AN INVESTIGATION INTO THE CAUSES OF AN UNUSUAL PORPOISE (*Phocoena phocoena* AND *Phocoenoides dalli*) MORTALITY EVENT IN SOUTHERN BRITISH COLUMBIA

Final report to the Department of Fisheries and Oceans,

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INTRODUCTION

Cetacean strandings have typically been classified into two types: 1) single strandings (including a mother/offspring pair); and 2) mass strandings. Singly stranded cetaceans have been reported world-wide wherever populations of cetaceans exist, and appear to reflect natural mortality patterns in a population, with most individuals stranding due to serious pathological conditions. Mass strandings are more unusual, and seem to be largely limited to a few species of high social odontocetes and are extremely clustered geographically, both on a local and world-wide scale. Most research on causes of mortality in cetaceans have focused on singly or mass stranded individuals. In recent years, a third category of marine mammal mortality has been recognized; that of large-scale mortality events or die-offs. In many cases these events have been linked, albeit in some cases only circumstantially, to biotoxins, viral outbreaks or parasitic infections (Geraci 1989; Geraci et al. 1982, 1989; Harwood 1990; Keyes 1965).

In British Columbia, the Stranded Whale and Dolphin Program (SWDP), coordinated by the Marine Mammal Research Group, has been investigating the causes of mortality of cetaceans since 1987 (see Baird and Guenther in press; Guenther and Baird 1993; Guenther et al. 1993). Mass strandings in B.C. are extremely rare, with the last recorded one occurring in the 1940's (Carl 1945). Single strandings occur fairly frequently, and the number of records of single stranded animals has been increasing each year, likely due to increased public awareness of the stranding program (Baird 1994).

Prior to 1993, only one record of a possible cetacean die-off had been recorded in the province. This involved a report of 12 neonatal porpoises, likely all Dall's porpoise (*Phocoenoides dalli*), washing up on North Beach, Graham Island, over a three day period in 1992 (Guenther et al. 1993). The remoteness of the site and lack of funds precluded detailed investigation of these strandings, and the lack of sighting records of cetaceans in that area made it impossible to conclude whether the large number of strandings was due to an increase in Dall's porpoise use of the area, or whether some agent or agents was responsible for the deaths of an increased number of neonatal porpoises. A similar occurrence around southern Vancouver Island, extending over a two month period in the spring of 1993 and involving both Dall's and harbour (*Phocoena phocoena*) porpoises, was investigated in much greater detail. The purpose of this report is to review the history of porpoise strandings in the area of the 1993 event, to summarize information collected from stranded porpoises from this event, and to present other information necessary in the determination of possible causes of the event.

METHODS AND RESULTS

SIGHTING DATA -

Since 1987 extensive advertising and public relations efforts have been

undertaken to encourage the public to report cetacean sightings and strandings in British Columbia, with efforts focusing around the southern tip of Vancouver Island. Since 1987 cetacean sightings in this area have also been recorded through two dedicated sources: 1) trained naturalists working for a local whale watching company (Sea Coast Expeditions); and 2) by the senior author during research on killer whales (*Orcinus orca*) in local waters, sponsored by Simon Fraser University. Effort (measured as the number of days on the water) from these two sources has increased slightly over the last four years.

STRANDING HISTORY -

Between 1987 and 1992, during the months of April through June, an average of 2.3 (range 1-4) dead porpoises had been found in the area around Victoria each year. In 1993, between 10 April and 7 June, 24 dead porpoises (11 harbour, 10 Dall's, and 3 unidentified) were recorded in the area from Victoria to Jordan River, along the south and southwest coasts of Vancouver Island. Figure 1 shows the number of porpoise stranding records from the area between Victoria and Jordan River each year (records from Baird et al. 1988; Stacey et al. 1989; Langelier et al. 1990; Guenther et al. 1992, 1993; Baird and Guenther in press). There is no indication of an increase in public reporting between 1987 and 1992, and this area is well populated and almost all beaches are accessible. Public knowledge of the stranding program in this area has been high since its inception in 1987; thus the great increase in strandings in 1993 appears to reflect an actual increase in the number of porpoises dying in that period. All cetacean strandings (defined as any dead animal, whether on the beach or floating) from around southern Vancouver Island between 1987 and 1992 were reported by the public (Baird unpublished), and all but one of the 24 strandings from spring 1993 were also from public sources. Thus the increase in stranding records is likely not due to the increase in dedicated sighting efforts. After June 1993 the number of porpoise strandings in the Victoria area returned to levels similar to previous years (Baird et al. 1994).

One possible explanation for the increased number of strandings in 1993 is an increase in the number of porpoises utilizing the area around southern Vancouver Island during that year. Comparisons of sighting records of porpoises in the area from Victoria to Jordan River during the period from April through June 1993, with sightings from previous years (Figure 2), indicates the large number of dead animals recorded during 1993 is not due to an influx of porpoises into the area.

1993 STRANDINGS -

Locations of 1993 porpoise strandings are shown in Figure 3. Animals of both sexes (8 males, 9 females, 7 undetermined) and all ages (including two pregnant females, one of each species) were represented. All animals were found

dead either floating or on shore. State of decomposition of many of the animals was considered to be fresh to slightly decomposed, implying that the animals did not wash into the area from elsewhere. Necropsies were undertaken on 17 animals, with samples collected for histopathology, toxicology, bacteriology, virology, and biotoxin analysis. One or more veterinarians were present at most necropsies. The data sheet used to collect information is presented in Appendix 1. Skeletal materials collected were disseminated to a variety of institutions (Table 1).

