

FINAL REPORT

GRAY WHALE PHOTOGRAPHIC IDENTIFICATION IN 2001: COLLABORATIVE RESEARCH IN THE PACIFIC NORTHWEST

John Calambokidis

*Cascadia Research
218½ W Fourth Ave.
Olympia, WA 98501*

Merrill Gosho and Pat Gearin

*National Marine Mammal Laboratory
7600 Sand Point Way NE
Seattle, WA 98115*

James D. Darling

*West Coast Whale Research Foundation
2155 W 13th Ave
Vancouver, BC V6K 2S2*

William Megill and Mark Heath

*Coastal Ecosystems Research Foundation
Allison Harbour, PO Box 124
Port Hardy, BC V0N 2P0*

Dawn Goley

*Humboldt State University
1 Harpst Street
Arcata, California 95521*

Brian Gisborne

*Juan de Fuca Express
427-118 Menzies Street
Victoria, BC V8V 2G5*

Prepared for

*National Marine Mammal Laboratory
7600 Sand Point Way NE
Seattle, WA 98115*

September 2002

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INTRODUCTION

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, In press). This reports summarizes the field effort conducted by Cascadia Research in 2001 for gray whales and the results of comparison of the photographic identifications from this effort as well as that from field work conducted in 2001 by the National Marine Mammal Laboratory (NMML), West Coast Whale Research Foundation, Humboldt State University, Coastal Ecosystems Research Foundation, and the operator of the Juan de Fuca Express (a coastal ferry service). The field effort reported and these comparisons were conducted under contract to NMML.

METHODS

Surveys were conducted from California to British Columbia by Cascadia Research and collaborating researchers. Survey effort is described in detail below for Cascadia Research. Only brief summaries of the effort by collaborating researchers is provided here with more complete information available in the reports by the individual research groups.

Effort by Cascadia Research

A total of 32 surveys were conducted by Cascadia Research in 2001 between 25 March and 19 October in the waters off California, Oregon, and Washington (Table 1). This included both dedicated and opportunistic surveys (including off whale watching boats), and in one case observation and identifications made from land. These surveys yielded 78 identifications of gray whales. A summary of the survey effort conducted is summarized below:

- Six small boat surveys or observation from opportunistic platforms by Cascadia personnel were made in northern Puget Sound on 6 days from 25 March to 25 April 2001. These were all conducted out of Everett and covered Saratoga Passage and the waters around Camano and Whidbey Islands. The opportunistic observations were from a whale-watch boat *Saint Nicholas* operated by Mosquito Fleet.
- Five surveys were conducted in and around Grays Harbor from 19 April to 6 July 2001. Four of these were using Cascadia's RHIB and involved surveying Grays Harbor and the Washington outer coast waters north to Willoughby Island. One opportunistic survey was conducted in Grays Harbor aboard the *El Matador*.
- Four surveys were conducted out of La Push covering waters along the northern Washington Coast from 13 September to 5 October 2001 using Cascadia's RHIB. These included offshore effort to search for humpback whales.
- 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 14 occasions from 8 June to 19 October 2001.
- Three surveys were conducted for gray whales in three regions off California from 12 July to 4 August. Areas covered by single surveys included Point St. George Reef area, Bodega to Tomales Bay, and San Miguel Island. The latter two areas were not areas gray whales are typically found but our surveys were conducted in response to sighting reports from these areas.

Effort by NMML and collaborators

NMML and collaborating researchers conducted surveys to identify gray whales in a number of areas. Details of these surveys is provided in their reports but are summarized briefly below and in Tables 2 and 3:

- **National Marine Mammal Laboratory:** NMML obtained suitable identification photographs of gray whales during 75 sightings and representing 128 identifications in northern Puget Sound and off the northern Washington coast, Strait of Juan de Fuca, and along the south and western portions of Vancouver Island (Table 2).

