Vancouver Island in April 1951, and 10 (Table 13) were taken under a special government permit in April 1953. Of the specimens taken under special permit, one complete skeleton of a 40-foot male was retained as BCPM 6853.

A young male gray whale was found stranded at Wreck Bay, near Ucluelet, Vancouver Island, on August 16, 1966 (Fig. 12). Mr. Frank Buffam made the following measurements: total length from snout to notch of tail, 27 feet (824 cm); snout



FIG. 12. A 27-foot male gray whale, *Eschrichtius gibbosus*, stranded at Wreck Bay, Vancouver Island in August 1966. (Photograph by I. B. MacAskie.)

TABLE 13. Measurements of 10 gray whales processed at the Coal Harbour Whaling Station, April 2-7, 1953. Measurements are in centimetres and as percentages of total lengths.

No.:	1	2	3	4	5	6	7	8	9	10
Sex:	M	F	M	M	F	F	M	F	M	M
Reproductive condition:	Mature	Resting	Mature	Mature	Pregnant	Immature	Mature	Resting	Mature	Immature
1. Total length, tip of snout to notch of flukes	1110	1270	1160	1190	1182	1179	1140	1255	1215	1108
3. Tip of snout to blowholes	185	237	195	208	220	195	200	225	220	180
	16.7	18.6	16.8	17.5	18.6	16.5	17.5	17.1	18.1	16.3
5. Tip of snout to centre of eye	204	262	205	227	240	208	215	245	237	202
	18.7	20.6	17.7	19.1	20.3	17.6	18.9	19.5	19.5	18.2
6. (a) Tip of snout to tip of flipper	-	615	530	555	550	515	535	565	580	500
	-	48.4	45.6	46.6	46.5	43.6	46.9	45.0	47.8	45.1
(b) Tip of snout to axilla	-	450	370	397	415	362	380	405	415	350
	-	35.4	31.9	33.3	35.1	30.6	33.3	32.3	34.2	31.6
7. Eye to ear, centres	50	57	60	52	48	50	55	52	50	48
	4.5	4.5	5.2	4.4	4.1	4.2	4.8	4.1	4.1	4.3
8. Notch of flukes to dorsal hump	375	420	420	434	440	410	370	450	432	394
	33.8	33.0	36.2	36.5	37.2	34.7	32.4	35.9	35.5	35.5
9. Flukes, width at insertion	80	90	78	84	88	78	88	85	100	78
	7.2	7.1	6.7	7.1	7.4	6.5	7.7	7.6	8.2	7.0
10. Notch of flukes to anus	315	355	370	360	360	365	345	390	356	330
	28.4	27.9	31.9	30.2	30.4	30.9	30.3	31.1	29.3	29.8
11. Notch of flukes to umbilicus	540	605	605	590	590	593	590	620	600	555
	48.6	47.6	52.1	49.6	49.9	50.2	51.8	49.4	49.4	50.1
13. Anus to reproductive aperture	130	-	125	133	-	-	-	-	137	130
	11.7	-	10.8	11.2	-	-	-	-	11.3	11.7
16. Flipper, tip to axilla	135	165	160	158	-	183	155	160	165	150
	12.1	13.0	13.8	13.3	-	12.9	13.6	12.8	13.6	13.5
17. Flipper, tip to anterior end of lower border	195	222	215	213	210	215	205	223	221	205
	17.6	17.5	18.5	17.9	17.8	18.2	18.0	17.7	18.2	18.5
19. Flipper, greatest width	75	82	75	74	75	72	85	78	90	72
	6.8	6.5	6.5	6.2	6.3	6.1	7.5	6.2	7.4	6.5
20. Severed head, condyle to tip	261	317	253	278	-	255	250	300	280	-
	21.5	25.0	21.8	23.4	-	21.6	21.9	23.9	23.0	-
23. Flipper, tip to head of humerus	205	240	230	-	-	212	215	-	-	200
24. (a) Depth of peduncle just anterior to flukes	75	80	63	55	85	52	70	70	60	85
(b) Depth of peduncle, midway between flukes and anus	100	130	95	90	140	100	115	110	120	110
	9.0	10.2	8.2	7.6	11.8	8.5	10.1	8.8	9.9	9.0

to gape, 4.6 feet (140 cm); snout to middle of eye, 4.4 feet (149 cm); snout to middle of blowholes, 3.8 feet (114 cm); snout to insertion of flipper, 7.4 feet (226 cm); tail notch to umbilicus, 8.9 feet (272 cm); greatest length of flipper, 5.1 feet (158 cm); greatest width of flipper, 1.5 feet (46 cm). Cause of death was not apparent.

### Family BALAENOPTERIDAE

#### *Balaenoptera physalus* (Linnaeus 1758)—Fin whale or finback whale

This species is the most abundant of the baleen whales found off the coast of British Columbia and has always formed a large part of the commercial catch (Appendix I) (Fig. 13.) It occurs mostly offshore in the open ocean but frequently enters exposed coastal seas such as Hecate Strait and Queen Charlotte Sound and, occasionally, protected coastal seas such as Queen Charlotte Sound and the Strait of Georgia. Part of the catch consists of migrants travelling between summer feeding grounds in high latitudes and winter breeding grounds in low latitudes. Some, mostly young animals, appear to be resident throughout the summer off British Columbia, where they find an abundance of food consisting mostly of euphausiids (Pike, 1950).



FIG. 13. A 60-foot juvenile female finback whale, *Balaenoptera physalus*, at the Coal Harbour whaling station. (Photograph by G. C. Pike.)

