

FINAL REPORT

GRAY WHALE PHOTOGRAPHIC IDENTIFICATION IN 1998

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EXECUTIVE SUMMARY

In 1998, Cascadia Research and the National Marine Mammal Laboratory conducted photographic identification surveys for gray whale found in the waters of Washington State and along the southern coastline of Vancouver Island. A larger regional effort was also conducted from California to Southeastern Alaska involving a number of other collaborators including researchers with Humboldt State University, 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 a coastal ferry service. This research updates previous research efforts, which have revealed that a large number of gray whales seen off Washington State and British Columbia exhibit localized site fidelity. The information provided by this research contributes to an ongoing study of abundance, movements, residence times, and return rate of gray whales that feed in the Washington State waters for extended periods. This report summarizes activities and preliminary results of gray whale research conducted in Washington State and southern Vancouver Island in 1998 by Cascadia and NMML. Results of the larger effort from California to Alaska will be summarized in a future report.

Between 2 March and 17 November 1998, Cascadia personnel conducted a total of 53 gray whale surveys in the waters of Washington State and off the southern coastline of Vancouver BC. The National Marine Mammal Laboratory (NMML) provided identification photographs from # surveys, conducted between 6 June and 18 November 1998. On 249 occasions, 74 different gray whales were successfully identified by Cascadia Research and NMML in 1998.

Fewer whales were present on the northern Washington and western Strait of Juan de Fuca than previous years and most of the identifications in this region were made late in the season (after 1 September). Of the 57 seen on the northern Washington coast and on the north and south side of the Strait of Juan de Fuca, 32 (56%) had been identified in past years, a lower proportion than previous years. Individual whales moved between S. Vancouver Island and the Strait of Juan de Fuca and Washington outer coast. At least six different whales were present (from 27 identifications) in northern Puget Sound; four of these were animals that have been seen regularly each spring in this area since the early 1990s. None of the four gray whales identified in southern Puget Sound had been seen previously, consistent with past findings that this area is not used by regular returning animals.

INTRODUCTION

In 1998, Cascadia Research and the National Marine Mammal Laboratory continued photographic identification surveys for gray whales, in Washington State and along the southern coast of Vancouver Island, BC. 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 Washington State waters in spring, summer, and fall (so-called "seasonal residents". Summer feeding aggregations of gray whales have been observed in a number areas along the coasts of California (Patten and Samaras 1977, Malonee 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 (Darling *et al.* 1998, Nerini 1984).

Previous research has revealed that a significant number of the gray whales observed in Washington State exhibit localized site fidelity (Calambokidis *et al.* 1994, Calambokidis 1996, Calambokidis and Quan 1997, Calambokidis and Schlender 1998). The issue of "seasonal resident" whales has also gained significance due to the resumption of whaling for gray whales by the Makah. Currently abundance estimates, genetic make-up and recruitment mechanisms that may maintain this aggregation are unknown.

In addition to the field work reported here for 1998 a larger regional effort was also conducted from California to Southeastern Alaska involving a number of other collaborators including researchers with Humboldt State University, 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 a coastal ferry service. Results of the larger effort from California to Alaska will be summarized in a future report.

This report summarizes activities and preliminary results of gray whale photo-ID research conducted by Cascadia Research and the National Marine Mammal Laboratory in Washington State and southern Vancouver Island in 1998.

METHODS

Between 2 March and 17 November 1998, Cascadia personnel conducted a total of 53 gray whale surveys in the waters of Washington State and off the southern coastline of Vancouver B.C. (Table 1) Surveys were conducted by: 1) placing observers on whale watch boats, the *Victoria Express*, the *Deluxe* and the *Lucky Piere* out of Westport, WA (between 21 March through 30 June 1998), 2) small boat surveys conducted in Puget Sound, the western and eastern portions of the Strait of Juan de Fuca, Washington outer coast and southern Vancouver Island, and 3) placing biologist aboard the National Marine Sanctuary vessel, the *Tatoosh*, in conjunction with humpback whale surveys being conducted in the Olympic Coast National Marine Sanctuary.

Biologist from the National Marine Mammal Laboratory (NMML) provided identification photographs from surveys they conducted between 6 June and 18 November 1998. The photographs from NMML represent surveys from the Washington outer coast, the western Strait of Juan de Fuca and southern Vancouver Island, BC.

Procedures during Cascadia vessel surveys were similar to those used previously (Calambokidis *et al.* 1994). Effort data was 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. *Ilford* HP-5 negative film was shot using *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 they did not always raise their flukes out of the water. Markings used to distinguish whales included pigmentation of the skin, mottling, scarring, and barnacles, which varied among individuals. These markings have provided a reliable means of identifying gray whales over periods of close to 20 years.

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 using a scaled loop 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 markings described above.

Comparison of whales to determine any matches were made in a series of steps. First, the negatives of gray whales were examined and the best shot of the right and left side of the whales (for each sighting) 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

On 249 occasions, 74 different gray whales were successfully identified by Cascadia Research and NMML in 1998 (Tables 2-3). Each whale was seen from 1 to 14 times with a mean of 3.4 (SD= 3.1). The most identifications and individuals seen was off southern Vancouver Island; there were 75 identifications of 32 animals (Table 3). The northern Washington coast and the western Strait of Juan de Fuca had the next highest number of individuals seen (21 and 14). There were a large number of identifications made in Grays Harbor (59) but these were of only seven individuals. The high number of resightings in this area is partly the result of the more intense effort from whale watching boats over a less than 2 month period in Grays Harbor.

Identifications off southern Vancouver Island were made between 1 July and 11 November, although the highest number were seen in July, when 23 different individuals were identified (Table 4). This compares to only 12 individuals identified in July on the Washington outer coast and on the Washington side of the Strait of Juan de Fuca, an area that was being more intensely surveyed. Large numbers of whales remained off southern Vancouver Island through September, although in lower numbers than July. Numbers of whales identified in Washington waters off the outer coast and in the western strait, dropped to 6 in August and then came back up to 10 individuals in both August and September (Table 4). There was an increased number of whales identified on the Washington side of the Strait of Juan de Fuca, including the eastern portion, in October and November with nine and seven individuals seen each month, respectively.