ANALYSES -

None of the animals showed signs to indicate possible net entanglement (see e.g., Hare and Mead 1987). Stomachs contained fish otoliths, squid beaks, nereid worm jaws, crustaceans, or were empty, but none contained fleshy remains of fish or squid. Otoliths and beaks identified by W.A. Walker (National Marine Mammal Laboratory) indicated that the species composition of prey was generally similar to that from stranded animals in British Columbia in previous years. One unusual finding in two Dall's porpoise stomachs was the presence of nereid worm jaws. The presence of tissue attached to these jaws and the absence of large fish prey in these two stomachs implies direct ingestion (W.A. Walker, pers. comm.). While nereid worms are frequently recorded from the scats of northern fur seals (*Callorhinus ursinus*) in the Bering Sea, they may not have previously been recorded from cetaceans (W.A. Walker, pers. comm.).

A single sample of stomach fluids analyzed for biotoxins (saxitoxin and domoic acid) through the Department of Fisheries and Oceans was negative. Samples for histopathology, toxicology, bacteriology and virology were analyzed at the Animal Health Centre in Abbotsford, B.C. Due to post-mortem decomposition, not all analyses were performed on all samples. Microscopic evaluation of tissues demonstrated frequent parasitic infections but no specific indication of other infectious agents. Limited microbiological examinations were unrewarding. Levels of organochlorines and heavy metals were within the usual range for these species in this area (Tables 2 through 5).

CONCLUSIONS

We investigated several potential causes of this unusual mortality event. As noted, an influx of animals into the area or a change in observer effort do not seem to be responsible for the large number of animals found dead. Similarly, no commercial gillnet fisheries were in operation in local Canadian waters or in the adjoining waters of Washington State at that time. While there are occasional records of porpoises being caught in trawl fisheries in this area (Baird et al. 1988; Stacey et al. 1989), there was no obvious increase in the effort of this fishery locally in spring 1993, and animals showed no signs of entanglement.

Stomach contents did not imply that the animals were consistently eating

unusual prey, nor did the one sample of stomach contents analyzed for biotoxins indicate possible biotoxin poisoning. The timing of the event was also inconsistent with the agents most likely responsible for biotoxin poisoning (F.J.R. Taylor, University of British Columbia, personal communication). Histological and microbiological examination of tissues did not show consistent signs of viral or bacterial infections. Out of 12 animals for which tissues were suitable for histological examination, eight had significant lesions due to parasites (cholangitis and pneumonia most commonly) and one animal had an extensive peritonitis in conjunction with a large intra-abdominal abscess. Levels of organochlorines and heavy metals were within the usual range for these species in southern British Columbia. Thus, despite these investigations, the cause or causes of this event remain undetermined.

Impacts of such a die-off on the populations of these species also remains unclear. It is unknown what proportion of porpoises which died were found, as many animals which sink in deep water likely do not refloat, some which did float or which washed up on a beach and were seen by members of the public likely were not reported, and others were probably not seen. Particularly in the westerly portions of the area, where beach access is limited, animals could have washed up on shore and been eaten by scavengers and thus not found. In addition to knowledge of the absolute levels of mortality in this event, information on the population sizes and trends of both Dall's and harbour porpoise would be needed to estimate the impact on these populations. No detailed information on population levels or trends are available for these species in British Columbia, but in the case of the harbour porpoise, there is circumstantial evidence that the population has been declining since the early part of this century (Baird 1994; Calambokidis and Baird 1994).

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LITERATURE CITED

Baird, R.W. 1994. A program to monitor the status of small cetaceans in British Columbia. *In* Proceedings of the Pacific Ecozone Workshop, February 1-3, 1994, Sidney, B.C. In press.

Baird, R.W., and T.J. Guenther. In press. Account of harbour porpoise (*Phocoena phocoena*) strandings and bycatches along the coast of British Columbia. Reports of the International Whaling Commission Special Issue.

Baird, R.W., K. Langelier, and P.J. Stacey. 1988. Stranded whale and dolphin program of B.C. - 1987 report. Wildlife Veterinary Report 1(1):9-12.

Baird, R.W., S.G. Wischniowski, T.J. Guenther, M.L. McAdie, and T.E. Cornish. 1994. Strandings and fishing gear entanglements of cetaceans on the west coast of Canada in 1993. International Whaling Commission Meeting Document SC/46/O5.

Calambokidis, J., and R.W. Baird. 1994. Status of marine mammals in the Strait of Georgia, Puget Sound, and the Juan de Fuca Strait, and potential human impacts. Canadian Technical Report of Fisheries and Aquatic Sciences 1948: in press.

Carl, G.C. 1945. A school of killer whales stranded at Estevan Point, Vancouver Island. Report of the Provincial Museum of Natural History and Anthropology 1945:21-28.

Geraci, J.R. 1989. Clinical investigation of the 1987-88 mass mortality of bottlenose dolphins along the U.S. central and south Atlantic coast. Report to the National Marine Fisheries Service, U.S. Navy (Office of Naval Research) and Marine Mammal Commission.

Geraci, J.R., D.J. St. Aubin, I.K. Barker, R.G. Webster, V.S. Hinshaw, W.J. Bean, H.L. Ruhnke, J.H. Prescott, G. Early, A.S. Baker, S. Madoff and R.T. Schooley. 1982. Mass mortality of harbor seals: pneumonia associated with influenza A virus. Science 215:1129-1131.

