

FINAL REPORT

**GRAY WHALE PHOTOGRAPHIC IDENTIFICATION IN 2000:
COLLABORATIVE RESEARCH BY CASCADIA RESEARCH
AND THE NATIONAL MARINE MAMMAL LABORATORY**

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INTRODUCTION

Photographic identification surveys for gray whales has been conducted annually in the Pacific Northwest by Cascadia Research and the National Marine Mammal Laboratory (Calambokidis *et al.* 1999, 2000a, Calambokidis and Schlender 1998, Gosho *et al.* 1999, 2001). These surveys are part of an ongoing research effort to study the abundance, movements, residence times and return rates of gray whales that feed in these waters in spring, summer, and fall. Summer feeding aggregations of gray whales have been observed in a number of areas along the coasts of California (Patten and Samaras 1977, Mallonee 1991, Avery and Hawkinson 1992), Oregon (Sumich 1984), Washington (Flaherty 1983, Calambokidis *et al.* 1992, 1994, Wietkamp *et al.* 1992) and British Columbia (Darling 1984, Murison *et al.* 1984, Plews *et al.* 1985). Gray whales in these regions feed on a variety of prey including herring eggs/larvae, crab larvae, amphipods, mysids, and ghost shrimp, with locations of feeding often shifting from year and by season in response to shifting prey types and distribution (Darling *et al.* 1998, Nerini 1984).

Starting in 1998, there has been a collaborative effort among a number of groups conducting photographic identification of gray whales in the Pacific Northwest (Calambokidis *et al.* 2000b, submitted). In addition to the research reported here by Cascadia Research, the National Marine Mammal Laboratory, other organizations participating in this broader comparison include: West Coast Whale Research Foundation, University of Victoria, University of British Columbia, Vancouver Aquarium, Department of Fisheries and Oceans, Coastal Ecosystem Research Foundation, and the operator of the Juan de Fuca Express (a coastal ferry service). While this report summarizes results for NMML and Cascadia for 2000, a larger comparison involving other research groups is planned.

METHODS

Surveys were conducted from northern California to British Columbia by Cascadia Research and the National Marine Mammal Laboratory (Tables 1-5). A number of other groups have been conducting photographic identification research on gray whales and are collaborating together. This report represents only the effort by Cascadia and NMML with future reports addressing the larger collaborative effort.

Effort by Cascadia Research

A total of 53 surveys were conducted by Cascadia Research or collaborators between 15 March and 15 November 2000 in the waters off northern California, Oregon, and Washington (Tables 1-2). This included both dedicated and opportunistic surveys (including off whale watching boats), and observation made from land. A summary of the survey effort conducted is summarized by region in Table 2 and below:

- Small boat surveys, observation from opportunistic platforms, and land observations by Cascadia personnel made in Puget Sound on 19 days from 15 March to 24 July 2000. These included land observations in and around Budd Inlet of a single whale, small boat surveys and opportunistic observations from Mosquito Fleet's boat of the Saratoga Passage area and vicinity out of Everett, and surveys in and around Bellingham Bay using Cascadia boat and the *Red Head* and *Snow Goose*.
- Opportunistic photographs were also provided to us by other naturalists and researchers who opportunistically photographed gray whales in Puget Sound including Mark Sears (two sightings in Central Puget Sound) and Dave Ellifrit of the Center for Whale Research (two sightings off S Vancouver Island).
- Surveys were conducted in Grays Harbor using Cascadia's RHIB and opportunistic whale watch platforms on 13 days between 30 March to 12 July 2000.
- Surveys were conducted along the Washington Coast, western Strait of Juan de Fuca, and southern Vancouver Island (one survey) using Cascadia's RHIB on 5 days between 20 May and 4 October 2000.
- Surveys off Oregon covering the areas around Depoe Bay and Newport were conducted using Cascadia's RHIB and whale-watch boats (*Seastar* and *Discovery*) on 11 days from 4 August to 15 November 2000.
- A single small boat survey using Cascadia's RHIB was conducted off northern California in association with humpback whale effort on 28 August 2000.

Effort by NMML

Biologists from the National Marine Mammal Laboratory (NMML) provided identification photographs from surveys they conducted between 16 April and 23 November 2000 (Tables 3-5). The photographs from NMML represent surveys from the Washington outer coast, the western Juan de Fuca Strait, northern Puget Sound and along the West Coast of Vancouver Island, British Columbia.

Photographic identification procedures

Procedures during Cascadia vessel surveys were similar to those used previously (Calambokidis *et al.* 1994). Effort data were recorded every 30 min and when there was either a course change or a change in the environmental conditions. We recorded time, position (latitude and longitude from GPS) and environmental conditions (sea state, visibility, precipitation, cloud cover, and swell height). When a gray whale was found, the time, position, number of animals, and behaviors were recorded. Whales were approached to 30-50 m and followed through several dive sequences until suitable identification photographs could be obtained. At the end of a sighting the time, location, and roll and frame numbers of photographs taken during each observation were also noted.