Identifications in northern Puget Sound were all made from March through May, coinciding with the period that we have seen animals in this region in past years (Table 4). Four of the six animals identified in this region were animals that have been seen regularly in this area going back to 1990 (Table 5). Our sightings of these animals in early March (two on the 12th and one on the 14th) are the earliest in the season we have positively identified these animals in any year, although sighting reports in this region typically begin in early March. We made no identifications after 20 May and sighting reports from this region also dropped off in May. As in past years none of these regular animals were seen in this or any other region later in the season.

Identification of gray whales in southern Puget Sound were made on six occasions and represented four individuals. One animal was identified several times in March and then not seen again and three other animals were identified from mid-October to mid-November. As in past years, none of these whales were individuals that had been identified in past year in any region (Table 5).

Individual gray whales were documented moving among three regions; the Strait of Juan de Fuca (both the eastern and western portion), the Washington outer coast, and the southern portion of Vancouver Island (Table 6). Most common were whales seen on both the Washington outer coast and southern Vancouver Island (eight whales). Three of these whales were documented making multiple trips between these regions.

The proportion of whales identified off northern Washington) that had been identified in previous years was lower in 1998 (63%) than had been seen in some previous years (Table 5). It appears that in addition to there being fewer whales present most of the season, more of the whales were animals that had not been common in this region in the past. The lower number of whales seen off the northern Washington coast and high numbers seen off southern Vancouver Island was likely related to prey; gray whales are known to shift areas they feed in response to shifts in prey types and densities (Darling *et al.* 1998). If prey was not as plentiful on the northern Washington coast this may have discouraged the animals that typically use this area from being there and make animals encountered in this area more likely to be whales moving between areas.

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Table 1. Photo-ID survey effort by Cascadia Research in Oregon and Washington waters in 1998. Does not include photo-ID effort aboard whale watching boats.

Date	Vessel	Time		Latitude		Gray whale	
		Begin	End	South	North	Sit	Num
03/12/98	<i>Thom.</i> Launch	14:27:00	17:45:00	47 53.0	48 05.0	1	2
03/14/98	<i>Tully</i> Launch	10:29:00	14:20:00	48 07.9	48 13.1	1	1
03/18/98	N1	15:00:00	18:45:00	47 03.5	47 11.2	1	1
03/21/98	<i>Victoria Express</i>	11:06:00	13:30:00	Grays Harbor		3	6
03/21/98	<i>Tully</i> Launch	6:49:00	16:30:00	47 38.7	48 13.2	1	1
03/22/98	<i>Victoria Express</i>	14:05:00	16:53:00	Grays Harbor		5	10
03/22/98	<i>Tully</i> Launch	10:25:00	16:05:00	47 53.4	48 31.9	2	3
03/26/98	N1	16:00:00	17:42:00	47 03.4	47 05.3	1	1
03/27/98	N1	8:40:00	18:23:00	47 49.3	48 10.2	3	5
03/28/98	<i>Victoria Express</i>	11:02:00	16:45:00	Grays Harbor		11	21
03/29/98	<i>Victoria Express</i>	11:06:00	16:57:00	Grays Harbor		9	22
04/02/98	<i>Victoria Express</i>	11:03:00	13:33:00	Grays Harbor		4	6
04/04/98	<i>Victoria Express</i>	11:00:00	17:00:00	Grays Harbor		12	15
04/05/98	<i>Victoria Express</i>	14:10:00	17:01:00	Grays Harbor		4	4
04/07/98	HH	10:15:00	16:48:00	47 37.0	48 08.3		
04/09/98	<i>Victoria Express</i>	11:16:00	14:00:00	Grays Harbor		7	11
04/10/98	<i>Victoria Express</i>	11:00:00	13:30:00	Grays Harbor		2	3
04/11/98	<i>Victoria Express</i>	11:00:00	16:50:00	Grays Harbor		7	9
04/12/98	<i>Victoria Express</i>	14:01:00	16:50:00	Grays Harbor		6	11
04/12/98	HH	11:20:00	19:00:00	48 06.0	48 20.2		
04/15/98	HH	10:57:00	18:12:00	47 48.7	48 05.9	2	4
04/16/98	N1	11:10:00	19:45:00	47 51.4	48 25.4	3	7
04/16/98	<i>Victoria Express</i>	10:49:00	13:30:00	Grays Harbor		8	14
04/17/98	<i>Victoria Express</i>	11:00:00	13:35:00	Grays Harbor		3	3
04/18/98	<i>Victoria Express</i>	10:57:00	16:59:00	Grays Harbor		13	21
04/19/98	<i>Victoria Express</i>	10:58:00	17:00:00	Grays Harbor		9	14
04/19/98	N1	9:17:00	17:08:00	47 53.4	48 25.3	1	2
04/23/98	HH	8:47:00	12:20:00	47 53.7	48 00.0	1	1
04/24/98	<i>Victoria Express</i>	11:00:00	13:20:00	Grays Harbor		2	2
04/25/98	<i>Victoria Express</i>	11:04:00	16:55:00	Grays Harbor		3	5
04/26/98	<i>Victoria Express</i>	11:00:00	17:00:00	Grays Harbor		7	9
05/01/98	<i>Victoria Express</i>	11:04:00	13:30:00	Grays Harbor		4	7
05/02/98	<i>Victoria Express</i>	14:00:00	16:45:00	Grays Harbor		4	5
05/03/98	<i>Victoria Express</i>	11:00:00	13:30:00	Grays Harbor		2	2
05/08/98	HH	10:03:00	16:20:00	47 50.0	48 07.0		
05/11/98	<i>Duluxe</i>	11:40:00	13:30:00	Grays Harbor		2	2
05/20/98	HH	13:00:00	14:59:00	47 56.3	47 57.1	1	1
06/30/98	<i>Lucky Piere</i>			Grays Harbor			
07/14/98	DIS	6:57:00	15:38:00	48 19.6	48 26.9	1	3
07/21/98	Tatoosh	8:56:00	20:02:00	Olympic Marine Sanctuary			
07/22/98	Tatoosh	8:22:00	18:13:00	Olympic Marine Sanctuary			
08/25/98	N2	6:30:00	18:30:00	44 27.1	44 56.8	24	35
08/26/98	N2	7:40:00	19:20:00	46 54.3	48 23.4		
08/27/98	N2	7:05:00	20:48:00	48 14.2	48 42.2	8	14
09/29/98	N1	9:35:00	19:30:00	48 16.5	48 51.8	3	3
10/6/98	N1	8:00:00	19:08:00	41 41.7	41 55.0	2	7
10/10/98	N1	9:20:00	19:00:00	41 43.2	41 57.7	12	12
10/15/98	N1	14:30:00	16:19:00	47 06.1	47 08.0	1	1
10/21/98	HH	13:23:00	18:00:00	48 07.1	48 08.7	2	3
10/28/98	HH	12:25:00	16:00:00	48 07.0	48 07.5	1	1
11/11/98	HH	11:25:00	15:07:00	48 07.0	48 17.7	2	3
11/12/98	N1	16:00:00	16:50:00	47 06.1	47 08.3	1	1
11/17/98	DEB	14:16:00	15:42:00	47 01.1	47 01.5	2	2
Total		53 days				204	316

Table 2. Sightings of gray whales identified by Cascadia or NMML in Washington and S. Vancouver Island in 1998.