Growth of fin whales in British Columbia waters is slower than in the southern hemisphere (Pike, 1953a). Sexual maturity is attained at average lengths of 57–58 feet (17.6 m) in males and 59–60 feet (18.2 m) in females; physical maturity is attained at average lengths of 65 feet (19.8 m) for males and 68 feet (20.8 m) for females (Pike, 1953a). Body measurements of 579 fin whales from British Columbia show a pattern of growth similar to that found in fin whales from the Antarctic but, for any given length, whales from the Antarctic are more juvenile in character (Fisheries Research Board of Canada, 1953, p. 94).

## *Balaenoptera borealis* Lesson 1828—Sei whale

The sei whale is abundant off the west coast of Vancouver Island during June, July, and August, when it concentrates in schools to feed primarily on copepods. In early years of the Coal Harbour whaling operation this species was largely ignored because of its small size and poor yield of oil.

In recent years, with the decline in abundance of the more desirable fin whale and increased attention to whales as a source of edible meat, the sei whale has become the most important species in the catch. During the period 1962 through 1966 it comprised 57% of the entire catch by British Columbia whalers (Table 3).

## *Balaenoptera acutorostrata* Lacépède 1804—Little piked whale, minke whale

There are five published records, based upon six strandings, of this species from the coast of British Columbia. An adult, sex unknown, drifted ashore near Pulteney Point, Queen Charlotte Strait, in the fall of 1936; a 15-foot (4.6-m) calf was taken from Sooke fish traps in August 1937 (Cowan, 1939). The skull (BCPM 1796) of the former and the entire skeleton of the latter (BCPM 2422) have been collected. A third specimen, a 26-foot (7.9-m) adult female, was found floundering in an ebbing tide in Roberts Bay in May 1946 (Carl, 1946b); the skeleton is BCPM 5657. Another skeleton (BCPM 4753) is from a female shot by A. Lyons and P. W. Martin near Shushartie on the north coast of Vancouver Island in August 1940. There is also a skull (BCPM 9061) of a female stranded on Quadra Island (Fig. 14). Another two specimens drifted ashore in Barkley Sound in 1964, apparently having been attacked by killer whales: one 27.7 feet (3.4 m) long on May 27, and one approximately 25 feet (7.6 m) long on July 20 (Hancock, 1965).

Two new stranding records are reported below; both are females that stranded in July 1963.

On July 11, 1963, a female, 22.4 feet (5.7 m) long, stranded alive on the beach at Schooner Cove on the west coast of Vancouver Island, and was reported by Mr George Hillier of Ucluelet. It was later shot while thrashing around on the beach. Local residents report that it was driven ashore by killer whales. Dr G. C. Carl and I. B. MacAskie examined and measured the specimen on July 19 and 20 (Table 14). The skull from this specimen is BCPM 9061. Dr O. Lovekin took photographs of the living specimen. The stomach was found to be empty. The number of baleen plates recorded from one side of the jaw was more than 270.

On July 23, 1963, a female, 26.4 feet (6.71 m) long, stranded alive on the beach at Gowlland Harbour, Quadra Island. It was first reported as a fin whale by Mr G. Winsby of the Department of Fisheries of Canada in Nanaimo. Messrs I. B. MacAskie and C. J. Morley, of the Nanaimo Station, examined, measured (Table 14), and photographed the specimen on July 25. They later assisted Mr L. Witt of the University of British Columbia in removing the skull, which was delivered to the university. Number of baleen plates from one side is recorded as more than 274.



FIG. 14. A minke whale, *Balaenoptera acutorostrata*, near Nanaimo, British Columbia, summer of 1958. (Photograph by Nanaimo Free Press.)

The number of baleen plates per side in the two specimens stranded in July 1963 (270+ and 274+, respectively) fall within the range reported by Jonsgård (1951) for Atlantic specimens, i.e., 270–348, with a mean of 304, and within the range reported by Omura and Sakiura (1956) for six Japanese specimens, i.e., 266–295, with a mean of 280. Scattergood (1949) gives figures of 256–272 for two Pacific specimens and remarks: "It would appear that the Pacific whales have slightly fewer baleen plates than those of the Atlantic." We agree with Scattergood's remark. Measurements of body proportions of these two specimens fall mostly within the range recorded (Omura and Sakiura, 1956) for specimens from Japan.

In other measurements such as the size of the mouth, position and height of the dorsal fin, length of flippers, and breadth of flukes, these two specimens are not different from either Atlantic or Pacific specimens. Cowan (1939), on the basis of comparative skeletal, skull, and external measurements of Atlantic and Pacific specimens, has shown that recognition of a Pacific subspecies, *B. davidsoni*, is not justified.

Only two minke whales are recorded in the statistics of whale catches from the west coast of North America. These were taken off the Queen Charlotte Islands in 1923. The species is seldom seen by whale catchers operating out of the Coal Harbour whaling station and is too small to tempt capture. Few specimens are sighted offshore, though some are frequently seen in inside waters, usually singly or in pairs.

The species is found southward to Baja California (Hall and Kelson, 1959). It is reported to have been abundant near Alaskan whaling stations and to have been seen as far north as the Chukchi Sea (Scattergood, 1949).

TABLE 14. Measurements in centimetres of two female minke whales stranded in 1963. Specimen 1 is from Long Beach (Wickaninnish Bay), Vancouver Island, July 11, 1963; specimen 2 is from Quadra Island, July 23, 1963.