For photographic identification of gray whales, both left and right sides of the dorsal region around the dorsal hump were photographed when possible. *Ilford* HP-5 negative film was used with *Nikon* 35mm cameras with 300mm f4.5 lenses. We also photographed the ventral surface of the flukes for identification when possible. The latter method was not as reliable as the sides of the whale because the gray whales did not always raise their flukes out of the water. Markings used to distinguish whales included pigmentation of the skin, mottling, and scarring, which varied among individuals. These markings have provided a reliable means of identifying gray whales (Darling 1984).

We also utilized the relative spacing between the knuckles along the ridge of the back behind the dorsal hump. The size and spacing of these bumps varies among whales and does not change over the years we have tracked whales. Measurements were made based on coordinates marked on a scanned image of the whale and compared to a database of values for all the whales in our catalog. A computer program (developed by Joe Evenson) provided a prioritized list of potential matches and then the match was verified or rejected based on the pigmentation and other markings described above.

Comparisons of whale photographs were made in a series of steps. First, all negatives of gray whales were examined and the best shot of the right and left sides of each whale (for each sighting) were selected and printed (7 x 2.5 inch). To determine the number of whales seen during the season, the prints were then compared to one another to identify whales seen multiple days. Finally a comparison was made to our catalog of whales seen in past years. Whale photographs that were deemed of suitable quality but did not match our existing catalog (compared by two independent matchers) were assigned a new identification number and added to the catalog.

RESULTS AND DISCUSSION

Survey effort by Cascadia resulted in 149 sightings of 192 gray whales of which 135 groups of 174 animals were approached to photograph (Tables 1-2). Photographs were taken of an estimated 143 whales and 117 of these were of suitable quality for photographic identification. The failure to obtain suitable quality photographs primarily occurred in effort from whale-watching boats or from land, where whales were not always close enough for reliable identification. The 117 suitable identifications obtained were of 60 unique whales. During surveys by NMML 68 groups of 146 gray whales were approached and 136 identifications made of 79 unique whales (Tables 3-5).

For both Cascadia and NMML, 253 identifications were made of 114 unique whales. These were widely distributed by region and season (Table 6). Identifications inside Puget Sound and in Grays Harbor were primarily made early in the season while those off Vancouver Island were almost all after 1 August.

Of the 114 whales identified, 67 had been identified previously (Tables 7-8). With the improved coverage in 1998 and 1999, a high proportion of these 67 had been identified in those two recent years (Table 7). Whales seen in previous years in a specific region tended to be resighted in that area, although this was not true for all locations. Whales identified in northern Puget Sound and Grays Harbor in 2000 had almost exclusively been only seen in that region previously (Table 7). Resighting locations among years were more varied among the locations along the outer coasts of Oregon, Washington, and Vancouver Island (Table 7).

The proportion of whales known from previous varied by region, as has been the case in past years (Table 8). Low proportion of the whale identified in Puget Sound had been seen in a previous year. The opposite was true for Vancouver Island and Oregon where high proportions of the whales identified in 2000 had been seen in previous years. Results were somewhat more mixed from the Washington Coast, Grays Harbor, and the Strait of Juan de Fuca with closer to 50% of whales known from previous years. Part of this was influenced by some of the identifications made early in the season in these areas.

There were 12 early season (March through May) identifications of 8 different whales made on the northern Washington coast or western Strait of Juan de Fuca in 2000. These identifications are of interest because they fall within the Makah U&A during the potential period that a hunt of migratory animals would be occurring. Two whales accounted for six of the sightings and were both whales known from previous years. The other six sightings were of six different whales that were seen only once and had not been seen in a previous year.

Combined with the data from other collaborators including UVIC, HSU, Juan de Fuca Express, West Coast Whale Research Foundation, Vancouver Aquarium, and CERF, the data from 2000 should provide an excellent sample to look at within season and between season movements, resighting rates, and to determine abundance.

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TABLES AND FIGURES

Tables

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6. Gray whale identifications by region and month in 2000
7. Sighting and sighting histories of gray whales identified in 2000
8. Proportion of gray whales identified in 2000 that had been seen previously by region

Appendix Table

1. Copies of datasheets from NMML with IDs indicated

Table 1. Summary of field effort by Cascadia Research personnel and collaborators off California, Oregon and Washii in 2000 including number of groups and animals seen, and estimated number of successful identifications.