ID	Temp#	Collection	Date	Sight#	Region	Location	comments
14		CRC	21-Mar-98	VE-6	GH	Inside	
14		CRC	28-Mar-98	VE-9	GH	Inside	
14		CRC	29-Mar-98	VE-9	GH	Inside	
14		CRC	29-Mar-98	VE-1A	GH+	Entrance	
14		CRC	10-Apr-98	VE-1	GH	Inside	
14		CRC	12-Apr-98	VE-6	GH	Inside	
14		CRC	12-Apr-98	VE-16	GH	Inside	
14		CRC	16-Apr-98	VE-05	GH+	Entrance	
14		CRC	18-Apr-98	VE-13	GH	Inside	
14		CRC	18-Apr-98	VE-8	GH	Inside	
15		NMML	01-Jul-98		SVI	Tsusiat Falls	
15		NMML	16-Jul-98		NWA	Greenbank	
15		CRC	27-Aug-98	N2-26	SVI		
21		CRC	22-Mar-98	T1-2	NPS		
21		CRC	27-Mar-98	N-8	NPS		
21		CRC	15-Apr-98	DS-6	NPS		
21		CRC	16-Apr-98	N-1	NPS		
21		CRC	16-Apr-98	N-10	NPS		
21		CRC	19-Apr-98	N-2	NPS		
22		CRC	14-Mar-98	T1-1	NPS		
22		CRC	22-Mar-98	T1-2	NPS		
22		CRC	27-Mar-98	N-8	NPS		
22		CRC	15-Apr-98	DS-6	NPS		
22		CRC	16-Apr-98	N-1	NPS		
22		CRC	16-Apr-98	N-10	NPS		
22		CRC	19-Apr-98	N-2	NPS		
30		NMML	25-Sep-98		WSJF	Jensen Creek	
37		NMML	15-Sep-98		NWA	Fuca Pillar-Skagway	
41		NMML	01-Jul-98		SVI	Tsusiat Falls	
41		NMML	01-Sep-98		SVI	E. Pachena	
41		CRC	21-Oct-98	W-1	ESJF	Green Pt.	
41		CRC	11-Nov-98	W-3	ESJF	Green Pt.	
42		NMML	14-Oct-98		WSJF	Sail Rock	
42		NMML	15-Oct-98		WSJF	Seal/Sail Rock	
43		NMML	24-Jul-98		NWA	Bodelteh	
49		CRC	12-Mar-98	TL-1	NPS		
49		CRC	27-Mar-98	N-8	NPS		
49		CRC	15-Apr-98	DS-6	NPS		
49		CRC	16-Apr-98	N-1	NPS		
49		CRC	16-Apr-98	N-10	NPS		
56		CRC	12-Mar-98	TL-1	NPS		
62		CRC	04-Apr-98	VE-6	GH+	Outside	
62		CRC	12-Apr-98	VE-16	GH	Inside	
62		CRC	12-Apr-98	VE-2	GH	Inside	
62		CRC	12-Apr-98	VE-1	GH	Inside	
62		CRC	16-Apr-98	VE-7	GH+	Entrance	
62		CRC	17-Apr-98	VE-5	GH+	Entrance	
79		CRC	14-Jul-98	D-2	NWA	Makaw Bay	
79		NMML	26-Aug-98		SVI	W. Tsusiat	
79		CRC	27-Aug-98	N2-19	SVI		
80		NMML	01-Jul-98		SVI	Tsusiat Falls	
80		CRC	14-Jul-98	D-2	NWA	Makaw Bay	
80		NMML	25-Aug-98		SVI	.5 mi. W. Carmanah	
80		CRC	27-Aug-98	N2-24	SVI		
80		CRC	27-Aug-98	N2-25	SVI		
80		NMML	28-Aug-98		SVI	Bonilla Pt.	
80		NMML	04-Sep-98		SVI	W. of Carmanah	
80		NMML	22-Sep-98		SVI	E. of Bonilla	
81		NMML	15-Sep-98		NWA	Fuca Pillar-Skagway	
83	T69	NMML	16-Aug-98		NWA	Guano Rock	
84		NMML	01-Jul-98		SVI	Tsusiat Falls	
84		NMML	01-Jul-98		SVI	Tsusiat Falls	

Table 3. Summary of gray whales identified by Cascadia and NMML in Washington State and S. Vancouver Island in 1998.