	Specimen	
	1	2
1. Length, total	683	803
2. Length, tip of upper jaw to centre of eye	122	130
4. Length of gape	127	132
5. Length, tip of upper jaw to ear	—	170
6. Centre of eye to ear	—	43
7. Centre of eye to gape	10	10
8. Centre of eye to blowholes	—	38
9. Length, tip of upper jaw to blowholes	91	102
10. Length, tip of jaw to insertion of flipper	208	224
11. Length, tip of upper jaw to tip of fin	—	254
12. Length, tip of upper jaw to umbilicus	143	168
13. Length, tip of upper jaw to genital aperture	192	233
14. Length, tip of upper jaw to anus	197	238
15. Projection of lower jaw	—	13
16. Length, tip of upper jaw to end of throat grooves	—	144
17. Thickness of blubber, anterior to dorsal fin	—	10
18. Thickness of blubber, midlateral at midlength	8	4
19. Thickness of blubber, midventral at midlength	10	4
20. Length of throat creases	—	144–108
24. Dimensions of eye	5–6	4–8
25. Length, mammary slits	15	20
26. Length, genital slit	41	46
Length, anal opening	3	3
27. Dimensions of blowholes	10–20	10–25
29. Length, flipper (anterior insertion to tip)	—	122
30. Length, flipper (axilla to tip)	—	118
31. Width, flipper	23	30
32. Height, dorsal fin	—	25
33. Length, dorsal fin base	—	51
34. Width of flukes	—	234

### *Balaenoptera musculus* (Linnaeus 1758)—Blue whale

This species (Fig. 15) has been taken commercially from British Columbia almost every year since the advent of steam whaling on this coast (Appendix I) but in much smaller numbers than fin, sperm, hump, or sei whales (Pike, 1954). During the past 40 years only 320 blue whales have been taken by British Columbia whalers. Because of its large size, it is eagerly hunted whenever opportunity arises. It does not concentrate in schools like the other species, but is usually found singly or in small groups of two or three individuals. It seldom enters marginal or inland seas but is usually found well offshore.



FIG. 15. A 56-foot immature female blue whale, *Balaenoptera musculus*, at the Coal Harbour whaling station. (Photograph by G. C. Pike.)

In 1965 the International Whaling Commission passed a regulation which prohibited catching of blue whales in the North Pacific Ocean for a 5-year period beginning in 1965. Existing regulations provide size limits of 70 feet for blue whales taken by factory ships and 65 feet for those taken from shore stations.

Growth of blue whales in British Columbia waters is slower than in the Antarctic. Sexual maturity is attained at average lengths of 67–68 feet (20.5 m) in males and 70–71 feet (21.5 m) in females; physical maturity is reached at average lengths of 78–80 feet (24.1 m) in males and 80–85 feet (25.1 m) in females (Fisheries Research Board of Canada 1955, p. 105). Body measurements in relation to total length for this locality show a pattern of growth similar to that for the Antarctic but, for any given length, whales from the Antarctic are more juvenile in character (Fisheries Research Board of Canada, 1953, p. 94). The longest blue whale recorded in British Columbia catches measured 86 feet (26.2 m). The British Columbia catch of 126 blue whales from 1948 to 1959 includes approximately 26% sexually immature whales.

There is one unpublished record of stranding of this species in British Columbia. A 60-foot (18.3-m) blue whale was reported stranded on Wickaninnish Island, 2 miles west of Tofino on the west coast of Vancouver Island, by Mrs P. Whittington, a resident, on August 12, 1959. Other residents say that someone removed a harpoon from the carcass. The animal probably died as a result of being wounded by a harpoon from one of the whale catchers operating out of Coal Harbour whaling station. This record is published by courtesy of Dr G. C. Carl.

### *Megaptera novaeangliae* (Borowski 1781)—Humpback whale

This species (Fig. 16) was formerly abundant along the coast of British Columbia. Prior to 1913, whaling stations along the west coast of Vancouver Island annually caught between 500 and 1000 whales, almost exclusively humpbacks. The catch of humpbacks declined in relation to that of other species until 1948, when the Coal Harbour operation began (Appendix I). During the 6-year period from 1948 through 1953, humpbacks contributed 20% of the commercial catch, from 1954 through 1959 only 7%, and from 1962 through 1965 a mere 2%.



FIG. 16. A 42-foot female humpback whale, *Megaptera novaeangliae*, at the Coal Harbour whaling station. (Photograph by G. C. Pike.)

British Columbia catches of humpback whales have followed a pattern similar to that of shore station catches from other localities. Following an initial period of importance at the start of a shore station operation, the catch of humpbacks has usually decreased in relation to that of other species (Pike, 1954). Formerly, the species was common even in protected coastal waters, including the Strait of Georgia, but now it is seldom encountered there. The species comprised 35% of the British Columbia whale catch from 1948 to 1959 (Table 10) and 72% of the whale catch at the Bay City whaling station, on the Washington coast 100 miles south of Vancouver Island, during the years 1911–25 (Scheffer and Slipp, 1948).

The International Whaling Commission decided in 1965 that the stock of humpback whales in the North Pacific could not withstand the heavy killing of recent years and catching was therefore prohibited in 1966 and 1967.

The growth of humpbacks in the northeast Pacific (Fisheries Research Board of Canada, 1955, p. 105) is similar to that for the Antarctic (Matthews, 1937) and the west coast of Australia (Chittleborough, 1955). Sexual maturity is attained at average lengths of 37–38 feet (11.5 m) in males and 38–39 feet (11.8 m) in females. The largest humpbacks taken on the British Columbia coast are 50–51 feet (16.5 m) long. Body measurements of 250 humpbacks from this region are similar to those from the southern hemisphere. Local colour variations (Pike, 1953b) distinguish specimens from those taken in the southern hemisphere.