Date	Vessel	State	Region	Time			Dist nmi	Gray whale				Comments
				Start	End	Durat		Sit #	An #	Pho #	ID #	
15-Mar	HAR	WA	NPS	9:10	16:31	7.4	55.5	5	10	8	9	
25-Mar	Sears	WA	CPS	9:10	12:30	3.3		1	2	2	1	Mark Sears
30-Mar	LP	WA	GH	13:12	15:15	2.1	10.7	3	3	2	1	Whale-watch
1-Apr	MM	WA	GH	10:59	13:05	2.1	11.5	3	3	2	2	Whale-watch
4-Apr	Land	WA	SPS	14:50	15:14	0.4		1	1	1	1	Budd Inlet
7-Apr	Land	WA	SPS	13:29	16:17	2.8		1	1	1	1	Budd Inlet
8-Apr	LP	WA	GH	11:15	13:10	1.9	7.3	5	8	3	0	Whale-watch
8-Apr	ME	WA	GH	14:05	16:15	2.2	5.6	1	1	1	0	Whale-watch
8-Apr	SN	WA	NPS	10:07	12:54	2.8	18.6	3	4	2	2	Whale-watch
11-Apr	N2	WA	NPS	7:00	14:40	7.7	62.2	8	8	4	4	
13-Apr	PUG	WA	NPS	8:57	16:18	7.4	31.6	2	2	0	0	During whale disposal
15-Apr	LP	WA	GH	14:02	16:06	2.1	6.3	5	5	5	0	Whale-watch
15-Apr	SN	WA	NPS	10:05	12:36	2.5	23.0	4	6	4	3	Whale-watch
17-Apr	DS	WA	NPS	14:15	16:00	1.8	1.5	1	1	1	0	
17-Apr	Land	WA	SPS	12:54	13:48	0.9		1	1	1	0	Budd Inlet
19-Apr	ME	WA	GH	12:05	14:00	1.9	4.8	1	4	2	2	Whale-watch
19-Apr	MM	WA	GH	12:02	13:50	1.8	5.7	3	5	3	3	Whale-watch
21-Apr	AC	WA	GH	14:10	16:19	2.2	4.9	5	9	4	3	Whale-watch
28-Apr	AC	WA	GH	11:00	13:15	2.3	6.7	2	2	2	1	Whale-watch
30-Apr	SN	WA	NPS	8:31	17:00	8.5	101.3	3	3	2	1	Whale-watch
1-May	RH	WA	NPS	6:20	17:48	11.5	19.9	4	9	7	7	
4-May	Land	WA	SPS	16:29	17:00	0.5		1	1	1	1	Carr Inlet
6-May	LP	WA	GH	14:07	16:05	2.0	7.0	4	5	4	0	Whale-watch
13-May	SN	WA	NPS	8:35	17:11	8.6	108.9	4	6	0	0	Whale-watch
14-May	N2	WA	NPS	13:05	17:39	4.6	18.3	2	3	2	2	
17-May	N2	WA	NPS	10:35	18:36	8.0	89.0	13	16	12	13	
19-May	MM	WA	GH	11:05	13:25	2.3	7.2	5	6	5	4	Whale-watch
19-May	SG	WA	NPS	11:37	15:15	3.6	4.1	1	1	0	0	Whale-watch
20-May	N2	WA	NWA	12:10	16:45	4.6	28.2	7	7	6	3	
22-May	N2	WA	GH	15:41	17:35	1.9	11.3	5	5	5	5	
23-May	Land	WA	SPS	13:40	15:20	1.7		1	1	1	1	Budd Inlet
26-May	Land	WA	SPS	15:06	15:28	0.4		1	1	1	1	Budd Inlet
1-Jun	N2	WA	WSJF &	12:00	21:35	9.6	95.5	1	1	1	1	
2-Jun	N2	WA	WSJF &	6:40	19:05	12.4	129.7	2	2	2	2	
7-Jun	CWR	BC	SVI					1	1	1	1	S Vanc.- Sydney
4-Jul	Land	WA	SPS	13:25	14:19	0.9		1	1	1	1	Budd Inlet
12-Jul	N2	WA	GH	12:45	15:10	2.4	19.4	2	2	2	2	Whale-watch
24-Jul	Sears	WA	CPS	14:55	17:12	2.3		1	1	1	1	Mark Sears
4-Aug	SS	OR	OR	13:30	14:50	1.3	5.3	1	1	0	0	Whale-watch
9-Aug	DIS	OR	OR	11:37	13:30	1.9	8.7					Whale-watch
9-Aug	SS	OR	OR	9:35	10:45	1.2	2.1	1	1	1	1	Whale-watch
15-Aug	DIS	OR	OR	9:10	16:02	6.9	18.4	1	2	1	1	Whale-watch
15-Aug	SS	OR	OR	12:35	13:03	0.5	3.1	1	1	1	1	
17-Aug	N2	OR	OR	7:38	20:23	12.8	122.3	3	4	4	4	Whale-watch
23-Aug	CWR	BC	SVI					1	1	1	1	Gordon Hd. Cordova Bay
24-Aug	DIS	OR	OR	11:41	13:30	1.8	10.1	1	1	1	1	Whale-watch
24-Aug	KF	OR	OR	14:45	15:30	0.8	3.6	1	1	1	1	
28-Aug	N1	CA	PSG	12:20	17:33	5.2	52.0					
12-Sep	DIS	OR	OR	11:34	13:33	2.0	12.8	1	1	1	0	
12-Sep	SS	OR	OR	15:00	16:16	1.3	7.1	4	4	4	4	Whale-watch
3-Oct	N1	WA	WSJF &	9:50	21:30	11.7	114.3	4	5	4	3	Whale-watch
4-Oct	N1	WA	WSJF &	7:50	18:30	10.7	89.6	16	22	22	21	
15-Nov	N1	OR	OR	8:15	18:00	9.8	98.0					
53 days						209	1,443	149	192	143	117	

Table 2. Summary of Cascadia effort and gray whales approached and identified by region in 2000.