ID	Times seen	Times seen by region							Seen by group		Dates seen	
		SPS	NPS	GH	ESJF	WSJF	NWA	SVI	CRC	NMML	First	Last
14	10			10					10		21-Mar	18-Apr
15	3						1	2	1	2	1-Jul	27-Aug
21	6		6						6		22-Mar	19-Apr
22	7		7						7		14-Mar	19-Apr
30	1					1				1	25-Sep	25-Sep
37	1						1			1	15-Sep	15-Sep
41	4				2			2	2	2	1-Jul	11-Nov
42	2					2				2	14-Oct	15-Oct
43	1						1			1	24-Jul	24-Jul
49	5		5						5		12-Mar	16-Apr
56	1		1						1		12-Mar	12-Mar
62	6			6					6		4-Apr	17-Apr
79	3						1	2	2	1	14-Jul	27-Aug
80	8						1	7	3	5	1-Jul	22-Sep
81	1						1			1	15-Sep	15-Sep
83	1						1			1	16-Aug	16-Aug
84	2							2	2	2	1-Jul	1-Jul
85	3						2	1	3	3	1-Jul	30-Jul
91	2					1	1		2	2	9-Jul	31-Aug
92	4						1	3	4	4	1-Jul	22-Sep
93	2						1	1	2	2	21-Jul	24-Aug
101	4					1		3	4	4	1-Jul	25-Sep
107	1						1		1	1	6-Jun	6-Jun
123	1							1	1	1	3-Jul	3-Jul
130	1							1	1	1	3-Jul	3-Jul
135	1							1	1	1	1-Jul	1-Jul
138	1							1	1	1	22-Sep	22-Sep
140	1					1			1	1	17-Aug	17-Aug
141	1							1	1	1	1-Jul	1-Jul
150	2							2	2	2	1-Jul	22-Sep
166	3						3		1	2	14-Jul	1-Sep
175	3						3			3	22-Jul	16-Oct
186	2							2	2	2	1-Jul	1-Jul
187	11					1	10			11	24-Jul	18-Nov
190	2			2					2	2	5-Apr	19-Apr
192	10						7	3	1	9	1-Jul	21-Oct
209	1						1			1	22-Jul	22-Jul
212	7							7	2	5	1-Jul	29-Sep
219	7							7	2	5	1-Jul	29-Sep
227	2							2		2	1-Jul	3-Jul
228	2					2				2	1-Nov	4-Nov
231	8							8	2	6	1-Jul	29-Sep
232	3							3	1	2	17-Jul	27-Aug
233	2							2	2	2	1-Jul	3-Jul
234	1							1		1	1-Jul	1-Jul
236	3							3	1	2	25-Aug	28-Aug
237	1							1	1	1	27-Aug	27-Aug
239	4					4				4	14-Oct	22-Oct
242	7					4	2	1		7	17-Jul	5-Nov
243	1							1		1	17-Jul	17-Jul
244	1							1		1	22-Sep	22-Sep
246	1							1		1	3-Jul	3-Jul
248	1							1		1	1-Jul	1-Jul
249	5				1	4			1	4	14-Oct	21-Oct
250	1					1				1	7-Nov	7-Nov
251	1						1			1	9-Jul	9-Jul
252	1					1				1	5-Nov	5-Nov
253	1					1				1	31-Oct	31-Oct
254	1							1		1	1-Sep	1-Sep
255	7					7				7	14-Oct	28-Oct
258	1	1							1		15-Oct	15-Oct
259	2	2							2		12-Nov	17-Nov
260	1	1							1		17-Nov	17-Nov
262	2	2							2		18-Mar	26-Mar
264	7		7						7		21-Mar	20-May
267	2				2				2		21-Oct	11-Nov
268	2				2				2		28-Oct	11-Nov
269	10			10					10		22-Mar	19-Apr
270	11			11					11		22-Mar	18-Apr
271	14			14					14		4-Apr	11-May
272	1						1			1	31-Aug	31-Aug
273	6			6					6		21-Mar	26-Apr
304	3						3			3	15-Sep	21-Oct
305	1		1						1		27-Mar	27-Mar
Total times	249	6	27	59	7	31	44	75	116	133		
Total IDs	74	4	6	7	4	14	21	32	32	54		

Table 5. Number of whales identified by region and prportion seen in previous years

Region	Identifications	Unique IDs	Seen prev. years	
			#	%
N Wa. (Straits and outer coast)	82	35	22	63%
N. Wa. incl BC side of straits	157	57	32	56%
Grays Harbor	59	7	3	43%
N. Puget Sound	27	6	4	67%
S. Puget Sound	6	4	0	0%

Table 6. Number of whales identified by NMML/CRC in study area in 1998 and within-season inter-regional movements.

Region	IDs	Region						
		SPS	NPS	GH	ESJF	WSJF	NWA	SVI
S Puget Sound	4							
N Puget Sound	6	0						
Grays Harbor	7	0	0					
E Strait of Juan de Fuca	4	0	0	0				
W Strait of Juan de Fuca	14	0	0	0	1			
N Washington outer coast	21	0	0	0	0	3		
S Vancouver Is.	32	0	0	0	1	2	8	