### Family BALAENIDAE—Right Whales

#### *Balaena glacialis* (Müller 1776)—Black right whale

Right whales have been taken in British Columbia catches on four occasions (Appendix I): twice in 1924 and once in 1926 at Queen Charlotte Islands stations, and once in 1951 at the Coal Harbour whaling station on Vancouver Island. They have also appeared in Alaskan whale catches (Kellogg, 1931), but not in Washington

whale catches (Scheffer and Slipp, 1948). Scammon (1874) states that "... in former years, the right whales were found on the coast of Oregon, and occasionally in large numbers; but their chief resort was upon what is termed the 'Kodiak Ground,' the limits of which extended from Vancouver Island northwestward to the Aleutian Chain..." Townsend's map of the distribution of right whales based upon logbook records dating from 1785 to 1913 (Townsend, 1935) shows that the species was taken in the Gulf of Alaska and southward to the north end of Vancouver Island mostly during May, June, and July, and in the Bering Sea mostly during August and September. Waters off British Columbia, Washington, Oregon, and California were probably wintering grounds for the species during former periods of abundance before United States whalers had decimated the population during the latter half of the 19th century (Gilmore, 1956).

The right whale taken off the northwest coast of Vancouver Island in May 1951 was a 41-foot (12.5-m) male, young, but sexually mature (Fig. 17).



FIG. 17. A 41-foot black right whale, *Balaena glacialis*, at the Coal Harbour whaling station, May 1951. (Photograph by G. C. Pike.)

Only three offshore records, each of single individuals seen in July or August, have been reported in logbook returns since 1958. Two of these were from the weather-ship located at 50°N, 145°W; one was from 54°N, 155°W. Fiscus and Niggol (1965) recorded sightings of 22 right whales off Washington in April 1959. Two of these were schools of eight each and were sighted within 15 miles of shore.

The name *Balaena glacialis* is used here on the authority of Omura (1959), who found no specific distinction between the North Pacific right whale and the North Atlantic right whale.

## ORDER PINNIPEDIA

### Family OTARIIDAE—Eared Seals

#### *Callorhinus ursinus* (Linnaeus 1758)—Northern fur seal

Fur seals (Fig. 18) occur in British Columbia waters mostly as migrants travelling between winter feeding grounds off California and summer breeding grounds in the



FIG. 18. An adult male (right) and an adult female northern fur seal, *Callorhinus ursinus*, on the Pribilof Islands. (Photograph by V. B. Scheffer.)

Bering Sea (Kenyon and Wilke, 1953). Prior to the North Pacific Fur Seal Treaty of 1911, fur seals were taken in large numbers by sealers off the British Columbia coast, mostly during March and April (Townsend, 1935). The treaty expired in 1941. In its place, the Interim Convention on Conservation of North Pacific Fur Seals came into effect in 1957 and the four contracting governments—the United States, Canada, the USSR, and Japan—engaged in a cooperative research program designed to obtain knowledge primarily on distribution, wintering areas, reproduction, and feeding habits of the species as they relate to other marine resources. Canada's share in this program required the capture of 500–750 seals pelagically from the eastern Pacific each year during the first 6-year term of the Interim Convention (Pike et al., MS, 1959). The Convention was extended in 1964 for a further period of 6 years (retroactive to 1963). The quota requirement was relaxed and emphasis was placed upon a study of the quality of skins and the effect of fur seals on other marine resources.

Some mature females and many yearlings and juveniles of both sexes winter in exposed coastal seas and in protected coastal waters of British Columbia. A wintering population of mature females occurs in northern Hecate Strait. They do not normally come ashore, but juveniles born the previous summer may strand and die on exposed

ocean beaches, especially during winters characterized by intense storms. Manzer and Cowan (1956) list records of fur seals in inside coastal waters of British Columbia up to and including 1955. Records of sightings and strandings since 1957 are being compiled by the Nanaimo Station. These records show more than usual numbers of stranded yearlings during the winter of 1957-58, when five were reported in December, 26 in January, one in February, and one in May, from the west coast of Vancouver Island. Among these stranded seals were 18 bearing tags applied to the flippers the previous July and August by the U.S. Fish and Wildlife Service on the Pribilof Islands. The ratio of tagged to untagged pups on the Pribilof Islands was approximately 1:10 in 1956, but the ratio for tags recovered from strandings on the west coast of North America was almost 1:1. This may indicate that many untagged stranded yearlings were not reported, or possibly that the tag was in some way a handicap to the young seals.

Annual catches by area are listed in the Annual Reports of the Department of Fisheries of Canada, Ottawa. Nearly 50,000 fur seals were taken in British Columbia waters by native Indians using canoe and spear, during the 28-year period from 1912 to 1940. Approximately 85% of the annual catch were taken on the west coast of Vancouver Island.

Approximately 2000 fur seals have been taken pelagically from waters off Washington, British Columbia, and Alaska, mostly in March, April, and May, during the course of Canadian fur seal research from 1958 through 1966. Preliminary results of research are described in annual reports submitted to the North Pacific Fur Seal Commission (Pike et al., MS, 1959, MS, 1960). Fur seals feed mostly on herring and squid in British Columbia waters (Clemens et al., MS, 1936; Fisheries Research Board of Canada, 1959, p. 108; Spalding, 1964). The histology of reproduction and the estrus cycle in the female have been studied by Craig (1964).