Region	Surveys	Survey dates		Sight	Anim	IDs	Unique
		Start	End				
S Vancouver Is.	3	7-Jun	4-Oct	15	19	19	16
Strait of Juan de Fuca	4	1-Jun	4-Oct	5	6	5	3
N Washington coast	5	20-May	4-Oct	12	14	8	5
Grays Harbor	13	30-Mar	12-Jul	41	53	23	9
N Puget Sound	12	15-Mar	19-May	39	56	41	19
C Puget Sound	2	25-Mar	24-Jul	2	3	2	2
S Puget Sound	7	4-Apr	4-Jul	7	7	6	1
Oregon	11	4-Aug	15-Nov	14	16	13	8
California	1	28-Aug	28-Aug	0	0	0	0
Total	58	15-Mar	15-Nov	135	174	117	63
Excluding multiple regions	53						60

Table 3. Sightings of gray whales by NMML in 2000.

Date	TIME	LAT	LONG	Num	PHO1	ROLL	FRAM	NOID	ID1	ID2	ID3	ID4	ID5	ID6	ID7	ID8	REGIO	Location	comment	Reference location
4-May	15:40	48 22.3	124 34.0	1	MG	1	13-25	1	324								WSJF			Third Beach to Bullman Beach
4-May	16:41	48 20.216	124 29.38	2	MG	2	01-12	2	504	242							WSJF	N of		Rasmussen Creek and Bullman Bch
15-May	14:07	48 22.5	124 34	1	MG	3	01-37	1	242								WSJF	NW of		Waadah Island, off Seal Rock
22-May	11:34	48 20.164	124 29.252	1	MG	4	6-26	1	242								WSJF			Rasmussen Creek
23-May	12:01	48 13.061	124 43.105	1	MG	4	27-31	1	530								NWA			Duck Point
30-May	9:44	48 21.281	124 32.549	1	MG	5	01-16	1	515								WSJF	E of		Snow Creek
2-Jun	12:31	47 59	122 16	4	MG	5	17-37	4	396	505	501	539					NPS	Between		Gedney Island & Everret Jetty
2-Jun	13:12	48 00	122 16	4	MG	6	1a-28a	4	539	509	546	21					NPS	Between and N		Gedney Island & Everret Jetty
2-Jun	14:57	48 02	122 22	3	MG	7	1-37	3	53	543	22						NPS	S tip of, and S of		Camano Is, Langley, Whidbey Is
2-Jun	17:40	48 02.5	122 25	1	MG	8	1-37	1	22								NPS	S of		Langley, Whidbey Island
7-Jun	9:52	48 22.544	124 35.571	1	MG	9	1a-14a	1	515								WSJF	SW of		Waadah Island
7-Jun	10:17	48 22.285	124 34.012	1	MG	9/10	20a-37a	1	242								WSJF	reef of		Third Beach, then Snow Ck
2-Jul	10:24	48 20.982	124 31.112	1	MG	10	9-18	1	242								WSJF	S of		Bullman Beach
18-Jul	9:30	48 22.278	124 34.310	1	MG	10	19-37	1	516								WSJF			Third Beach
18-Jul	11:40	48 21.974	124 43.348	1	MG	11	1-14	1	204								NWA			Skagway
17-Aug	14:19	48 43.998	125 07.382	1	MG	11	15-25	1	94								SVI	NW of		Pachena Point
17-Aug	15:18	48 45.046	125 09.711	1	MG	11	26-37	1	84								SVI			Pachena Bay, outside rocks
17-Aug	15:31	48 45.046	125 09.711	2	MG	12	1-14	2	84	192							SVI			Pachena Bay, outside rocks
17-Aug	16:10	48 46.901	125 13.371	3	MG	12	15-28	3	226	187	300						SVI			Cape Beale
18-Aug	14:39	49 22.290	125 29.253	1	MG	12	29	1	93								WVI			Matlahaw
18-Aug	15:13	49 22.241	125 32.275	1	MG	12	30-37	1	42								WVI			Estevan Point
18-Aug	15:38	49 22.241	125 32.275	7	MG	13	1-37	7	277	175	30	101	229	227	186		WVI			Estevan Point and then Perez Rks
18-Aug	17:06	49 25.8	126 35.7	3	MG	14	1a-19a	3	41	123	145						WVI			Perez Rocks
19-Aug	15:42	49 36.337	126 51.530	3	MG	14	20a-37a	3	306	149	86						WVI	SW of		Inner Bajo Reef
19-Aug	16:22	49 36.337	126 51.530	7	MG	15/16	1-37,1-37	7	143	136	15	86	186	514	518		WVI	W end of		Inner Bajo Reef
20-Aug	10:20	49 28.701	126 35.124	2	MG	17	1-28	2	37	140							WVI	N of		Split Cape
20-Aug	10:33	49 28.460	126 35.022	1	MG	17	29-30	1	81								WVI	End of		Split Cape
20-Aug	10:58	49 25.797	126 35.661	8	MG	18/19	1-37,1-37	8	30	227	101	308	15	178	83	281	WVI			Perez Rocks