Geraci, J.R., D.M. Anderson, R.J. Timperi, D.J. St. Aubin, G.A. Early, J.H. Prescott, and C.A. Mayo. 1989. Humpback whales (*Megaptera novaeangliae*) fatally poisoned by dinoflagellate toxin. Canadian Journal of Fisheries and Aquatic Sciences 46:1895-1898.

Guenther, T.J., and R.W. Baird. 1993. Harbour porpoise (*Phocoena phocoena*) strandings and incidental catches on the B.C. coast: collection of tissues for examination of stock identity. Report prepared under Contract No. 40ABNF202252 to the National Marine Mammal Laboratory, Seattle.

Guenther, T.J., R.W. Baird, K.M. Langelier, J.K.B. Ford, G.M. Ellis, P.J. Stacey, and T.E. Cornish. 1992. Cetacean strandings and entanglement in fishing gear on the Canadian west coast during 1991. International Whaling Commission Meeting Document SC/44/O15.

Guenther, T.J., R.W. Baird, J.K.B. Ford, K.M. Langelier, M.L. McAdie, S.G.

Wishniowski, and T.E. Cornish. 1993. Cetacean strandings and entanglement in fishing gear on the west coast of Canada during 1992. International Whaling Commission Meeting Document SC/45/04.

Hare, M.P., and J.G. Mead. 1987. Handbook for determination of adverse human-marine mammal interactions from necropsies. Northwest and Alaska Fisheries Center Processed Report 87-06.

Harwood, J. 1990. The 1988 seal epizootic. Journal of Zoology, London 222:349-351.

Keyes, M.C. 1965. Pathology of the northern fur seal. Journal of the American Veterinary Medical Association 147:1090-1095.

Langelier, K.M., P.J. Stacey, and R.W. Baird. 1990. Stranded whale and dolphin program of B.C. - 1989 report. Wildlife Veterinary Report 3(1):10-11.

Stacey, P.J., R.W. Baird, and K.M. Langelier. 1989. Stranded whale and dolphin program 1988 report. Wildlife Veterinary Report 2(1):10-11.

Table 1. Porpoise strandings from southern Vancouver Island, 10 April 1993 to 7 June 1993.

NUMBER[1]	DATE	SPECIES[2]	LOCATION	COMMENTS[3]
SWDP93-05	10 April 1993	Dall's porpoise	McMicking Pt, Victoria, VI	1,2,4,5,7-10,13-17,19,m,139.8cm,BMS
SWDP93-06	22 April 1993	harbour porpoise	200 m W Holland Pt, Victoria, VI	1,2,4,5,7-10,13-17,19,f,133.6cm,P
SWDP93-07	25 April 1993	harbour porpoise	McMicking Pt, Victoria, VI	1,2,4,5,7-10,13-17,19,f,125.0cm,WSS
SWDP93-08	26 April 1993	Dall's porpoise	Church Pt, VI	1,2,4,5,7-10,13-15,17,m,159.5cm,RBCM
SWDP93-09	28 April 1993	harbour porpoise	Ten Mile Pt, Victoria, VI	1,2,3,5,7-10,13-17,m,146.2cm,SoM
SWDP93-10	4 May 1993	Dall's porpoise	300 m W Clover Pt, Victoria, VI	1,2,4,5,7-10,13-17,m,160.4cm,SM
SWDP93-11	10 May 1993	harbour porpoise	N tip William Hd, VI	1,2,4,5,7-10,13-17,m,130.2cm,SM
SWDP93-13	11 May 1993	harbour porpoise	150 m SSE Clover Pt, Victoria, VI	1,2,4,5,7-10,13-17,m,124.0cm,RBCM
SWDP93-14	14 May 1993	Dall's porpoise	350 m W Finlayson Pt, Victoria, VI	1,2,4,5,7-10,13-17,f,174.1cm,UVIC
SWDP93-15	14 May 1993	Dall's porpoise	E side Ross Bay, Victoria, VI	1,2,4,5,7-10,13-17,f,179.4cm,NBM,fetus,MMRG
SWDP93-16	16 May 1993	harbour porpoise	W side Harling Pt, Victoria, VI	1,4,u,RBCM
SWDP93-17	17 May 1993	Dall's porpoise	S Crekye Pt, VI	1,2,4,5,7-10,13-17,m,162.4cm,MCM
SWDP93-19	18 May 1993	unidentified porpoise	mouth of Pedder Bay, VI	NR,u
SWDP93-20	19 May 1993	harbour porpoise	Caffrey Pt, Becher Bay, VI	1,2,4,7-10,13-17,f,113.5cm,RBCM
SWDP93-21	24 May 1993	harbour porpoise	Brother's I	4,u,MMRG
SWDP93-22	26 May 1993	harbour porpoise	Beechy Head, VI	1,2,4,7-10,13-17,f,125.1cm,?
SWDP93-23	26 May 1993	Dall's porpoise	Albert Head, VI	1,2,4,7-10,13-17,f,147.2cm,P
SWDP93-24	26 May 1993	harbour porpoise	McNeill Bay, VI	1,2,4,7-10,13-17,m,RBCM
SWDP93-25	27 May 1993	Dall's porpoise	1 km E Tugwell Creek, VI	1,2,3,7-10,13-17,f,151.8cm,UVIC
SWDP93-26	3-5 May 1993	harbour porpoise?	William Hd, VI	NR,u
SWDP93-27	24 May 1993	Dall's porpoise	Sandcut Beach, VI	NR,u
SWDP93-28	7 May 1993	harbour porpoise?	1 km W Hoskyn Pt, Becher Bay, VI	NR,u
SWDP93-29	29 May 1993	Dall's porpoise	9 km S Jordan River, VI	NR,u
SWDP93-30	7 June 1993	harbour porpoise	2 km W Otter Pt, VI	1,2,4,5,9,10,13,15-17,f,171.2cm,?,fetus,P

Notes to Table 1.