- **Brian Gisborne, Juan de Fuca Express:** Brian obtained identification photographs of gray whales on 583 occasions as part of his water taxi service primarily between Port Renfrew and Bamfield. Surveys were primarily conducted from early May to early October 2001.
- **Humboldt State University:** Humboldt conducted surveys off northern California. Identification photographs were obtained on 76 occasions on 13 days from 21 June to 28 October 2001.
- **Jim Darling, West Coast Whale Research Foundation:** Jim conducted three surveys along the west coast of Vancouver Island from Ucluelet to Nootka Island on 31 July, 6-11 September, and 3-4 October 2001. These yielded 35 identifications for gray whales.
- **Coastal Ecosystems Research Foundation:** CERF conducted five surveys on 21 days from 7 July to 23 September 2001 primarily in the vicinity of Cape Caution but on two occasions extending north to Aristazabal Island. Identification photographs were obtained of at least 38 unique individuals of suitable quality. Additional photographic identifications were made on other surveys but not included in the current dataset.

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

Gray whale effort by Cascadia and the other collaborating organizations yielded a minimum of 938 identifications of 199 unique individual gray whales in 2001 (Table 3 and 4). This is more that has been identified in any past year. This number does not include multiple identifications of individuals made by CERF north of Vancouver Island.

The majority of the identifications (630) were made along the West Coast trail of southern Vancouver Island (Table 3). This was in part due to the daily survey effort conducted by the Juan de Fuca Express with additional surveys by NMML, but also the large concentration of gray whales that used this area. The largest number of identifications were made in June and July (Table 3). The number of gray whales sighted per day during the regular surveys conducted by the Juan de Fuca Express showed a clear seasonal pattern with numbers growing early in the season and peaking from mid-June through July (Figure 1). The sightings peaked on 17 July when 95 gray whales were sighted on the round-trip from Port Renfrew to Bamfield.

Sightings in the Grays Harbor vicinity and in Puget Sound were primarily made early in the season from March through May when the gray whale migration was still underway (Table 3). These animals were sometimes engaged in feeding but other times appeared to be traveling or interacting socially.

Among the 199 whales identified, 114 or 57% were whales known from previous years and already in the catalog maintained at Cascadia. These proportion of whales known from previous years varied by region (Table 3). None of the five whales identified off southern and central California had been identified in previous years. Just over half the whales identified off northern California were known from previous years. Of the 8 whales identified early in the season outside Grays Harbor only two were know from previous years. Relatively high proportions of the whales identified off Oregon (75%), the north Washington coast (68%), western Vancouver Island (78%), and north of Vancouver Island (79%) were known from previous years.

Movement between regions within 2001 were fairly common, although 123 of the 199 individual whales were only seen in a single region (Table 5). None of the five whales identified in southern and central California or the six seen in northern Puget Sound were seen in any other area. The finding in northern Puget Sound is consistent with past years where we have found the same small group of individual whales return to this area every spring and are rarely if ever seen anywhere else; where they move to in the summer is not known. Movement among other regions was common, especially between adjacent areas. Six of 16 whales identified off Oregon were also seen off northern California. More than half the whales identified off northern Washington and western Vancouver Island had also been seen off southern Vancouver Island along the West Coast Trail, an area between these two regions and where we had the most thorough sampling. There were no interchanges documented from any portion of California and the area north of Vancouver Island.

Resightings of individual whales by month showed that whales seen early in the season were unlikely to be seen later that season (Table 6). None of the whales seen in March and April

2001 were seen later that year, even though some were known from previous years. These were whales identified in the Grays Harbor area and northern Puget Sound. Starting in May the whales identified had a high probability of being seen in later months. Conversely, all three whales seen late in the season in November had been seen in earlier months.

Estimates of abundance were calculated using mark-recapture techniques and inter-year samples as has been done in past years. The 2001 dataset provides an excellent basis given the broad geographic coverage and large sample obtained. While not all data from all collaborators was available for 2000, a relatively large representative sample was obtained by Cascadia, NMML, and Humboldt (Table 7). Inter-year mark-recapture estimates using 2000 and 2001 yielded estimates of 322 (w/ California) and 246 (w/o California). In both cases these exclude the animals only seen before 1 June. These estimates are slightly higher than those reported previously (Calambokidis et al. 2000, In press) and may be the result of the much larger sample obtained in 2001 compared to previous years. A more complete abundance estimate will be possible using multi-year capture-recapture estimates and with a more complete dataset from 1999 and 2000. This will also allow a better evaluation of whether California should be included in the estimates or not.