### *Eumetopias jubatus* (Schreber 1776)—Northern or steller sea lion

This species is well known on the coast of British Columbia, where it congregates on bare rocks exposed to the open ocean during the pupping and mating season in June and July, and disperses widely along exposed and protected coasts and throughout inside coastal waters during fall and winter months (Newcombe and Newcombe, 1914; Newcombe et al., 1918; Wailes and Newcombe, 1929; Pike and Maxwell, 1958). Numbers of sea lions in British Columbia following the pupping season were estimated at 11,000-12,000 from an aerial census in 1956-57 (Pike and Maxwell, 1958). Since that time they have been reduced to about 4000 by heavy killing, especially in 1959 and 1960. At present two major rookeries, on the Scott Islands (Fig. 19) and near Cape St. James, accommodate most of the population during the summer breeding season. Sizable rookeries were formerly located on Virgin and Pearl Rocks and on North Danger Rocks in Hecate Strait. The population has been much reduced and few pups are now born in these locations.



FIG. 19. An adult male northern sea lion, *Eumetopias jubatus*, on the Scott Islands' rookery, British Columbia. (Photograph by F. Velsen.)

A study of distribution, life history, reproduction, and feeding habits of the species was started in 1956 by the Fisheries Research Board in order to assess the amount of damage done by sea lions to fish and gear and to recommend the need and means for control (Pike and Maxwell, 1958; Anon., 1941; Fisheries Research Board of Canada, 1959, p. 108; Spalding, 1964). Recently the animals have been used commercially as a source of mink food. If sea lions are now to be considered as a commercial resource, killing must be curtailed or eliminated for a period of years in order to build up a breeding stock that will allow a substantial sustainable harvest.

Specimens, mostly skulls, are common in British Columbia museum collections because of the past abundance of the species and the large number of animals killed.

### *Zalophus californianus* (Lesson 1828)—California sea lion

British Columbia is the northern extremity of the range of this species, which breeds south of Monterey Bay, California (Cowan, 1936). The species occurs almost every winter in the Barkley Sound area on southern Vancouver Island (Cowan and Guiguet, 1965). Published specimen records include two skulls, both from the west coast of Vancouver Island: one from the beach at Clayoquot (Cowan and Guiguet, 1965) and one from a large bull shot near Ucluelet (Guiguet, 1953).

California sea lions were encountered in 1958 during the course of studies on northern sea lions along the west coast of Vancouver Island by Fisheries Research Board employees. A large male was seen and photographed by Mr F. J. Velson on Long Beach Rocks, near Ucluelet, in March 1958. A male in company with 20-30 northern sea lions was shot by Mr D. J. Spalding in Effingham Inlet, Barkley Sound, on February 17, 1958. The animal measured 65.6 inches (193 cm) from tip of snout to tip of tail, and the skull is now in the BCPM collection. Occasionally a single male California sea lion is seen in the company of a small herd of northern sea lions on Race Rocks, near Victoria.

#### Family PHOCIDAE—Earless Seals

#### *Phoca vitulina richardi* (Gray 1864)—Pacific harbour seal

Vancouver Island, British Columbia, is the type locality for this subspecies, which ranges from Alaska to Mexico. (McLaren (1966) considered that the ice-front harbour seal of northern Bering and southern Chukchi seas deserves full status as *Phoca largha* Pallas, 1811.) Two syntypes, which include a skeleton taken from the Fraser River in 1861 and a skull from Queen Charlotte Sound in 1862, are listed by Scheffer (1958).

The harbour seal (Fig. 20) is abundant in British Columbia, where it frequents littoral waters and shores along the entire coastline. Sometimes it ascends large rivers or becomes resident in lakes many miles from the sea (Cowan and Guiguet, 1965). It is



FIG. 20. Pacific harbour seal, *Phoca vitulina*. (Photograph by Karl W. Kenyon.)

considered a nuisance by salmon fishermen because of its habit of plundering gillnets. Formerly a bounty was paid. This resulted in an average kill of about 3000 seals annually from 1914 until 1964.

Fisher (1952) studied harbour seals in the Skeena River region in 1945 and 1946. His published review includes distribution, feeding habits, reproduction, parasitism, damage to fishing gear, and effectiveness of the bounty system in controlling the species. Stutz (1967a, b) published the results of preliminary studies on the moult, pelagic patterns, and population distribution of British Columbia harbour seals. A review of the species in the Province as a whole, based on collections in 1964 and 1965, is in preparation (M. A. Bigg, unpublished data). Numerous specimens, mostly skulls and skins, are contained in British Columbia museum collections.

TABLE 15. Sight records of elephant seals in British Columbia waters, 1958–62.