[1]Consecutive record numbers are given as each record is received, therefore records are not in chronological order.

[2]If species identification is not positive, indicated with "?".

[3]Comments: NR, not recovered. 1. measurements; 2. photographs; 3. radiographs; 4. skeleton and/or baleen,

Notes to Table 1 continued:

whole/partially collected; 5. aging of teeth; 6. blood tests/cultures; 7. histology samples; 8. gross post mortem examination; 9. heavy metal analysis; 10. organochlorine analysis; 11. dioxin analysis; 12. duplicate tissue samples in Ottawa; 13. duplicate tissue samples in Victoria; 14. parasitology examination; 15. stomach content analysis; 16. reproduction studies; 17. genetic analysis; 18. plaster cast replica of whole/part animal; 19. educational use (anatomy labs, class displays etc); Sex: f = female, m = male, u = unknown. Institution where skeletal materials or baleen deposited listed at end (UVIC = University of Victoria; MMRG = Marine Mammal Research Group; P = private collection, details available from MMRG; RBCM = Royal British Columbia Museum; BMS = Bamfield Marine Station; SM = Sidney Museum; NBM = New Brunswick Museum; SoM = Sooke Museum; MCM = Malaspina College Museum; WSS = Wellington Secondary School, Nanaimo).

Table 2. Heavy metal and trace mineral levels for harbour porpoise liver. Means were calculated using a value of zero for those parameters which were not detected (ND) at the minimum detectable limits.

Parameter	Harbour Porpoise 1993 N=8		Harbour Porpoise 1988 - 1991 N=9	
(ug/g)	Mean	Range	Mean	Range
Selenium (Se)	2.02	1.17-6.46	2.75	1.02-8.75
Copper (Cu)	11.5	5.0-24.0	15.9	2-54
Zinc (Zn)	53	29-129	34	10-98
Iron (Fe)	473	267-783	287	112-602
Manganese (Mn)	5.1	1.4-7.5	3.4	ND-6
Cadmium (Cd)[1]	0.06	ND-0.3	0.3	ND-0.8
Calcium (Ca)	238	33-900	139	ND-311
Magnesium (Mg)	338	170-900	156	ND-232
Mercury (Hg)[1]	4.2	ND-30.3	6.1	ND-39.2

Minimum Detectable Limits (ug/g - wet weight basis) [1]0.05

Levels from 1988-1991 from Guenther and Baird (1993).

Table 3. Organochlorine levels for harbour porpoise blubber. Means were calculated using a value of zero for those parameters which were not detected (ND) at the minimum detectable limits.

Parameter	Harbour Porpoise 1993 N=8		Harbour Porpoise 1988, 1990, 1991 N=7	
(ug/g)	Mean	Range	Mean	Range
HCB[1]	0.09	0.001-0.03	0.081	ND-0.33
Alpha-BHC[2]	0.062	0.003-0.1	0.067	ND-0.24
Lindane[2]	0.011	ND-0.03	0.003	ND-0.022
Beta-BHC[2]	0.08	0.02-0.2	0.070	ND-0.29
Oxychlordane[3]	0.03	0.01-0.08	0.017	ND-0.12
t-Nonachlor[3]	0.3	ND-0.3	0.192	ND-0.45
Alpha-Chlordane[3]	0.1	ND-0.2	0.106	ND-0.37
p,p-DDE[4]	2.4	ND-3.7	1.238	ND-1.38
p,p-DDD[3]	0.21	0.01-0.5	0.188	ND-0.67
p,p-DDT[3]	0.15	0.01-0.3	0.119	ND-0.33
PCB[5]	4.0	0.3-11	1.257	ND-6.2

Minimum Detectable Limits (ug/g - wet weight basis) [1]0.001 [2]0.002 [3]0.01 [4]0.005 [5]0.05

Levels from 1988-1991 from Guenther and Baird (1993).

Table 4. Heavy metal and trace mineral levels for Dall's porpoise liver. Means were calculated using a value of zero for those parameters which were not detected (ND) at the minimum detectable limits.

Parameter	Dall's Porpoise 1993 N=8		Dall's Porpoise 1987 - 1992 N=16	
(ug/g)	Mean	Range	Mean	Range
Selenium (Se)	2.49	1.38-4.62	1.72	0.83-9.96
Copper (Cu)	8.0	5.8-12.9	16.84	6-83.9
Zinc (Zn)	48	34-58	30.25	23-62
Iron (Fe)	462	200-883	250.56	169-570
Manganese (Mn)	7.5	3.3-10.0	4.68	3-10.4
Cadmium (Cd)[1]	0.1	0.2-0.5	0.41	0.2-5.5
Calcium (Ca)	158	34-541	94.06	38-280
Magnesium (Mg)	291	156-830	180.19	164-313
Mercury (Hg)[1]	2.89	0.1-16.5	2.24	0.28-25.6

Minimum Detectable Limits (ug/g - wet weight basis) [1]0.05
Levels from 1987-1992 from Baird (unpublished).