ACKNOWLEDGEMENTS

Support for the photographic identification reported here, the comparison of gray whale photographs and preparation of this report on the 2001 field season came primarily from the National Marine Mammal Laboratory. Some of Cascadia's field effort on gray whales was conducted incidental to humpback whale research for the Southwest Fisheries Science Center and the Olympic Coast National Marine Sanctuary. A number of individuals helped arrange support for this work including Jeff Laake, Joe Scordino, Robert DeLong, Jay Barlow, and Ed Bowlby.

We thank the operators of the boats that allowed us to gather data from their boats including the *El Matador* in Grays Harbor and the *St. Nicholas* (operated by Mosquito Fleet) in northern Puget Sound. We thank the Oregon whale watch boats that allowed Anne Nelson to conduct observations on their trips out of Newport and Depoe Bay including the *Discovery* (operated by Marine Discovery Tours) and the *Seastar* (operated by Jim Sinnott of Zodiac Adventures).

A number of people assisted in the field effort and in the printing and matching of photographs. We thank our volunteers and interns whose assistance in the field and in the processing of the photographic identifications was invaluable. They include Oscar Torres, Katie Luxa, Randy Lumper, Nate Donley, Moira Morel, Alyssa Farrell, Fiona Johnston, Shellie Ogilvy, EJ Etherington, Heather Weidenhoft, Brooke Smith, Nora Moloney, Suzanne Stricker, Beth Phillips, and Cody Massing. Annie Douglas and Randy Lumper assisted in fieldwork and in the photographic matching and analysis. Anne Nelson assisted in matching and conducted surveys off Oregon.

Permission to conduct this research was provided by the U.S. National Marine Fisheries Service and the Makah Tribal Nation.

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TABLES AND FIGURES

Tables

1. Summary of survey effort conducted for gray whales by Cascadia Research in 2001
2. Summary of gray whale identifications by NMML in 2001.
3. Summary of identifications for each region broken down by organization and month.
4. Summary of sightings of individual whales in 2001.
5. Interchange of gray whales between regions in 2001.
6. Resightings of gray whales between months in 2001.
7. Petersen capture-recapture estimates for seasonal resident gray whales.

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1. Sightings of gray whales by date along southern Vancouver Island during regular trips by Brian Gisborne in 2001.

Table 1. Summary of field effort for gray whales by Cascadia Research personnel off California, Oregon and Washington in 2001.