20-Aug	11:57	49 25.797	126 35.661	7	MG	20	1-37	7	101	281	227	511	81	308	175		WVI			Perez Rocks
20-Aug	12:18	49 25.797	126 35.661	5	MG	21/22	1-37,1-37	5	175	123	528	41	136				WVI			Perez Rocks
20-Aug	13:09	49 22.988	126 33.856	4	MG	22/23	9-37,1-37	4	301	93	42	244					WVI			Estevan Lighthouse
21-Aug	11:59	48 52.052	125 22.589	2	MG	24	1-35	2	234	130							WVI	W of		Wouwer Island
3-Oct	9:53	48 21.5	124 32	2	MG	25	1-31	2	516	508							WSJF			Sail Rock
3-Oct	14:28	48 09.554	124 45.49	1	MG	25/26	32-37,1	1	372								NWA			North Ozette Island
3-Oct	15:48	48 13.060	124 42.815	1	MG	26	9-25	1	532								NWA	S of		Father & Son
3-Oct	17:21	48 21.5	124 32	2	MG	26	26-36	2	508	516							WSJF			Sail Rock - Sail River
31-Oct	11:52	48 10.186	124 45.294	1	MG	27	1-13	1	319								NWA	S of		East Bodelteh
31-Oct	12:32	48 09.163	124 45.084	3	MG	27/28	14-37,1	3	83	510	372						NWA	SW of		Ozette Island
31-Oct	14:53	48 23.578	124 41.979	1	MG	29	1-8	1	396								NWA			Slant Rock
21-Mar	48 21.38	124 32.01		1	PJG	1	1a-11a	1	324								WSJF			Sail Rock
19-Apr	48 21.7	124 33		1	PJG	1	19a-27a	1	324								WSJF			Seal Rock
6-Sep	48 09.2	124 45.1		1	PJG	2	18-23	1	542								NWA			South Ozette Island
18-Sep	48 17.5	124 42		1	PJG	3	1a-10a	1	205								NWA			Portage Head
18-Sep	48 23	124 35		1	PJG	3	12a-17a	1	508								WSJF			Green Buoy near Neah Bay
20-Sep	48 50	125 20		1	PJG	3	18a-26a	1	84								WVI			Sykes Reef, Barkley Sound
22-Sep	49 37	126 52		1	PJG	3	27a-31a	1	101								WVI	N		Bajo Reef
22-Sep	49 36.3	126 51.5		2	PJG	3	32a-36a	2	451	308							WVI	S		Bajo Reef
22-Sep	49 36.3	126 51.5		2	PJG	4	1-3	2	451	308							WVI	S		Bajo Reef
22-Sep	49 28.5	126 35.1		1	PJG	4	9-11	1	502								WVI			Split Cape
22-Sep	49 28.5	126 35.1		2	PJG	4	12-23	1	502								WVI			Split Cape
22-Sep	49 26	126 35.7		3	PJG	4	24-36	0									WVI	N		Perez Rocks
22-Sep	49 26	126 35.7		1	PJG	5	1-3	0									WVI	N		Perez Rocks
22-Sep	49 26	126 35.7		6	PJG	5	4-21	5	175	525	92	178	536				WVI	N		Perez Rocks
22-Sep	49 26	126 35.7		2	PJG	5	22-31	2	320	506							WVI	N		Perez Rocks
23-Sep	48 53	125 30		1	PJG	5	32-33	1	386								WVI			Starlight Rocks, Barkley Sound
23-Sep	48 49.9	125 13.4		5	PJG	6	1-30	5	244	89	105	130	226				SVI			Cape Beale
23-Sep	48 45	125 09.7		4	PJG	6	31-36	2	300	254							SVI			Pachena Bay/Seabird Rocks
23-Sep	48 45	125 09.7		5	PJG	7	1-3	2	186	84							SVI			Pachena Bay/Seabird Rocks
23-Sep	48 42	124 58		1	PJG	7	4-9	1	140								SVI	5 mi E of		Pachena Point
23-Sep	48 43	125 04		1	PJG	7	10-14	1	93								SVI			Darling River
23-Sep	48 42.5	125 02		2	PJG	7	15-22	2	87	204							SVI	1 mi E of		Darling River
23-Sep	48 42	124 57.5		2	PJG	7	23-31	2	87	187							SVI			Klanawa River
23-Sep	48 41.4	124 55		1	PJG	7	32-36	1	107								SVI	.5 mi W of		Tsusiat Falls
23-Sep	48 40	124 50		1	PJG	8	0a-4a	1	529								SVI	1 mi E of		Nitnat Buoy
23-Sep	48°36.2	124°44.6		1	PJG	8	5a-20a	1	219								SVI			Carmanah
11-Oct	48 21.5	124 32		1	PJG	9	1-11	1	508								WSJF			Sail River
12-Oct	48 17.65	124 42.05		2	PJG	9	12-27	2	510	296							NWA	N side of		Anderson Point Reef
12-Oct	48 07.40	124 43		1	PJG	9	28-33	1	372								NWA	1 mi SE of		White Rock