ID	Other-ID	Collec Date	Year	Sight#	Region	Location
15	Estevan		3-Aug-84	1984 -	SVI	59 48 46.0 125 09.5
15	Estevan		21-Aug-84	1984 -	SVI	59 48 46.5 125 09.0
15			10-Aug-89	1989 MB-1	NWA	99 48 17.1 124 42.2
15			23-Aug-90	1990 -	SVI	59 48 22.0 123 51.0
15	JD9612		8-Oct-96	1996 JD-	WVI	59 49 10 125 57
15	JD9612		16-Oct-96	1996 JD-	WVI	59 49 10 125 57
15			9-Aug-97	1997 N2-4	SVI	59 48 42.1 124 59.9
15			6-Sep-97	1997 NML-2	SJF	49 48 18.4 124 25.2
15			20-Sep-97	1997 NML-2	SJF	49 48 19.6 124 27.9
15			28-Sep-97	1997 NML-2	SJF	49 48 22.8 124 35.4
15			29-Sep-97	1997 NML-1	SJF	49 48 22.3 124 34.6
15			29-Sep-97	1997 NML-2B	SJF	49 48 21.7 124 32.9
15			29-Sep-97	1997 NML-3	SJF	49 48 21.9 124 32.8
15			29-Sep-97	1997 NML-4	SJF	49 48 21.7 124 33.2
15			30-Sep-97	1997 NML-1	SJF	49 48 19.7 124 28.2
30			2-Sep-83	1983 -	SVI	59 49 00.5 123 00.2
30	102		23-Sep-90	1990 -	SVI	59 48 21.0 123 47.0
30			24-Jun-92	1992 -	CS	59 49 20.8 126 15.7
30	JD926		21-Jul-92	1992 JD-	WVI	59 49 23 126 30
30	JD926		18-Sep-92	1992 JD-	WVI	59 49 23 126 30
30	G010		1994 -	1994 -	NBC	59 51 10 127 48
30	JD926G10	CERF	24-Aug-91	1995	NBC	500m S of Cape Caution, 800m offshore 51 8.6 127 48.1
30	JD926G10	CERF	27-Aug-91	1995	NBC	700m N of Wentworth Rk. 50 57.7 127 31.2
30	JD926		19-Sep-95	1995 JD-	WVI	59 49 23 126 30
30	JD926G10	CERF	1-Sep-92	1996	NBC	off Grinch Bay 51 8.3 127 43.8
37			1-Jul-88	1988 -	SVI	59 48 42.0 125 00.0
37	JD9210		21-Jul-92	1992 JD-	WVI	59 49 23 126 30
37			18-Sep-92	1992 -	CS	59 49 10.6 126 01.5
37	JD9210		18-Sep-92	1992 JD-	WVI	59 49 10 125 54
37			25-Oct-92	1992 -	CS	59 49 10.4 126 01.5
37	JD9210		25-Oct-92	1992 JD-	WVI	59 49 10 125 54
37			27-Jul-96	1996 NMM-1	SVI	59 48 21.8 124 26.0
41			23-Aug-90	1990 -	SVI	59 48 22.0 123 51.0
41			9-Sep-91	1991 -	SVI	59 48 25.5 123 16.0
41			27-Jun-92	1992 -	CS	59 49 10.6 126 11.0
41	JD924		27-Jun-92	1992 JD-	WVI	59 49 19 126 14
41			27-Jul-96	1996 NMM-1	SVI	59 48 21.8 124 26.0
41			16-Aug-96	1996 WDW-	SJF	49 48 07.3 123 16.7
42	792		10-Aug-84	1984 -	SVI	59 48 46.0 125 09.0
42	792		16-Aug-84	1984 -	SVI	59 48 46.0 125 10.0
42	792		21-Aug-84	1984 -	SVI	59 48 43.0 125 05.0
42	F		1-Jul-88	1988 -	SVI	59 48 43.0 125 02.0
42			23-Aug-90	1990 -	SVI	59 48 22.0 123 51.0
42			5-Jul-93	1993 -	SJF	49 48 22 124 31
42			14-Jul-93	1993 N18-1	SJF	49 48 23.6 124 39.1
42			15-Jul-93	1993 N18-1	SJF	49 48 23.3 124 38.0
42			15-Jul-93	1993 N18-26	SJF	49 48 23.2 124 38.0
42			1-Aug-93	1993 N18-14	SJF	49 48 23.2 124 37.9
42	JD9417		13-Jul-94	1994 JD-	WVI	59 49 19 126 14
42	JD9417		6-Aug-94	1994 JD-	WVI	59 49 17 126 15
42	JD9417G34	CERF	30-Aug-91	1995	NBC	N of Wilkie Pt. 51 8.3 127 43.6
42			24-Oct-95	1995 NOV-5	SJF	49 48 18.7 124 25.9
42	JD9417		13-Aug-96	1996 JD-	SVI	59 48 42 124 57
42	JD9417		9-Oct-96	1996 JD-	WVI	59 49 10 125 57
43	Friendly		16-Aug-84	1984 -	SVI	59 48 46.5 125 09.0
43	Friendly		21-Aug-84	1984 -	SVI	59 48 43.0 125 04.0
43			24-Aug-90	1990 -	SVI	59 48 39.0 124 48.0
43			28-Aug-92	1992 -	SVI	59 48 46.5 125 11.5
43			21-Jul-93	1993 N18-8	NWA	99 48 10.5 124 45.6
43			1-Aug-93	1993 N18-9	NWA	99 48 09.3 124 44.9
43			9-Jul-94	1994 NOV-6	NWA	99 48 10.4 124 44.5
43			4-Aug-94	1994 -	NWA	99 48 11 124 44
43			22-Jul-95	1995 NOV-11	NWA	99 48 21.1 124 42.4
43			23-Jul-95	1995 NOV-14	NWA	99 48 21.1 124 42.5
43	JD9510		9-Aug-95	1995 JD-	WVI	59
43	JD9510G36	CERF	10-Jul-92	1996	NBC	Middle of Burnett Bay, 40m offshore 51 7.5 127 40.8
43	JD9510G36	CERF	16-Jul-92	1996	NBC	Middle of St. Johns Bay 51 8.4 127 42.2
43	JD9510G36	CERF	17-Jul-92	1996	NBC	Middle of Burnett Bay, 50m offshore 51 7.5 127 40.8
43	JD9510G36	CERF	17-Jul-92	1996	NBC	W-end of St. Johns Bay off Brentwood Rks. 51 8.3 127 42.4
43	JD9510G36	CERF	20-Jul-92	1996	NBC	N-side of Burnaby Rks. 51 7.9 127 41.5
43	JD9510G36	CERF	20-Jul-92	1996	NBC	1km N of Raynor Pt. 400m offshore 51 9.1 127 45.9
43	JD9510G36	CERF	21-Jul-92	1996	NBC	About 1/2 way across Burnett Bay 51 7.3 127 41.3