Date	Vessel	Pers	Launch	Region	State	Time			# seen	Other activities
						Start	End	Duration		
25-Mar	St Nic	RL	Everett	NPS	WA	10:00	14:30	4.5	4	Whale watch boat
31-Mar	St Nic	RL	Everett	NPS	WA	10:00	14:30	4.5	2	Whale watch boat
8-Apr	St Nic	RL	Everett	NPS	WA	10:00	14:30	4.5	3	Whale watch boat
14-Apr	St Nic	BP	Everett	NPS	WA	10:05	14:30	4.4	2	Whale watch boat
19-Apr	N1	JAC	Westport	GH+	WA	8:45	15:45	7.0	12	EJ scat col.
22-Apr	St Nic	RL	Everett	NPS	WA	10:00	14:45	4.8	1	Whale watch boat
25-Apr	N1	JAC	Everett	NPS	WA	9:00	21:40	12.7	1	Whidbey, OO
9-May	El Matador	RL	Westport	GH	WA	12:58	15:22	2.4	3	Whale watch boat
21-May	N1	JAC	Westport	GH+	WA	10:47	17:10	6.4	3	EJ scat col.
8-Jun	Discovery	AN	Newport	OR	OR	11:30	13:40	2.2	4	Whale watch boat
8-Jun	Land	AN	Gov. Pt	OR	OR	18:00	18:00	0.0	1	Whale watch boat
13-Jun	N1	JAC	Westport	GH+	WA	15:08	22:11	7.1	1	EJ scat col.
15-Jun	Sea Star	AN	Depoe Bay	OR	OR	9:00	10:23	1.4	4	Whale watch boat
15-Jun	Discovery	AN	Newport	OR	OR	11:30	13:37	2.1	3	Whale watch boat
6-Jul	N1	JAC	Westport	GH+	WA	10:30	19:10	8.7		EJ scat col.
12-Jul	N1	JAC	Crescent City	NCA	CA	13:50	18:50	5.0	3	
22-Jul	Sea Star	AN	Depoe Bay	OR	OR	11:05	12:25	1.3	4	Whale watch boat
22-Jul	Discovery	AN	Newport	OR	OR	14:02	16:02	2.0	1	Whale watch boat
25-Jul	N2	JAC	Santa Barbara	San Miguel	CA	6:45	21:30	14.8	1	Attach 4 CC
4-Aug	N2	TEC	Bodega Bay	Cordell-Bodega	CA	8:19	19:15	10.9	5	Foggy
10-Aug	Sea Star	AN	Depoe Bay	OR	OR	9:00	9:55	0.9	4	Whale watch boat
10-Aug	Discovery	AN	Newport	OR	OR	11:39	12:40	1.0	1	Whale watch boat
17-Aug	N1	JAC	Depoe Bay	OR	OR	9:45	18:35	8.8	14	
17-Aug	Sea Star	AN	Depoe Bay	OR	OR	9:10	10:15	1.1	3	Whale watch boat
17-Aug	Discovery	AN	Newport	OR	OR	11:40	12:51	1.2	5	Whale watch boat
13-Sep	N1	JAC	La Push	NWA	WA	8:25	19:18	10.9		
23-Sep	N1	JAC	La Push	NWA	WA					Foggy
24-Sep	N1	JAC	La Push	NWA	WA					High swell
5-Oct	N1	JAC	La Push	NWA	WA	8:40	19:26	10.8	3	
6-Oct	Orca	AN	Depoe Bay	OR	OR	9:30	10:20	0.8	1	Whale watch boat
6-Oct	Discovery	AN	Newport	OR	OR	14:11	16:05	1.9	2	Whale watch boat
19-Oct	Discovery	AN	Newport	OR	OR	9:13	11:03	1.8	1	Whale watch boat
32	days							146	92	

Table 2. Summary of sightings where gray whales were identified by NMML in 2001.