Table 4. Summary of effort and identifications in 2000 by the National Marine Mammal Laboratory for photographs provided to Cascadia Research.

Date	Region	Sightings	Animals	Identifications
21-Mar-00	W Strait of Juan de Fuca	1	1	1
19-Apr-00	W Strait of Juan de Fuca	1	1	1
4-May-00	W Strait of Juan de Fuca	2	3	3
15-May-00	W Strait of Juan de Fuca	1	1	1
22-May-00	W Strait of Juan de Fuca	1	1	1
23-May-00	N Washington coast	1	1	1
30-May-00	W Strait of Juan de Fuca	1	1	1
2-Jun-00	N Puget Sound	4	12	12
7-Jun-00	W Strait of Juan de Fuca	2	2	2
2-Jul-00	W Strait of Juan de Fuca	1	1	1
18-Jul-00	N Washington coast	1	1	1
18-Jul-00	W Strait of Juan de Fuca	1	1	1
17-Aug-00	S. Vancouver Island	4	7	7
18-Aug-00	W Vancouver Island	4	12	12
19-Aug-00	W Vancouver Island	2	10	10
20-Aug-00	W Vancouver Island	6	27	27
21-Aug-00	W Vancouver Island	1	2	2
6-Sep-00	N Washington coast	1	1	1
18-Sep-00	N Washington coast	1	1	1
18-Sep-00	W Strait of Juan de Fuca	1	1	1
20-Sep-00	W Vancouver Island	1	1	1
22-Sep-00	W Vancouver Island	9	20	14
23-Sep-00	S. Vancouver Island	10	23	18
23-Sep-00	W Vancouver Island	1	1	1
3-Oct-00	N Washington coast	2	1	2
3-Oct-00	W Strait of Juan de Fuca	2	4	4
11-Oct-00	W Strait of Juan de Fuca	1	1	1
12-Oct-00	N Washington coast	2	3	3
31-Oct-00	N Washington coast	3	5	5
		68	146	136

Table 5. Summary of NMML effort and gray whales approached and identified by region in 2000.

Region	Surveys	Survey dates		Sight	Anim	IDs	Unique
		Start	End				
N Puget Sound	1	2-Jun	2-Jun	4	12	12	10
N Washington coast	7	23-May	31-Oct	11	13	14	11
S. Vancouver Island	2	17-Aug	23-Sep	14	30	25	19
W Strait of Juan de Fuca	12	21-Mar	11-Oct	15	18	18	6
W Vancouver Island	7	18-Aug	23-Sep	24	73	67	42
All areas	29	21-Mar	31-Oct	68	146	136	79

Table 6. Summary of identifications of gray whales by Cascadia and NMML by region and month in 2000. Resightings of individuals are counted.

Region	Month								Total
	3	4	5	6	7	8	9	10	
W Vancouver Is.						51	16		67
S Vancouver Is.				1		8	18	17	44
Strait of Juan de Fuca	1	1	6	5	2		1	7	23
N Washington coast			4		1		2	15	22
Grays Harbor	1	11	9		2				23
N Puget Sound	9	10	22	12					53
C Puget Sound	1				1				2
S Puget Sound		2	3		1				6
Oregon						9	4		13
Grand Total	12	24	44	18	7	68	41	39	253

Table 7. Summary of sightings and past-year histories of whales identified in 2000 by Cascadia or NMML.