Table 5. Organochlorine levels for Dall's porpoise blubber. Means were calculated using a value of zero for those parameters which were not detected (ND) at the minimum detectable limits.

Parameter	Dall's Porpoise 1993 N=8		Dall's Porpoise 1987-1992 N=11	
(ug/g)	Mean	Range	Mean	Range
HCB[1]	0.20	0.001-0.7	0.15	0.02-0.7
Alpha-BHC[2]	0.10	0.002-0.16	0.11	ND-0.6
Lindane[2]	0.02	ND-0.05	0.03	ND-0.25
Beta-BHC[2]	0.13	ND-0.4	0.08	ND-0.6
Oxychlordane[3]	0.05	0.01-0.2	0.01	ND-0.1
t-Nonachlor[3]	0.25	ND-0.9	0.23	0.04-0.8
Alpha-Chlordane[3]	0.08	ND-0.2	0.60	ND-0.6
p,p-DDE[4]	4.0	ND-12	1.30	0.07-5.1
p,p-DDD[3]	0.3	ND-1.3	0.12	ND-0.4
p,p-DDT[3]	0.34	0.01-1.1	0.19	0.02-0.6
PCB[5]	4.2	ND-14	1.64	ND-6.2

Minimum Detectable Limits (ug/g - wet weight basis) [1]0.001 [2]0.002 [3]0.01 [4]0.005 [5]0.05

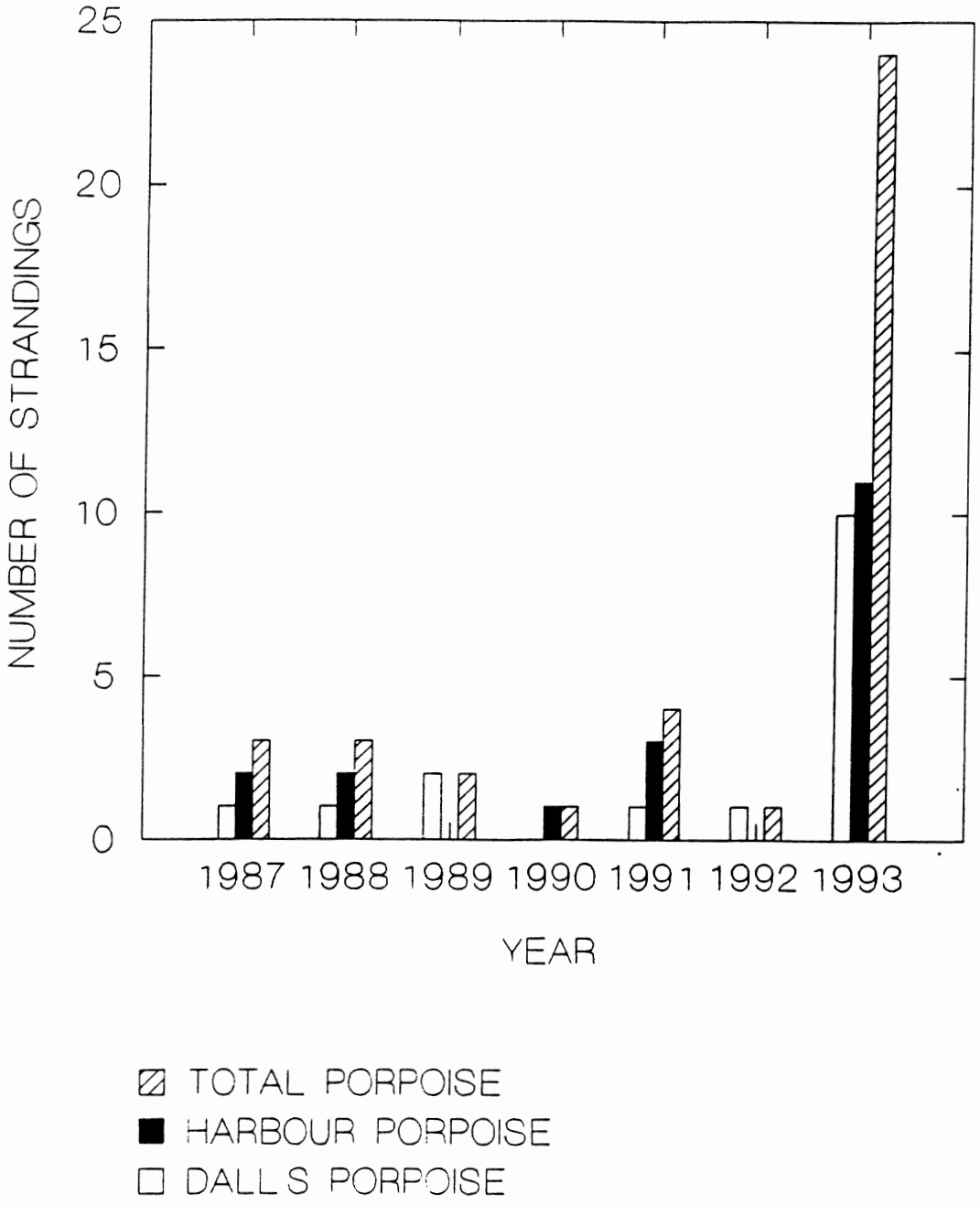


Figure 1. Number of dead porpoises recorded in the area from Jordan River to Victoria, during the months of April through June each year since 1987.