Date	Time	Lat	Long	Region	Location	Num.	Pho	Roll	Frame	Comment	#ID	ID1	ID2	ID3	ID4	ID5	ID6
3/22/2001	12:11	48 04.61	122 24.14	NPS	E side Whidbey Is. Saratoga Passage	2	MG	1	1-23		2	49	56				
3/22/2001	14:00	48 04.97	122 28.45	NPS	E side Whidbey Is. Saratoga Passage	2	MG	1	24-29		2	49	56				
6/13/2001	13:27	48 07.05	124 43.12	NWA	S of Sand Pt	2	MG	2	10-37		2	120	602				
6/26/2001	10:08	48 10.54	124 45.95	NWA	Off Sail Bodelteh	1	MG	3	1-18		1	603					
6/26/2001	11:18	48 02.69	124 41.85	NWA	E of Hand Rk	2	MG	3,4	19-37,1-37		2	595	596				
6/26/2001	14:47	48 03.64	124 42.17	NWA	S of Yellow Bnk	2	MG	5	7-14		1	595					
6/26/2001	16:20	48 20.80	124 42.21	NWA	Greenbank	1	MG	5	15-32		1	604					
6/27/2001	12:31	48 20.57	124 30.22	WSJF	W of Rasmussen Ck	1	MG	5,6	33-37,1-7		1	605					
6/28/2001	11:10	48 34.44	124 39.57	SVI	E of Bonilla Pt	2	MG	6	8-37		2	574	587				
6/28/2001	12:59	48 41.69	124 57.96	SVI	Klanawa Rv mouth	6	MG	7,8	1-E,1-30		4	87	219	596	135		
6/28/2001	14:21	48 42	125 00	SVI	Klanawa Rv mouth	2	MG	8	31-37		0						
6/28/2001	14:42	48 42.15	124 59.77	SVI	Klanawa Rv mouth	3	MG	9	1-E		3	175	192	396			
6/28/2001	15:48	48 43.01	125 05.05	SVI	Pachena Pt	1	MG	10	1-18		1	105					
6/28/2001	16:08	48 44.21	125 07.58	SVI	Pachena Bay	5	MG	10,11	19-E,1-13		3	42	107	572			
6/28/2001	17:14	48 46.34	125 08.48	SVI	Deep in Pachena Bay	1	MG	11	14-22		1	166					
6/28/2001	14:36	48 46.45	125 12.22	SVI	Cape Beale	7	MG	11,12,13	23-E,1-E,1-E		6	187	186	319	306	212	93
7/6/2001	10:53	48 34.76	124 40.85	SVI	E of Bonilla Pt	5	MG	14,15	1-E,1-15		6	587	570	219	396	577	593
7/6/2001	12:43	48 38.45	124 48.88	SVI		1	MG	15	16-24		1	529					
7/6/2001	13:18	48 41.09	124 55.70	SVI	Tsisiat Fls	3	MG	15,16	25-E,1-29		2	192	135				
7/6/2001	14:38	48 41.86	124 58.57	SVI	W of Klanawa Rv mouth	3	MG	16,17	30-E,1-14a		4	127	15	84	166		
7/6/2001	15:22	48 43.00	125 05.98	SVI	Pachena Pt	1	MG	17	15a-19a		1	41					
7/7/2001	8:04	48 55.05	125 30.88	WVI	NW of George Fraser Is	2	MG	17	20a-29a		2	94	76				
7/7/2001	13:23	48 16.59	125 13.24	WVI	E of Rafael Pt	1	MG	17	30a-E		1	311					
7/8/2001	15:24	49 25.15	126 35.64	WVI	Perez Rks	1	MG	18	1-12		1	311					
7/8/2001	15:44	49 22.43	126 33.44	WVI	S of Estevan Pt	1	MG	18	13-20		1	149					
7/9/2001	8:32	48 56.54	125 35.84	WVI	NW of Amphetrite Pt	1	MG	18	21-24		1	601					
7/9/2001	8:56	48 55.23	125 33.60	WVI		1	MG	18	25-37		1	149					
7/9/2001	11:08	48 49.90	125 13.84	WVI	Edward King Is	1	MG	19	1-16		1	598					
7/9/2001	11:27	48 49	125 14	WVI	E side Forger Is Cv	1	MG	19	17-22		1	606					
7/9/2001	12:49	48 47.23	125 13.65	SVI	Cape Beale	3	MG	19	23-29		1	242					
7/9/2001	13:17	48 46.38	125 12.26	SVI	SE of Cape Beale	2	MG	19,20	30-E,1-6		1	130					
7/9/2001	13:52	48 43	125 06	SVI	E of Pachena Pt	2	MG	20	7-29		2	42	319				
7/9/2001	14:19	48 42.92	125 03.40	SVI	Darling Rv	1	MG	20	30-37		1	93					
7/9/2001	14:24	48 42.92	125 03.40	SVI	Darling Rv	1	MG	21	1-15		1	238					
7/9/2001	14:49	48 41.49	124 59.13	SVI		1	MG	21	16-34		1	138					
7/9/2001	15:03	48 41.77	124 58.44	SVI		1	MG	21	35-37		1	92					
7/9/2001	15:18	48 40.98	124 55.43	SVI	Tsisiat Fls	1	MG	22	1-10		1	41					