Date	Location	Approx. latitude	Source of information
Apr. 9, 1958	Hecate Strait	52°30'N	FPL <i>Beldis</i>
Sept. 1, 1958	Squally Channel	50°-N	FPL <i>Clavella</i>
Apr. 27, 1959	Graham Reach	53°-N	FPC <i>Babine Post</i>
Apr. 30, 1959	Principe Channel	53°30'N	FPC <i>Nicola Post</i>
Sept. 8, 1959	Lewis Pass	53°-N	FPC <i>Nicola Post</i>
Sept. 27, 1959	Luscombe Inlet	52°-N	FPC <i>Kitimat</i>
Feb. 23, 1960	Quatsino Sound	50°30'N	FPL <i>Pholis</i>
Mar. 3, 1960	Hecate Strait	53°16'N	FPL <i>Beldis</i>
Apr. 17, 1960	Grenville Channel	53°30'N	FPC <i>Nicola Post</i>
May 27, 1960	25 mi S Estevan Point	49°-N	MV <i>Pacific Ocean</i>
June 12, 1960	Queen Charlotte Sound	51°20'N	MV <i>Pacific Ocean</i>
July 18, 1960	Quatsino Sound	50°30'N	FPL <i>Pholis</i>
July 23, 1960	Hecate Strait	53°52'N	FPL <i>Clavella</i>
July 25, 1960	Hecate Strait	53°54'N	FPL <i>Clavella</i>
Aug. 22, 1960	Tasu Sound	52°40'N	FPC <i>Sooke Post</i>
Oct. 18, 1960	Goletas Channel	-	FPL <i>Brama</i>
Apr. 6, 1961	Brockton Island	-	FPL <i>Pholis</i>
Apr. 28, 1961	Ashdown Island	-	FPC <i>Howay</i>
May 7, 1961	Wright Sound	53°21'N	FPL <i>Clavella</i>
May 9, 1961	Caamano Sound	-	FPC <i>Howay</i>
May 9, 1961	Oval Hill	-	FPC <i>Howay</i>
May 9, 1961	Ashdown Island	-	FPC <i>Howay</i>
May 11, 1961	20 mi off Caamano Sound	-	FPC <i>Laurier</i>
Sept. 10, 1961	Graham Reach	-	FPL <i>North Rock</i>
Sept. 15, 1961	Hecate Strait	53°15'N	FPL <i>North Rock</i>
Sept. 16, 1961	Hecate Strait	52°58'N	FPL <i>North Rock</i>
Sept. 16, 1961	Tolmie Channel	-	FPC <i>Babine Post</i>
Oct. 8, 1961	Hastings Point	-	FPC <i>Sooke Post</i>
Oct. 16, 1961	Dawson Inlet	-	FPC <i>Sooke Post</i>
Mar. 28, 1962	Laredo Inlet	-	FPC <i>Babine Post</i>
May 7, 1962	Wright Sound	53°21'N	FPL <i>Clavella</i>
Sept. 9, 1962		53°36'N	FPL <i>Clavella</i>

The development of a European market for harbour seal skins was responsible for the establishment of a commercial industry in 1963. Fur buyers paid hunters from \$15 to \$65 per skin. With the decline in the market in 1965 there was a considerable reduction in the catch, and recent prices (1967 and 1968) are not attractive. If market conditions permit this new industry to survive, the best yield would be obtained with about a 5-month summer-closed season from June through October. This would prohibit killing during the peak of the pupping season in June and during the summer moult, when skins are of poor quality and many wounded animals would be lost by sinking.

### *Mirounga angustirostris* (Gill 1866)—Northern elephant seal

The northern elephant seal is an occasional visitor to British Columbia, 1000 or more miles north of its breeding localities off California and Mexico. The most northerly record for the west coast of North America is the stranding of a subadult male on Prince of Wales Island, Alaska, 55°30'N (Willet, 1943).

Only two specimens have been taken in British Columbia. A male, 15 feet (4.6 m) long, was shot and retrieved in Queen Charlotte Strait in September 1944 (Cowan and Carl, 1945). A male, 13.5 feet (4.1 m) long, was driven ashore by killer whales and subsequently shot by a fisherman near Ucluelet about April 10, 1952. The skeleton was salvaged by the British Columbia Provincial Museum. The stomach contained only clusters of hagfish eggs and the partially digested vertebral column of a fish, probably a hagfish (Cowan and Guiguet, 1965).

The number of northern elephant seals seen in British Columbia waters (Table 15) indicates that the species is not as rare as formerly believed. Most observations are from Hecate Strait and from broad channels between islands along the eastern shores of Hecate Strait. In every case but one, single individuals were seen. On April 26, 1964, three were seen together from the *T. W. Islander*. Northern elephant seals have also been frequently reported, as solitary individuals, by whalers operating within a 100-mile range of Quatsino Sound during the months of May to September.

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## APPENDICES

### APPENDIX I. BRITISH COLUMBIA WHALE CATCHES, 1905-67; DATA FROM ANNUAL REPORTS OF THE DEPARTMENT OF FISHERIES, OTTAWA, CANADA.

Year	Stations	Blue	Fin	Hump	Sei	Sperm	Others	Sub- total	Annual total
1905	Sechart								
1906	"								
1907	Kyuquot, Sechart								
1908	"								
1909	"								
1910	"							812	812
1911	"							890	
	Rose Harbour, Naden Harbour							309	1199
1912	Kyuquot, Sechart							583	
	Rose Harbour, Naden Harbour							526	1109
1913	Kyuquot, Sechart	10	93	372		11		486	
	Rose Harbour, Naden Harbour							219	705
1914	Kyuquot, Sechart							320	
	Rose Harbour, Naden Harbour							253	573
1915	Kyuquot	12	68	55		1	1B	137	
	Naden Harbour							92	229
1916	Kyuquot	15	94	64		11	1B	185	
	Rose Harbour, Naden Harbour							228	413
1917	Kyuquot								379
	Rose Harbour, Naden Harbour								
1918	Kyuquot							246	
	Rose Harbour, Naden Harbour							254	500
1919	Kyuquot								
	Rose Harbour, Naden Harbour	37	217	65	74	35	4(?)		432
1920	Kyuquot								
	Rose Harbour, Naden Harbour	26	149	98	121	56	43(?)	146	493
(1921	Not operating)							347	493
1922	Kyuquot		37	23	1	31		92	
	Rose Harbour, Naden Harbour	4	57	27		7		95	187