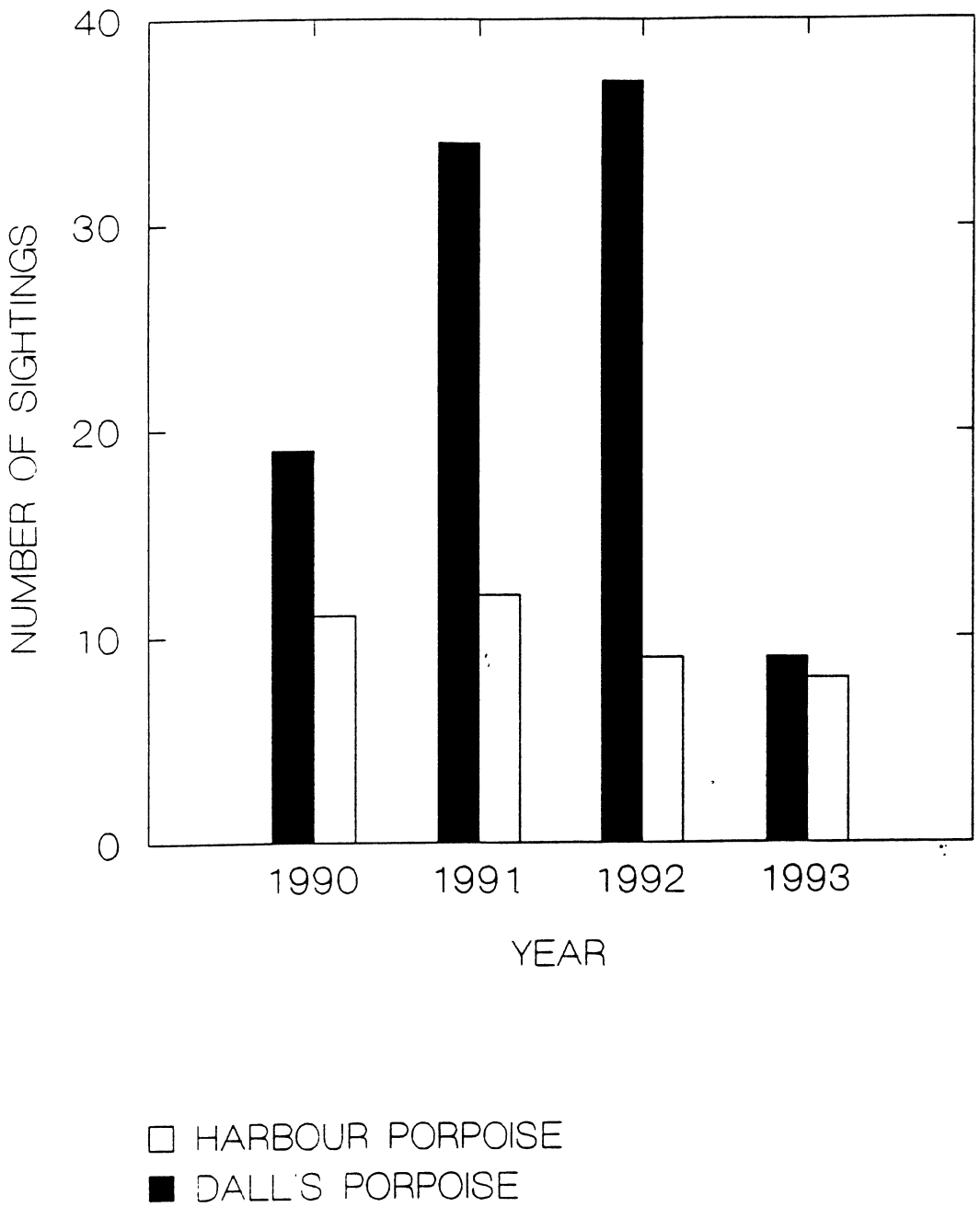


Figure 2. Number of porpoise sightings recorded in the area from Victoria to Jordan River, during the months of April through June each year, from two dedicated sources.