7/9/2001	15:41	48 38.92	124 48.97	SVI	E of YJ whistle By	2?	MG	22	11-30		3	127	81	570			
7/31/2001	10:10	48 18.30	124 41.47	NWA	Strawberry Rk	1	MG	23	1-14		1	107					
7/31/2001	11:00	48 10.51	124 46.10	NWA	S of W Bodelteh	2	MG	23	15-36		2	603	607				
8/3/2001	15:08	48 18.69	124 40.23	NWA	Makah Bay	1	MG	24	1-10		1	605					
8/9/2001	12:29	48 42.17	124 59.85	SVI	between Darling & Klanawa Rv	1	MG	24	11-21		1	166					
8/9/2001	15:47	48 53.85	125 26.68	WVI	between Great Bear & Alley Rks	3	MG	24,25	22-35,1-19		3	92	130	136			
8/9/2001	16:08	48 52.67	125 29.20	WVI	Starlight Rf	3	MG	25,26	20-37,1-37		2	187	143				
8/10/2001	14:07	49 22.50	126 33.61	WVI	W of Estevan Pt	1	MG	27	1-16a		1	94					
8/10/2001	14:26	49 23.70	126 34.88	WVI	S of Perez Rks	3	MG	27,28	17a-E,1-22		4	37	87	529	94		
8/10/2001	15:07	49 24.67	126 36.45	WVI	W of Perez Rks	1	MG	28	23-37		1	140					
8/10/2001	15:48	49 28.04	126 35.16	WVI	W of Split Cp	1	MG	29	1-16		0						
8/11/2001	11:12	49 37.48	126 51.50	WVI	NW of Bajo Pt	1	MG	29	17-26		1	144					
8/11/2001	12:28	49 37.71	126 51.06	WVI	NW of Bajo Pt	1	MG	29	27-32		1	212					
9/6/2001	9:20	48 21	124 41.5	NWA	Greenbank	3	MG	30	1-15		3	396	226	608			
9/6/2001	9:57	48 18	124 41.5	NWA	Anderson Hd	4	MG	30	16-22		2	507	296				
9/6/2001	10:11	48 17	124 41.5	NWA	Portage Hd	6	MG	30	23-36		3	130	205	576			
9/6/2001	10:24	48 17	124 41.5	NWA	Portage Hd	2	MG	31	1-12		2	609	169				
9/6/2001	10:36	48 17	124 41.5	NWA	Portage Hd	1	MG	31	13-14		1	319					
9/6/2001	11:35	48 10.5	124 46	NWA	N side central Bodelteh	1	MG	31	15-27		1	166					
9/6/2001	12:54	48 09.5	124 45	NWA	W of Ozette Is	1	MG	31	28-37		1	515					
11/7/2001	11:18	48 23.35	124 37.90	WSJF	Koiltah Pt	2	MG	32	1-21		1	610					
11/7/2001	12:07	48 23.5	124 40	WSJF	Warmhouse Bch	2	MG	32,33	22-36, 1-19		2	610	605				
11/8/2001	13:07	48 10.05	124 45.12	NWA	S of E Bodelteh	1	MG	33	20-24		1	242					
11/8/2001	15:08	48 23.5	124 40	WSJF	Warmhouse Bch	1	MG	33	25-31		1	605					
7/27/2001	15:05	48 04.79	124 42.65	NWA	2 mi. S of Yellow Bnk	2	PJG	1	7-20		2	127	14				
7/27/2001	15:49	48 08	124 43	NWA	.75 mi SE of White Rk	1		1	21-22		1	319					
8/9/2001	16:30	48 22	124 43.5	NWA	Skagway Rks	1		1	31-34		1	76					
8/30/2001	10:23	48 18.87	124 41.55	NWA	.5 mi SE Strawberry Rk	2		2	1-11a	Biopsy	3	166	507	169			
8/30/2001	10:45	48 18.92	124 41.42	NWA	SE of Strawberry Rk	2		2	12-22	Biopsy	3	242	510	169			
8/30/2001	11:07	48 18.9	124 41.4	NWA	SE of Strawberry Rk	1		2	23-24a		1	130					
8/30/2001	11:23	48 19.62	124 41.42	NWA	Waatch Pt	2		2	25-29	Biopsy	3	319	396	515			
8/30/2001	11:45	48 20.66	124 41.42	NWA	Greenbank	2		2	30-36	Biopsy	2	396	319				
8/30/2001	13:53	48 09.94	124 45.35	NWA	NW of Ozette Is	3		3	1-5?		1	605					
8/30/2001	15:10	48 09	124 45	NWA	S Ozette Is	2-3		3	6-15		2	605	205				
8/30/2001	15:40	48 10	124 45	NWA	N Ozette Is	2		3	16-25		2	605	205				
8/30/2001	15:50	48 10	124 45	NWA	S of E Bodelteh	3		3	26-36		2	532	296				
9/13/2001		48 22	124 43.5	NWA	Skagway Rks	1		4	1-3		1	396					
#####	15:00	48 22	124 32	WSJF	Seal Rk	1		4	4-8	Biopsy	1	610					