ID	Other-ID	Collec Date	Year	Sight#	Region	Location
43	JD9510G36	CERF	29-Jul-92	1996	NBC	3/4nm N of Neck Ness 51 13.1 127 47.9
43	JD9510G36	CERF	5-Aug-92	1996	NBC	in Bay S of Neck Ness 51 11.6 127 47.3
43	JD9510G36	CERF	15-Aug-92	1996	NBC	N.A.
43	JD9510G36	CERF	20-Aug-92	1996	NBC	just S of Neck Ness 51 11.7 127 47.7
43	JD9510G36	CERF	21-Aug-92	1996	NBC	near 2m Reef in S-Hoop Bay 51 12.4 127 47.6
43	JD9510G36	CERF	27-Aug-92	1996	NBC	off Indian Cove in kelp bed inside RK. #2.5 51 11.6 127 47.2
43	JD9510G36	CERF	28-Aug-92	1996	NBC	N-side of Sylvester Bay near 46 Rk. 51 9.4 127 45.5
43	JD9510G36	CERF	29-Aug-92	1996	NBC	Lougheed Bay 51 8.3 127 42.8
43	JD9510G36	CERF	1-Sep-92	1996	NBC	S-side of Fab 4 51 12.3 127 47.1
43			9-Aug-97	1997 N2-5	SVI	59 48 42.4 125 00.4
43			2-Sep-97	1997 NML-5	NWA	99 48 21.8 124 33.5
79			14-Jul-93	1993 N18-2	SJF	49 48 23.5 124 40.2
79			14-Jul-93	1993 N18-19	SJF	49 48 23.6 124 38.8
79			15-Jul-93	1993 N18-25	SJF	49 48 23.6 124 39.7
79			21-Jul-93	1993 N18-3	NWA	99 48 22.7 124 44.1
79	JDG5	CERF	27-Jul-90	1994	NBC	between Knight I. and the Tinsons (W opening to Tinson Pass) 50 59.7 127 32.1
79	JDG5	CERF	31-Jul-90	1994	NBC	W of Foxtrott Pt. 51 4.7 127 38.7
79	JDG5	CERF	14-Aug-90	1994	NBC	Middle of Burnett Bay, 1/4nm off sandy beach 51 7.3 127 41.2
79	JDG5	CERF	12-Jul-91	1995	NBC	off Nina Pt. 51 2.9 127 35.3
79	JDG5	CERF	20-Jul-91	1995	NBC	Allison Reefs 51 2 127 31.8
79	JDG5	CERF	22-Jul-91	1995	NBC	on Slater Rks. 51 1.7 127 32.7
79	JDG5	CERF	24-Jul-91	1995	NBC	SW-end Elizabeth Rks. 51 1 127 32.9
79	JDG5	CERF	5-Aug-91	1995	NBC	100m E of Elizabeth Rks. 51 .6 127 33
79	JDG5	CERF	23-Aug-91	1995	NBC	off E-rock 51 2.3 127 33.7
79	JDG5	CERF	25-Aug-91	1995	NBC	off E-Rk. 51 2.3 127 33.8
79	JDG5	CERF	26-Aug-91	1995	NBC	N-Bay 51 2.6 127 34
79	JDG5	CERF	27-Aug-91	1995	NBC	on 2 o'clock Rk. 51 1.6 127 33.7
79	JDG5	CERF	28-Aug-91	1995	NBC	off S-side Elizabeth Rks. 51 .7 127 32.8
79	JDG5	CERF	29-Aug-91	1995	NBC	in kelp bed 100m SE of E-Rk. 51 2.2 127 33.3
79	JDG5	CERF	30-Jun-92	1996	NBC	Ketchikan N 51 .6 127 32.2
79	JDG5	CERF	1-Jul-92	1996	NBC	N-side Seahorse 51 2.7 127 34.1
79	JDG5	CERF	2-Jul-92	1996	NBC	N.A.
79	JDG5	CERF	3-Jul-92	1996	NBC	Tip of Bramham Pt. 75m offshore 51 3.4 127 36.3
79	JDG5	CERF	5-Jul-92	1996	NBC	on Slater Rks. 51 1.6 127 33.3
79	JDG5	CERF	6-Jul-92	1996	NBC	Middle of Pass between Tinsons and Knight I. 50 59.8 127 32
79	JDG5	CERF	7-Jul-92	1996	NBC	E of No Justice Reef 51 2.7 127 33.8
79	JDG5	CERF	9-Jul-92	1996	NBC	300m NE of Bremner Pt. 51 6.7 127 40.3
79	JDG5	CERF	10-Jul-92	1996	NBC	Pisspott Reef 51 2.6 127 33.9
79	JDG5	CERF	14-Jul-92	1996	NBC	SW -side Elizabeth Rks. 51 1 127 32.5
79	JDG5	CERF	17-Jul-92	1996	NBC	in Bay between Loblaws Rks. and Sobeyls Rks. 51 4.7 127 37.3
79	JDG5	CERF	18-Jul-92	1996	NBC	W-side of Seahorse on S-side of kelp bed 51 2.7 127 34.3
79	JDG5	CERF	20-Jul-92	1996	NBC	off inside of Bramham Pt. (Miles Inlet) 51 3.5 127 35.9
79	JDG5	CERF	23-Jul-92	1996	NBC	20m off centre Elizals S-side 51 1.9 127 33.4
79	JDG5	CERF	27-Jul-92	1996	NBC	just N of Town Rk. 51 2.2 127 31.7
79	JDG5	CERF	28-Jul-92	1996	NBC	off Rks. S of Mayor 51 2.6 127 35.6
79	JDG5	CERF	31-Jul-92	1996	NBC	S-side middle Seahorse 51 2.6 127 34.3
79	JDG5	CERF	1-Aug-92	1996	NBC	S-end of #4 Reef 51 2.4 127 34.2
79	JDG5	CERF	3-Aug-92	1996	NBC	1 WL SW of Albert 51 2.6 127 33.4
79	JDG5	CERF	18-Aug-92	1996	NBC	Entrance to Southgate Pass 51 1 127 31.6
79	JDG5	CERF	31-Aug-92	1996	NBC	off 3 Sisters
80			14-Jul-93	1993 N18-5	NWA	99 48 15.0 124 42.7
80			15-Jul-93	1993 N18-21	NWA	99 48 11.0 124 44.4
80			21-Jul-93	1993 N18-4	NWA	99 48 15.2 124 42.7
80			25-Aug-94	1994 -	NWA	99 48 23 124 44
80			25-Aug-94	1994 -	NWA	99 48 21.5 124 43
80			29-Aug-94	1994 -	NWA	99 48 13.5 124 43
80			23-Jun-95	1995 -	SJF	49 48 23.5 124 40
80	JD967		8-Aug-96	1996 JD-	WVI	59 49 10 125 57
80			16-Aug-96	1996 NMM-2	NWA	99 48 17.6 124 41.5
80			23-Aug-96	1996 NMM-3	NWA	99 48 17.9 124 42.0
80			27-Aug-96	1996 NMM-1	NWA	99 48 18.9 124 42.0
80			27-Aug-96	1996 NMM-2	NWA	99 48 18.9 124 42.0
80			18-Sep-96	1996 NMM-1	NWA	99 48 17.7 124 41.5
80			18-Sep-96	1996 NMM-3	NWA	99 48 17.6 124 41.5
80			26-Sep-96	1996 NMM-1	SJF	49 48 21.1 124 34.8
80			6-Oct-96	1996 N2-8	NWA	99 48 11.2 124 44.1
81			14-Jul-93	1993 N18-7	NWA	99 48 10.8 124 44.4
81			21-Jul-93	1993 N18-5	NWA	99 48 13.0 124 42.0
81			1-Aug-93	1993 N18-10	NWA	99 48 09.4 124 44.6
81			19-Aug-95	1995 NOV-5B	SJF	49 48 21.5 124 31.9
81			19-Aug-95	1995 NOV-16	SJF	49 48 23.5 124 38.2
81			23-Sep-97	1997 NML-1	SJF	49 48 23.4 124 42.4