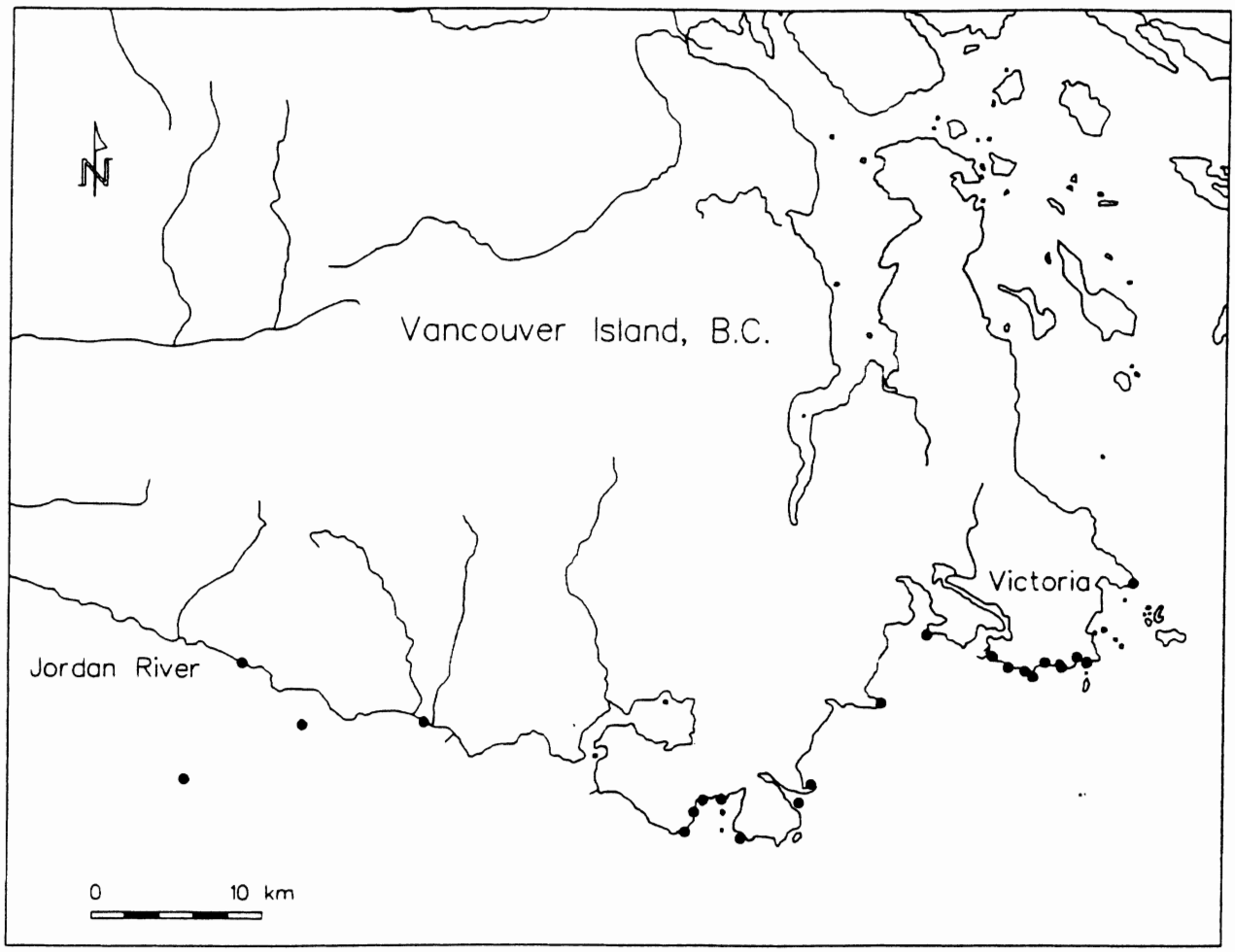
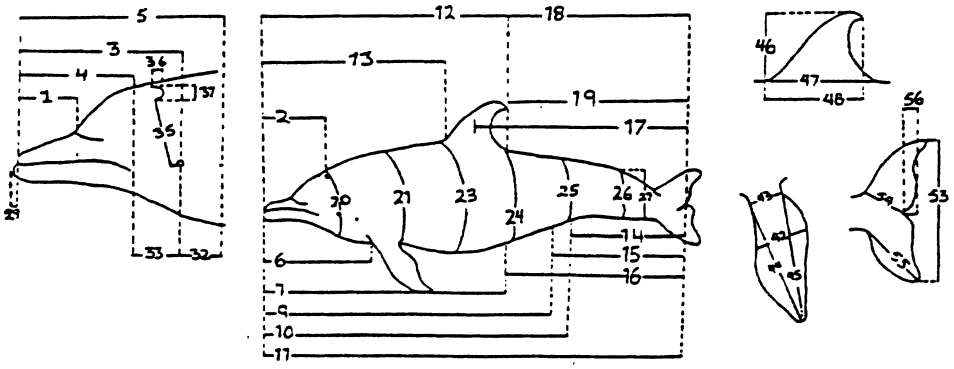


Figure 3. Map showing locations of porpoise "strandings" around southern Vancouver Island between 10 April and 7 June 1993.

CETACEAN DATA SHEET

Appendix 1

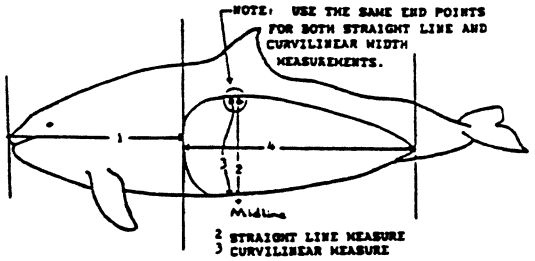
SPECIES _____ SEX_____ SWDP RECORD # _____
DATE/TIME OF INCIDENT_____ TOTAL LENGTH_____ (cm or_____)
TYPE OF INCIDENT_____
LOCALITY_____
_____ LAT. & LONG._____
WHO REPORTED_____ PHONE_____ FAX_____
ADDRESS_____ DATA WITH THEM_____
DATE SHEET COMPLETED_____ by_____
PEOPLE HELPING W/DATA COLLECTION_____
SPECIMEN KEPT yes___ no___ SPECIMEN LOCATION/#_____
CONDITION OF ANIMAL_____
DESCRIPTION OF COLOURS/SCARS_____
TOOTH COUNT upper l._____ upper r._____ lower l._____ lower r._____
BALEEN length longest plate_____ width of longest plate _____ (cm or____) colour_____
 # OF THROAT/VENTRAL GROOVES (count latter between flippers)_____
PHOTOS overall view____ head___ blowhole___ eye___ flipper___ dorsal fin____ genital slit___ flukes___
MEASUREMENTS (cm or_____) Take on left side of animal and to the nearest mm (indicate if otherwise). If time is limiting, those measurements with underlined numbers are the most important and should be taken first. Most measurements are taken in a straight line parallel to the body axis. Those marked with a * are taken point to point and those marked with a # are curvilinear (following the contours of the body).