Table 3. Summary of identifications for each region broken down by organization and month.

Region	Total Identif.	Unique IDs	Identifications by organization						Identifications by month							Seen			
			BG	CERF*	CRC	HSU	JD	NMML	3	4	5	6	7	8	9	10	11	Prev	%
S and C California	7	5				7							1	6				0	0%
N California	79	34			3	76						6	40		13	20		19	56%
Oregon	41	16			41							5	2	31	2	1		12	75%
Grays Harbor	5	5			5							1	3	1				3	60%
central Washington coast	9	8			9							5	4					2	25%
N Puget Sound	13	6			9		4		7	6								6	100%
N Washington coast	53	31			4		49					7	6	21	14	4	1	21	68%
Strait of Juan de Fuca	6	2					6					1				1	4	0	0%
S Vancouver Island	630	103	583				47			1	45	225	296	48	15			59	57%
W Vancouver Island	57	36					35	22						21	13	10	13	28	78%
N of Vancouver Island*	38	38		38										20	15	3		30	79%
All regions	938	199	583	38	78	76	35	128	7	13	52	245	386	134	57	39	5	114	57%

* Identifications for N of Vancouver Island by CERF shows only the first sighting for an individual for the season, more complete sighting histories will be included when available.

Table 5. Interchange of gray whales between regions in 2001. Matrix value shows number of gray whales seen in both areas.

Region	Unique	Region											
	IDs	SCA	CA	OR	GH	GH+	NPS	NW	AW	SJ	SVI	WVI	NBC
S and C California	5	-											
N California	33		-										
Oregon	16		6	-									
Grays Harbor	5			1	-								
central Washington coast	8				3	-							
N Puget Sound	6						-						
N Washington coast	31		1	4				-					
Strait of Juan de Fuca	2							1	-				
S Vancouver Island	103		3	2				16	1	-			
W Vancouver Island	36		1	1				3		28	-		
N of Vancouver Island*	38							2		19	2	-	

Table 6. Resightings of gray whales between months in 2001. Matrix value whos number of different whales seen in both months.

	Unique	Month									
	IDs	3	4	5	6	7	8	9	10	11	
March	3	-									
April	10	1	-								
May	29			-							
June	71			19	-						
July	127			19	57	-					
August	68			13	27	45	-				
September	45			6	14	27	19	-			
October	34			1	9	21	8	8	-		
November	3				2	2	2		1	-	

Table 7. Petersen capture-recapture estimates for seasonal resident gray whales. Estimates based on new 2001 data are shown along with estimates reported previously.

IDs used	Sample 1		Sample 2		Match	Est.	CV
	Year	n	Year	n			
New estimates using 2001 data							
Seen >1 June*	2000	112	2001	181	63	320	0.07
Seen >1 June & w/o California	2000	86	2001	152	53	246	0.07
Estimates using 1999 data from Calambokidis et al. (2000)							
Seen >1 June & w/o PS or GH	1998	134	1999	127	63	269	0.06
also w/o California	1998	134	1999	93	56	222	0.06
Estimates based on 1998 data (from Calambokidis et al. In press)							
Seen >1 June & w/o PS or GH	1997	29	1998	134	22	175	0.09
Seen >1 June & w/o PS or GH	1996	28	1998	134	22	169	0.09

*All IDs from Puget Sound and almost all from Grays Harbor were prior to 1 June in 2001

Sightings of of gray whales by Brian Gisborne by day along south Vancouver Island