ID	Other-ID	Collec Date	Year	Sight#	Region	Location
83		14-Jul-93	1993	N18-8	NWA	99 48 10.3 124 45.2
83		14-Jul-93	1993	N18-14	NWA	99 48 09.3 124 44.8
83		15-Jul-93	1993	N18-18	NWA	99 48 09.3 124 44.8
83		15-Jul-93	1993	N18-19	NWA	99 48 10.2 124 45.3
83	JD944	18-May-94	1994	JD-	WVI	59 49 10 125 57
83	JD944	7-Jun-94	1994	JD-	WVI	59
83	JD944	22-Jun-94	1994	JD-	WVI	59 49 10 125 57
83	JD944	2-Jul-96	1996	JD-	WVI	59 49 10 125 57
83		23-Jul-96	1996	NMM-1	NWA	99 48 26.2 124 42.8
83		12-Jul-97	1997	NML-2	NWA	99 48 10.0 124 45.2
84	Fig 4.left	1-Aug-90	1990	-	SVI	59 48 43.5 125 03.0
84		14-Jul-93	1993	N18-11	NWA	99 48 09.2 124 44.7
84		14-Jul-93	1993	N18-12	NWA	99 48 09.2 124 44.7
84		14-Jul-93	1993	N18-16	NWA	99 48 07.7 124 43.8
84		21-Jul-93	1993	N18-11	NWA	99 48 11.0 124 44.7
85	kelp/Mystr	15-Aug-84	1984	-	SVI	59 48 46.0 125 09.5
85	Kelp/Mystr	16-Aug-84	1984	-	SVI	59 48 42.5 125 02.0
85		14-Jul-93	1993	N18-10	NWA	99 48 09.3 124 44.6
85		14-Jul-93	1993	N18-12	NWA	99 48 09.2 124 44.7
85		14-Jul-93	1993	N18-13	NWA	99 48 09.4 124 44.4
85		15-Jul-93	1993	N18-17	NWA	99 48 09.4 124 44.3
85		21-Jul-93	1993	N18-14	NWA	99 48 09.2 124 44.6
85		1-Aug-93	1993	N18-6	NWA	99 48 09.3 124 44.6
85		1-Aug-93	1993	N18-8	NWA	99 48 09.3 124 44.6
91		1-Aug-93	1993	N18-5	NWA	99 48 09.2 124 44.1
91		1-Aug-93	1993	N18-11	NWA	99 48 10.3 124 45.2
92		1-Aug-93	1993	N18-12	NWA	99 48 10.3 124 45.2
92		27-Jul-96	1996	NMM-3	SVI	59 48 39.0 124 50.2
92		6-Oct-96	1996	N2-1	SVI	59 48 44.7 125 08.9
92		6-Oct-96	1996	N2-3	SVI	59 48 46.1 125 08.1
92		9-Aug-97	1997	N2-2	SVI	59 48 38.8 124 48.9
92		2-Sep-97	1997	NML-4A	NWA	99 48 10.2 124 45.5
93	Bob	8-Aug-84	1984	-	SVI	59 48 08.0 125 23.5
93	Bob	17-Aug-84	1984	-	SVI	59 48 09.0 125 25.0
93		1-Aug-93	1993	N18-7	NWA	99 48 09.1 124 44.1
93	JD965	17-Jul-96	1996	JD-	WVI	59 49 10 125 57
93	JD965	13-Aug-96	1996	JD-	SVI	59 48 42 124 57
93		23-Sep-97	1997	NML-2	SVI	59 48 42.2 125 00.5
101	Smoking Wh	8-Aug-84	1984	-	SVI	59 48 53.0 125 23.5
101	Smoking Wh	8-Aug-84	1984	-	SVI	59 48 45.5 125 10.0
101	Smoking Wh	10-Aug-84	1984	-	SVI	59 48 45.4 125 10.1
101	Smoking Wh	15-Aug-84	1984	-	SVI	59 48 45.6 125 10.0
101	Smoking Wh	17-Aug-84	1984	-	SVI	59 48 54.0 125 27.5
101	Smoking Wh	17-Aug-84	1984	-	SVI	59 48 54.0 125 26.0
101	Smoking Wh	20-Aug-84	1984	-	SVI	59 48 51.5 125 27.0
101	Whale A	15-Jul-88	1988	-	SVI	59 48 40.0 124 51.0
101		28-Aug-92	1992	-	SVI	59 48 46.5 125 12.5
101	927,9217	11-Sep-92	1992	-	WVI	59 49 15.0 126 07.0
101	JD927	11-Sep-92	1992	JD-	WVI	59
101	927,9217	25-Oct-92	1992	-	WVI	59 49 15.6 126 09.0
101	JD927	25-Oct-92	1992	JD-	WVI	59 49 10 125 57
101	JD927	22-Jun-94	1994	JD-	WVI	59 49 10 125 57
101	JD927	6-Aug-94	1994	JD-	WVI	59 49 17 126 15
101	JD927	6-Sep-95	1995	JD-	WVI	59 49 23 126 30
101	JD927	19-Sep-95	1995	JD-	WVI	59 49 23 126 30
101	JD927	5-Sep-96	1996	JD-	WVI	59 49 19 126 14
107		9-Jul-94	1994	NOV-6	NWA	99 48 10.4 124 44.5
107		4-Aug-94	1994	-	NWA	99 48 10 124 46
107		19-Aug-95	1995	NOV-4	SJF	49 48 21.4 124 32.0
107		11-Jul-97	1997	NML-1	SVI	59 48 39.5 124 20.1
107		22-Aug-97	1997	NML-1	SJF	49 48 19.0 124 40.7
123	Banf	15-Aug-84	1984	-	SVI	
130	JD9424G42	Gjisser	8-Aug-84	1988	SVI	Barkley Sound
130	JD9424G42	Gjisser	12-Aug-84	1988	SVI	Barkley Sound
130	JD9424G42	Gjisser	14-Aug-84	1988	SVI	Barkley Sound
130	JD9424G42	CERF	31-Jul-90	1994	NBC	kelp bed off Foxtrott Pt. (see map) 51 4.5 127 38.4
130	JD9424G42	J Darlir	1-Nov-90	1994	WVI	Siwash Rks. 49 16 126 11
130	JD9424G42	CERF	21-Jul-92	1996	NBC	S-end of Cranstown Pt. 51 21.8 127 47.3
130	JD9424G42	CERF	22-Jul-92	1996	NBC	N.A.
130	JD9424G42	CERF	21-Aug-92	1996	NBC	in kelpbed off Bay Pt. (S) between + and *(37) 51 21 127 47.4
130	JD9424G42	CERF	27-Aug-92	1996	NBC	off E-side S-Ruby Rk. 51 18.3 127 49
130	JD9424G42	CERF	28-Aug-92	1996	NBC	N-side Ruby Rks. 51 18.4 127 49.2