APPENDIX I. BRITISH COLUMBIA WHALE CATCHES, 1905-67; DATA FROM ANNUAL REPORTS OF THE DEPARTMENT OF FISHERIES, OTTAWA, CANADA. — (Continued)

Year	Stations	Blue	Fin	Hump	Sei	Sperm	Others	Sub-total	Annual total
1923	Kyuquot Rose Harbour, Naden Harbour	62	166	78	53	94	2B		455
1924	Kyuquot Rose Harbour, Naden Harbour	17	38	19	48	19		141	
		39	87	28	52	64	2R;1B	273	414
1925	Kyuquot Rose Harbour, Naden Harbour	29	135	40	68	76	3B	82	
								269	351
1926	Rose Harbour, Naden Harbour	14	124	25	25	80	1R	269	269
1927	" "	10	138	21	7	82		258	258
1928	" "	47	140	21	13	83	1B	305	305
1929	" "	16	168	9	67	146	1B	407	407
1930	" "	10	62	12	89	147		320	320
(1931-32 Not operating)									
1933	Rose Harbour	1	17		1	190		209	209
1934	Rose Harbour, Naden Harbour		71	14		265		350	350
1935	Rose Harbour	6	20	1		175		202	202
1936	Rose Harbour, Naden Harbour	3	48	14	2	311		378	378
1937	" "	1	44	7		265		317	317
1938	" "	4	50	4		252		310	310
(1939 Not operating)									
1940	Rose Harbour	2	90	2		126		220	220
1941	Rose Harbour, Naden Harbour	1	67	27		233		328	328
1942	Rose Harbour	1	25	7		130		163	163
1943	" "		15	7		69		91	91
(1944-47 Not operating)									
1948	Coal Harbour		37	115	2	28		182	182
1949	"	2	105	76	3	69		255	255
1950	"	4	150	95	24	40	1B	314	314
1951	"	9	216	51	5	153	1B, 1R, 1G	437	437
1952	"	16	240	61	22	126		465	465
1953	"	8	181	47	14	275	10G, 4B	539	539
1954	"	11	150	106	134	226	3B	630	630
1955	"	11	120	37	139	320	3B	630	630
1956	"	14	168	28	37	127	1B	375	375
1957	"	15	284	49	93	190	4B	635	635
1958	"	8	573	40	39	112	2B	774	774
1959	"	28	369	27	185	260		869	869

(Continued)

APPENDIX I. BRITISH COLUMBIA WHALE CATCHES, 1905-67; DATA FROM ANNUAL REPORTS OF THE DEPARTMENT OF FISHERIES, OTTAWA, CANADA. — (*Concluded*)

Year	Stations	Blue	Fin	Hump	Sei	Sperm	Others	Sub- total	Annual total
(1960-61)	Not operating								
1962	Coal Harbour	27	157	16	340	172			712
1963	"	30	220	24	154	147	3B		578
1964	"	12	140	10	613	105			880
1965	"	9	83	18	604	151			865
1966	"	—	134	—	354	231	2B		721
1967	"	—	102	—	89	304	1M		456

*Vancouver Island Stations:*

- (a) Sechart—Barcley Sound on the west coast of Vancouver Island;
- (b) Kyuquot—Kyuquot Sound on the west coast of Vancouver Island;
- (c) Coal Harbour—Quatsino Sound on the west coast of Vancouver Island;
- (d) Another station operated unsuccessfully at Page Lagoon, near Nanaimo, from 1906 to 1909.

*Queen Charlotte Islands Stations:*

- (a) Rose Harbour—southern end of Moresby Island;
- (b) Naden Harbour—northeast coast of Graham Island.

Catch figures, by species, agree with those contained in International Whaling Statistics (Sandefjord, Norway) for the years 1930-58, with the following exceptions:

- (a) For 1933: one sei whale is described as a humpback in International Whaling Statistics.
- (b) For 1936: two sei whales are not entered in International Whaling Statistics.

Other whales: B=Bottlenose; G=Gray whale; M=Minke whale; R=Right whale; (?)=Unknown species.

APPENDIX II. SUMMARY OF SPECIMEN RECORDS OF CETACEANS FROM BRITISH COLUMBIA UP TO 1965; SIGHT RECORDS AND CATCH RECORDS ARE NOT INCLUDED.