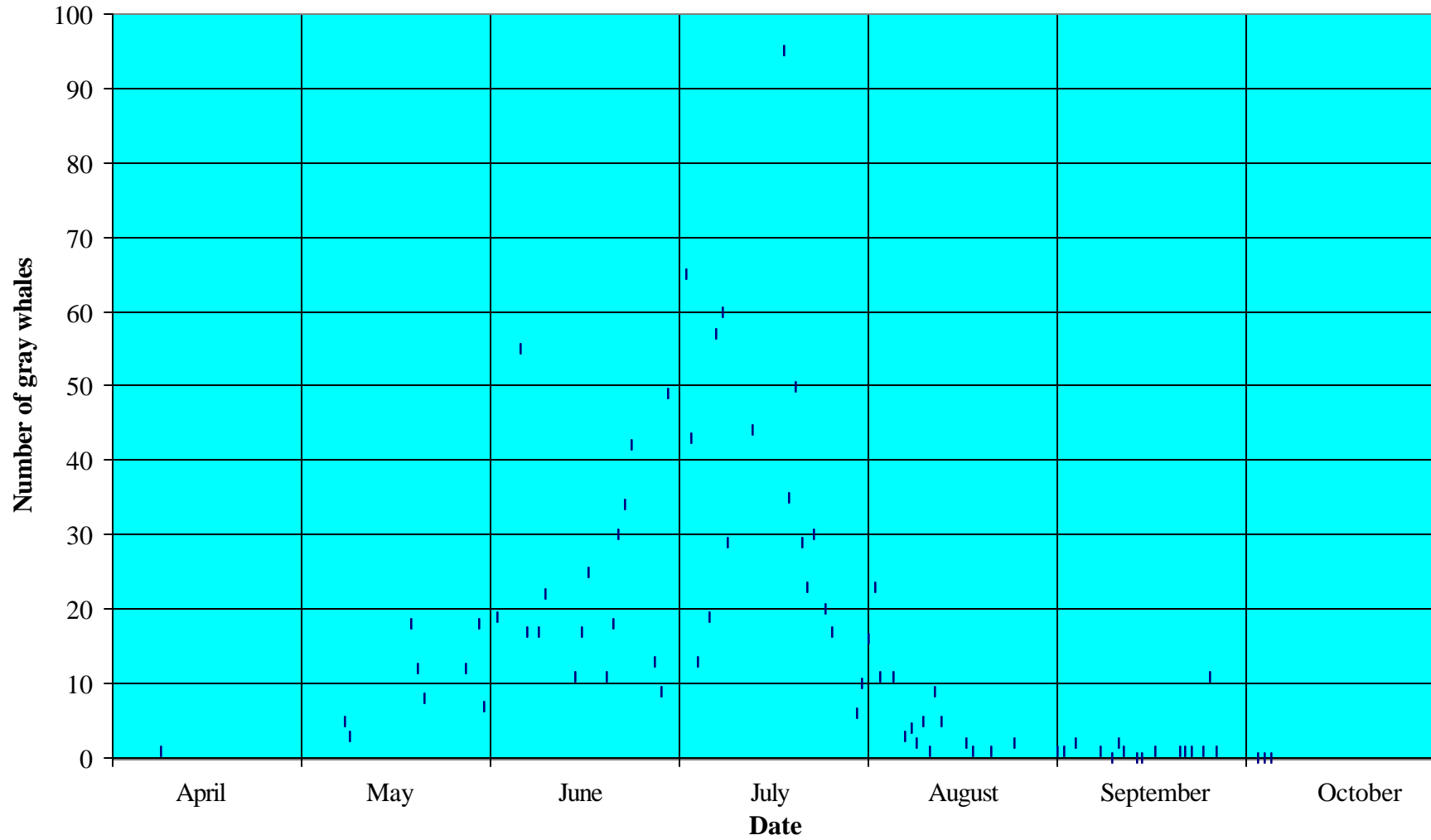


Figure 1. Sightings of gray whales by date along southern Vancouver Island during regular trips by Brian Gisborne in 2001.