FROM SNOUT (tip of upper jaw) 1.to apex of melon_____ 2.to center of blowhole(s)_____
3.to center of eye_____ 4.to angle of mouth_____ 5.to ear_____
6.to anterior insertion of flipper_____ 7.to center of umbilicus_____
8.to end of ventral grooves_____ 9.to center of genital slit_____
10.to center of anus_____ 11.to notch (total length)_____ 12.to tip of dorsal fin_____
13.to anterior insertion of dorsal fin_____
FROM FLUKE NOTCH 14.to center of anus_____ 15.to center of genital slit_____
16.to center of umbilicus_____ 17.to center of dorsal fin_____
18.to posterior insertion of dorsal fin_____ 19.to dorsal fin tip_____
GIRTHS 20.at eye#_____ 21.at posterior insertion of flipper#_____ 22.maximum#_____
23.at anterior insertion of dorsal fin#_____ 24.at posterior insertion of dorsal fin#_____
25.at anus#_____ 26.midway from anus to fluke notch#_____
27.height of peduncle at (26)*_____ 28.thickness of peduncle at (26)*_____
HEAD 29.projection lower/upper jaw_____ 30.rostral width at apex of melon*_____
31.length eye opening*_____ 32.center of eye to ear*_____
33.center of eye to angle of mouth*_____ 34.center of right eye to blowhole edge#_____
35.center of left eye to blowhole edge#_____ 36.blowhole length_____
37.blowhole width*_____ 38.diameter of right ear opening_____
39.diameter of left ear opening_____ 40.diameter of head between center of eyes*_____
41.length of throat grooves_____
MISCELLANEOUS 42.maximum flipper width*_____ 43.flipper width at insertion*_____
44.flipper length, anterior*_____ 45.flipper length, posterior*_____
46.dorsal fin height*_____ 47.length of dorsal fin base_____
48.length of dorsal fin base from anterior insertion to point bisected by tip_____
49.length of mammary slits l._____r._____ 50.number of mammary slits*_____
51.genital slit length_____ 52.anal slit length_____ 53.fluke width*_____
54.fluke insertion to notch*_____ 55.fluke insertion to tip*_____
56.depth of fluke notch_____

 SPECIES_____ DATE_____ SWDP RECORD #_____

DALL'S PORPOISE FLANK PATCH PIGMENTATION MEASUREMENTS 1.snout to patch_____
2.patch height - straight_____ 3.patch height - curvilinear_____ 4.patch length_____



BLUBBER THICKNESS (cm or_____) Measurements do not include skin.
@ pectoral flipper - dorsal_____ lateral_____ ventral_____
@ front of dorsal fin - dorsal_____ lateral_____ ventral_____
@ anus - dorsal_____ lateral_____ ventral_____
WEIGHTS (grams or_____) whole animal_____ blubber_____ heart_____
lung l._____r._____ liver_____ spleen_____ pancreas_____
kidney l._____r._____ gonads l._____r._____
stomach full_____ stomach empty_____ intestines_____ bone_____
MAMMARY GLAND milk?_____ colour_____ dimensions (LxWxD)_____
PARASITE and PATHOLOGY CHECKLIST Indicate type if present, "NO" if absent, "NE" if not examined.
barnacles_____ cyamids_____ eye_____ mouth_____ genital slit_____
anal slit_____ appendages_____ blubber_____ mammary glands_____
muscle_____ esophagus_____ lungs_____ liver_____ kidney_____
heart_____ brain_____ air sinuses_____
STOMACH CONTENTS intact fish_____ fish bones_____ squid beaks_____
otoliths_____ parasites_____ other_____
GONADS (LxWxD) l._____ r._____
flat diameter uterine horn l._____ r._____
FETUS total length_____ weight_____ sex_____
PHOTOS OF AUTOPSY _____ **X-RAYS** _____
MATERIALS COLLECTED skull_____ skeleton_____
frozen in aluminum foil Wrap tissues individually with dull side of foil in. If possible, collect five 7x7 cm samples of each tissue and indicate the number collected. Tissues of the same type can be stored together but please double bag and double label everything with permanent ink on a piece of paper in case of leakage.
skin and blubber_____ liver_____ kidney_____ brain_____ other_____
frozen in I.O.S. jar If possible collect 2 full jars of each tissue and indicate the number and amount collected.
blubber_____ liver_____
frozen, refrigerated or in formalin ectoparasites_____ endoparasites_____ fetus_____
baleen (not in formalin)_____ other_____
frozen or in water teeth (3 from middle of lower left jaw or indicate number & location)_____
stomach contents_____ other_____
in DMSO (2 vials or indicate number) skin (preferably) or muscle (or other, specify) _____
in formalin Tissues for histopathology should be a maximum of 1 cm thick in order for formalin to penetrate.
liver_____ lung_____ kidney_____ gonads_____ other_____
COMMENTS Make note of anything not noted elsewhere on sheet and fully describe anything unusual.

_____
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CAUSE OF DEATH _____

Return sheet to: Marine Mammal Research Group, Box 6244, Victoria, B.C. CANADA V8P 5L5.
Phone (604) 380-1925, Fax 380-1206, Report strandings in B.C. toll-free to: 1-800-665-5939. Rev. Oct'92