ID	Times seen	Collector		No. Reg	Region								Dates seen		Year last seen	Regions in 1998	Region in 1999	
		CRC	NMML		WVI	SVI	SJF	NWA	GH	NPS	CPS	SPS	OR	First				Last
14	4	4		1				4						30-Mar-00	12-Jul-00	1998	GH	
15	2		2	1	2									19-Aug-00	20-Aug-00	1999	NVA,SVI	SVI
21	5	4	1	1										15-Mar-00	2-Jun-00	1999	NPS	NPS
22	3	1	2	1										17-May-00	2-Jun-00	1999	NPS	NPS
30	2		2	1	2									18-Aug-00	20-Aug-00	1999	SJF,SVI	WVI
37	1		1	1	1									20-Aug-00	20-Aug-00	1999	NWA,SVI,WVI	WVI
41	2		2	1	2									18-Aug-00	20-Aug-00	1999	SJF,SVI,WVI	SVI,NBC
42	3	1	2	2	2	1								18-Aug-00	4-Oct-00	1999	SJF,SVI,WVI	SJF,SVI,WVI
44	1	1		1										15-Mar-00	15-Mar-00	1999		NPS
49	1	1		1										15-Apr-00	15-Apr-00	1999	NPS	NPS
53	2	1	1	1										17-May-00	2-Jun-00	1999		NPS
56	5	5		1										15-Mar-00	15-Apr-00	1998	NPS	
74	3	3		1				3						1-Apr-00	28-Apr-00	1999		GH
81	4	2	2	2	2	2								20-Aug-00	4-Oct-00	1999	NWA,SVI,WVI	NWA,WVI
83	5	3	2	2	1			4						20-Aug-00	31-Oct-00	1999	NWA,WVI	OR,WVI
84	4		4	2	1	3								17-Aug-00	23-Sep-00	1999	OR,SVI	OR,WVI
86	2		2	1	2									19-Aug-00	19-Aug-00	1999	NBC	WVI,NBC
87	3	1	2	1		3								23-Sep-00	4-Oct-00	1999	SVI,WVI	OR,WVI
89	2	1	1	1		2								23-Sep-00	4-Oct-00	1998	OR,SVI,WVI	
92	1		1	1	1									22-Sep-00	22-Sep-00	1999	NWA,SVI	SVI,WVI
93	5	2	3	2	2	3								18-Aug-00	4-Oct-00	1999	NWA,SVI	CA,OR
94	2	1	1	1		2								17-Aug-00	4-Oct-00	1999	WVI	OR,WVI
101	4		4	1	4									18-Aug-00	22-Sep-00	1998	SJF,SVI	
105	1		1	1		1								23-Sep-00	23-Sep-00	1999	OR,SVI,WVI	NBC
107	2	1	1	1		2								23-Sep-00	4-Oct-00	1999	OR,NWA,SVI	NWA
123	2		2	1	2									18-Aug-00	20-Aug-00	1999	SVI	SVI
130	2		2	2	1	1								21-Aug-00	23-Sep-00	1998	SVI,NBC	
136	2		2	1	2									19-Aug-00	20-Aug-00	1999	WVI	WVI
140	2		2	2	1	1								20-Aug-00	23-Sep-00	1999	SJF,SVI,WVI	CA
143	1		1	1	1									19-Aug-00	19-Aug-00	1999	SVI,WVI,NBC	SVI,WVI
145	1		1	1	1									18-Aug-00	18-Aug-00	1998	OR,WVI	
149	1		1	1	1									19-Aug-00	19-Aug-00	1998	WVI	
164	3	3		1				3						19-May-00	22-May-00	1995 (GH)		
175	4		4	1	4									18-Aug-00	22-Sep-00	1999	NWA,SVI,WVI	WVI
178	2		2	1	2									20-Aug-00	22-Sep-00	1999	WVI	NWA,WVI
186	3		3	2	2	1								18-Aug-00	23-Sep-00	1999	OR,SVI,WVI	OR,WVI
187	4	2	2	1		4								17-Aug-00	4-Oct-00	1999	NWA,SVI	SVI,WVI
192	2	1	1	2		1								17-Aug-00	12-Sep-00	1999	NWA,SVI,WVI	SVI
196	2	2		1										17-Aug-00	12-Sep-00	1996 (GH+)		
204	2		2	2		1		1						18-Jul-00	23-Sep-00	1998	OR	
205	1		1	1				1						18-Sep-00	18-Sep-00	1999		NWA
219	2	1	1	1		2								23-Sep-00	4-Oct-00	1999	SVI	SVI
226	2		2	1		2								17-Aug-00	23-Sep-00	1999	SVII	CA
227	3		3	1	3									18-Aug-00	20-Aug-00	1998	SVI,WVI	
229	1		1	1	1									18-Aug-00	18-Aug-00	1999	SVI	WVI
234	3	1	2	2	1	1								21-Aug-00	4-Oct-00	1998	SVI	WVI
242	8	3	5	1				8						4-May-00	2-Jul-00	1999	NWA,SJF,SVI	SJF,SVI
244	3	1	2	2	1	2								20-Aug-00	4-Oct-00	1999	SVI,WVI	WVI
254	1		1	1		1								23-Sep-00	23-Sep-00	1999	SVI,WVI	WVI
277	1		1	1	1									18-Aug-00	18-Aug-00	1998	CA	
281	2		2	1	2									20-Aug-00	20-Aug-00	1999		OR,WVI
291	1	1		1										24-Aug-00	24-Aug-00	1999	CA	CA
296	3	2	1	1				3						4-Oct-00	12-Oct-00	1999	OR	WVI
300	3	1	2	1		3								17-Aug-00	4-Oct-00	1999	OR,WVI	NWA,WVI
301	1		1	1	1									20-Aug-00	20-Aug-00	1999	OR	CA,OR
302	1	1		1										12-Sep-00	12-Sep-00	1999	OR	OR,NWA
306	1		1	1	1									19-Aug-00	19-Aug-00	1998	WVI	
308	4		4	1	4									20-Aug-00	22-Sep-00	1998	WVI	
319	1		1	1				1						31-Oct-00	31-Oct-00	1998	WVI	
320	1		1	1	1									22-Sep-00	22-Sep-00	1999	WVI,NBC	WVI
324	3		3	1				3						21-Mar-00	4-May-00	1998	NBC	
364	2	2		1										9-Aug-00	15-Aug-00	1999		OR
368	6	6		1				6						19-Apr-00	22-May-00	1999		GH
372	3		3	1				3						3-Oct-00	31-Oct-00	1999		OR,SVI
396	2		2	2				1		1				2-Jun-00	31-Oct-00	1999		CPS,NPS
451	2		2	1	2									22-Sep-00	22-Sep-00	1999		WVI