Species	Locality	Date taken	Specimen and sex	Disposition of specimen	Published record
<i>Berardius bairdi</i>	West coast Vancouver Island, Lat 50°30'N	July, 1950	Skull, 33 ft M	UBC	Pike, 1953
	20 miles west of Cape St. James	Aug. 9, 1951	Skull, 29 ft F	BCPM 6415	Pike, 1953
<i>Mesoplodon stejnegeri</i>	Port McNeill, Vancouver Island	August, 1953	Skull, partial, F	UBC 4501	Cowan and Guiguet, 1956; Moore, 1963
	Long Beach, Vancouver Island	May, 1959	Skeleton, 12.5 ft F	UBC 7433	Moore, 1963
<i>Mesoplodon carlhubbisi</i>	Long Beach, Vancouver Island	July, 1963	Skull, 10.8 ft, M	UBC 9037	Unpublished
	Rivers Inlet	1965	Lower jaw only	UBC 9036	Unpublished
<i>Ziphius cavirostris</i>	Nr. Estevan Point, Vancouver Island	May 25, 1941	Skeletal fragments; 20 ft-21 ft F		Cowan, 1945; Foerster, 1941
	Near Cape Scott, Vancouver Island	1937	Skull, beach worn	BCPM 4557	Cowan and Hatter, 1940
	Nr. Bella Bella	ca. 1900	Skull	UBC 3691	Cowan and Guiguet, 1952
	Victoria, Vancouver Island	No date	Skull, partial	BCPM 5645	Cowan and Guiguet, 1952
	Jordan River, Vancouver Island	Jan. 1954	Skull, 16 ft M	BCPM 6416	Unpublished
	Sandspit, Queen Charlotte Islands	Feb. 1961	Skull, 17 ft M	UBC 8325	Unpublished
	Nr. Tow Hill, Queen Charlotte Islands	Dec. 16, 1960	Skeleton, 18.5 ft M	UBC 7999	Unpublished
<i>Stenella euprosyne</i>	Nootka Sound, Vancouver Island	Winter, 1948	Skull, partial	UBC 2884	Cowan and Guiguet, 1952
	Campbell River, Vancouver Island	April, 1961	Skull, complete	UBC 8011	Unpublished
	Near Kyuquot, Vancouver Island	April, 1963	Skull, skeletal fragments	UBC 9236	Unpublished
<i>Delphinus delphis</i>	Victoria, Vancouver Island	Apr. 18, 1953	Skeleton, M; model	BCPM 5792	Guiguet, 1954
<i>Lagenorhynchus obliquidens</i>	Estevan Point, Vancouver Island	June, 1943	Skull	BCPM 4996	Cowan and Guiguet, 1952
	Port Hardy, Vancouver Island	October 1943	Skull, partial	UBC 287	Unpublished
<i>Orcinus orca</i>	Victoria, Vancouver Island	No date	Skull, M	BCPM 4555	Unpublished
	Cherry Point, Vancouver Island	Sept. 28, 1944	Skull, 8 ft suckling F	BCPM 5106	Sheffer and Slipp, 1948
	Estevan Point, Vancouver Island	June 13, 1945	Skeleton, F	BCPM 5214	Carl, 1946
	Estevan Point, Vancouver Island	June 13, 1945	Skull, M	BCPM 5319	Carl, 1946
	Quadra Island	December 1949	Skull	BCPM 5655	Unpublished
	Nr. Bella Bella	No date	Skull	UBC 7430	Unpublished
Nr. Bella Bella	No date	Skull	UBC 7431	Unpublished	

(Continued)

APPENDIX II. SUMMARY OF SPECIMEN RECORDS OF CETACEANS FROM BRITISH COLUMBIA UP TO 1965; SIGHT RECORDS AND CATCH RECORDS ARE NOT INCLUDED. — (Concluded)

Species	Locality	Date taken	Specimen and sex	Disposition of specimen	Published record
<i>Phocoena phocoena</i>	Nootka Island	July, 1934	Skeleton, F	BCPM 3630	Unpublished
	Vancouver Island Coast				
	Hardy Bay, coast	August 1939	Skeleton, M	BCPM 4556	Unpublished
	Vancouver Island				
	Victoria,	August 1940	Complete juvenile	BCPM 4757	Unpublished
	Vancouver Island				
	Herrando Island	July 1942	Complete	BCPM 4935	Unpublished
	Gulf of Georgia				
<i>Phocoenoides dalli</i>	Off Little Qualicum R., Gulf of Georgia	March 1946	Skull	BCPM 5215	Unpublished
	Queen Charlotte City (?)	May 11, 1946	Skull	UBC 1880	Unpublished
	Bella Bella, nr. Millbank Sound	July 12, 1948	Skull	UBC 2796	Unpublished
	Baynes Sound, Vancouver Island	February 1962	Skull, 6.5 ft M	FRBC	Unpublished
	Nigei Island	April 1939	Skeleton, M	BCPM 3631	Cowan, 1944
	Laredo Channel	August 1939	Skeleton, M	BCPM 4552	Cowan, 1944
	Laredo Channel	August 1939	Skeleton, F	BCPM 4553	Cowan, 1944
	Laredo Channel	August 1939	Skeleton, M	BCPM 4578	Cowan, 1944
<i>Balaenoptera acutorostrata</i>	Goletas Channel	June 1939	Skeleton, F	BCPM 4579	Cowan, 1944
	West coast Vancouver	March 1949	Skull	BCPM 5321	Unpublished
	Queen's Sound	July 17, 1945	Skeleton, F	UBC 2795	Unpublished
	Goletas Channel	April, 1950	Skull, M	UBC 3185	Unpublished
	Hippa Island (?)	July 12, 1947	Skull	UBC 2312	Unpublished
	Barclay Sound, Vancouver Island	August 1949	Skeleton, F	UBC 3523	Unpublished
	Pultney Point Vancouver Island	December 1936	Skull	BCPM 1796	Cowan, 1939
	Sooke fish traps Vancouver Island	August 24, 1937	Skeleton, 15 ft F	BCPM 2422	Cowan, 1939
<i>Eschrichtius gibbosus</i>	Shushartie, Vancouver Island	August 1940	Skeleton, F	BCPM 4753	Unpublished
	Roberts Bay near Puget Sound	May 22, 1946	Skeleton, 26 ft F	BCPM 5657	Carl, 1946
	Quadra Island	July 1963	Skull, 26.4 ft F	UBCM 9061	Unpublished
	Schooner Cove, Vancouver Island	July, 1963	Skull, 22.4 ft F	BCPM 6824	Unpublished
	50°28'N, 128°07'W	April 6, 1953	Skeleton, 40 ft M	BCPM 6853	Unpublished

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