500	2	2	1											19-Apr-00	19-Apr-00			
501	1		1	1					2					2-Jun-00	2-Jun-00			
502	2		2	1	2									22-Sep-00	22-Sep-00			
411 (AKA)	1	1	1	1										12-Sep-00	12-Sep-00	1999	CA	
504	1	1	1	1				1						4-May-00	4-May-00			
505	2	1	1	1										17-May-00	2-Jun-00			
506	1	1	1	1	1									22-Sep-00	22-Sep-00			
507	1	1	1	1				1						4-Oct-00	4-Oct-00			
508	6	2	4	2				5						17-Aug-00	11-Oct-00			
509	1	1	1	1										2-Jun-00	2-Jun-00			
510	2		2	1										12-Oct-00	31-Oct-00			
511	1	1	1	1	1									20-Aug-00	20-Aug-00			
512	1	1	1	1										20-May-00	20-May-00			
513	1	1	1	1										1-May-00	1-May-00			
514	1	1	1	1	1									19-Aug-00	19-Aug-00			
515	2		2	1										30-May-00	7-Jun-00			
516	4	1	3	1										18-Jul-00	3-Oct-00			
518	1	1	1	1	1									19-Aug-00	19-Aug-00			
519	1	1	1	1				1						7-Jun-00	7-Jun-00			
520	3	3	1	1										1-May-00	1-May-00			
521	1	1	1	1										22-May-00	22-May-00			
522	1	1	1	1										14-May-00	14-May-00			
523	1	1	1	1										22-May-00	22-May-00			
524	1	1	1	1										14-May-00	14-May-00			
525	1	1	1	1	1									22-Sep-00	22-Sep-00			
526	1	1	1	1										20-May-00	20-May-00			
527	1	1	1	1				1						23-Aug-00	23-Aug-00			
528	1	1	1	1	1									20-Aug-00	20-Aug-00			
529	2	1	1	1				2						23-Sep-00	4-Oct-00			
530	1	1	1	1										23-May-00	23-May-00			
531	2	2	1	1										15-Mar-00	11-Apr-00			
532	1	1	1	1										3-Oct-00	3-Oct-00			
534	1	1	1	1										15-Mar-00	15-Mar-00			
535	1	1	1	1										19-Apr-00	19-Apr-00			
536	1	1	1	1	1									22-Sep-00	22-Sep-00			
538	4	4	1	1										15-Aug-00	24-Aug-00			
539	2	2	1	1										2-Jun-00	2-Jun-00			
540	1	1	1	1										17-May-00	17-May-00			
541	2	2	1	1										21-Apr-00	21-Apr-00			
542	1	1	1	1										6-Sep-00	6-Sep-00			
543	5	4	1	2										25-Mar-00	2-Jun-00			
544	3	3	1	1										1-May-00	1-May-00			
545	1	1	1	1										20-May-00	20-May-00			
546	6	5	1	2										17-May-00	24-Jul-00			
548	7	7	2	2										15-Mar-00	4-Jul-00			
549	6	6	1	1										15-Mar-00	17-May-00			
All	253	117	136		66	44	23	22	23	53	2	6	13	15-Mar-00	31-Oct-00			
Unique	112	59	78		41	25	6	14	9	23	2	1	8			67	54	51
Seen prev	66	30	55		33	21	2	7	4	7	0	0	5					
New	46	29	23		8	4	4	7	5	16	2	1	3					

Table 8. Proportion of gray whales identified in 2000 that had been seen previously by region.

Region	Total Ident.	Unique IDs	Seen previously		First year seen	
			#	%	#	%
W Vancouver Is.	67	42	34	81%	8	19%
S Vancouver Is.	44	25	21	84%	4	16%
Strait of Juan de Fuca	23	6	2	33%	4	67%
N Washington coast	22	14	7	50%	7	50%
Grays Harbor	23	9	4	44%	5	56%
N Puget Sound	53	23	7	30%	16	70%
C Puget Sound	2	2	0	0%	2	100%
S Puget Sound	6	1	0	0%	1	100%
Oregon	13	8	6	75%	2	25%
All	253	114	67	59%	47	41%