ID	Other-ID	Collec Date	Year	Sight#	Region	Location
130	JD9424G42	CERF	1-Sep-92	1996	NBC	off Ruby Rks. 51 18.2 127 49.3
130	JD9424G42	CERF	4-Sep-92	1996	NBC	N-end E-side False Egg I. (N of *, just S of rocks at NE-end) 51 19.4 127 48.2
135	JD928G28	Tober	29-Apr-53	1990	SVI	Barkley Sound
135	JD928G28	J Darlir	17-Sep-88	1992	WVI	Ahous Bay 49 10 125 54
135	JD928G28	J Darlir	27-Jul-89	1993	WVI	Estevan Pt. 49 23 126 30
135	JD928G28	J Darlir	21-Apr-91	1995	WVI	Long Beach 49 22 125 43
135	JD928G28	CERF	24-Aug-91	1995	NBC	N-entrance to Eliza Bay 51 19 127 45.4
135	JD928G28	CERF	31-Aug-91	1995	NBC	Hoop Bay NE of Submarine Reef, in kelp beds on * Rks. 51 12.8 127 47.3
135	JD928G28	J Darlir	12-Aug-92	1996	SVI	Pachena Pt. 48 43 125 06
135	JD928G28	J Darlir	19-Aug-92	1996	WVI	Siwash Rks. 49 16 126 11
135	JD928G28	J Darlir	4-Sep-92	1996	WVI	Siwash Rks. 49 16 126 11
138	JD7923G6	J Darlir	22-Aug-75	1979	SVI	WCT
138	JD7923G6	J Darlir	6-Sep-77	1981	WVI	Ahous Bay 49 10 125 54
138	JD7923G6	J Darlir	17-Jul-86	1990	WVI	Ahous Bay 49 10 125 54
138	JD7923G6	CERF	22-Aug-90	1994	NBC	Burnett Bay near Hayes Rk. 51 6.7 127 41.7
138	JD7923G6	CERF	24-Aug-91	1995	NBC	just W of Islets at N-End of Burnett Bay 51 8 127 41.5
138	JD7923G6	CERF	31-Aug-91	1995	NBC	0.5nm S of Cape Caution light 51 2.4 127 34.1
138	JD7923G6	J Darlir	18-Sep-91	1995	WVI	Estevan Pt. 49 23 126 30
138	JD7923G6	J Darlir	29-Oct-91	1995	WVI	Ahous Bay 49 10 125 54
138	JD7923G6	CERF	8-Jul-92	1996	NBC	Sylvester Bay 51 9.5 127 45.2
138	JD7923G6	CERF	16-Jul-92	1996	NBC	Middle of St. Johnls Bay 51 8.2 127 41.7
138	JD7923G6	CERF	17-Jul-92	1996	NBC	SE-end Sylvester Bay 51 8.9 127 44.6
138	JD7923G6	CERF	20-Jul-92	1996	NBC	between Neck Ness and Indian Cove 51 11.6 127 47.2
138	JD7923G6	CERF	21-Jul-92	1996	NBC	Just N of Raynor Pt. 51 8.7 127 44.6
138	JD7923G6	CERF	29-Jul-92	1996	NBC	3/4 t 1 nm S of Cape Caution on kelp bed 51 8.6 127 47.3
138	JD7923G6	CERF	5-Aug-92	1996	NBC	in Bay S of Neck Ness 51 11.7 127 47.4
138	JD7923G6	CERF	12-Aug-92	1996	NBC	200m S of Moody Pt. 51 7.9 127 41.7
138	JD7923G6	CERF	14-Aug-92	1996	NBC	off Wilkie Pt. 51 8.2 127 43.4
138	JD7923G6	CERF	14-Aug-92	1996	NBC	in St. Johnls Bay 51 9.5 127 45
138	JD7923G6	CERF	15-Aug-92	1996	NBC	in Kask Bay (between Burnaby and St. Johnls Bay) 51 8.3 127 42.3
138	JD7923G6	CERF	20-Aug-92	1996	NBC	300m S of Moody Pt. 51 7.9 127 42.3
138	JD7923G6	CERF	21-Aug-92	1996	NBC	100m S of Moody Pt. 51 8.3 127 42.4
138	JD7923G6	CERF	26-Aug-92	1996	NBC	300m off SW Caution 51 9.2 127 47
138	JD7923G6	CERF	27-Aug-92	1996	NBC	off Hoop 1.7 51 13.1 127 47.6
138	JD7923G6	CERF	1-Sep-92	1996	NBC	off Raynor Pt. 51 8.6 127 44.6
140	JD794	D		1979	WVI	
140	JD904	D		1990	WVI	
141			19-Jul-97	1997 N2-7	SVI	59 48 46.1 125 09.9
141			28-Aug-97	1997 NML-4	NWA	99 48 08.1 124 03.9
150	JD923	D		1992	WVI	
150	JD923	D		1993	WVI	
166			22-Jul-95	1995 NOV-3	SJF	49 48 21.6 124 32.6
166			22-Jul-95	1995 NOV-6	SJF	49 48 21.5 124 32.3
166			24-Jul-96	1996 NMM-1	SJF	49 48 15.9 124 20.0
166			24-Jul-96	1996 NMM-2	SJF	49 48 15.0 124 17.5
166			12-Jul-97	1997 NML-3	NWA	99 48 14.7 124 42.5
166			28-Aug-97	1997 NML-1	NWA	99 48 22.4 124 44.0
166			2-Sep-97	1997 NML-4A	NWA	99 48 10.2 124 45.5
166			6-Sep-97	1997 NML-1	SJF	49 48 21.7 124 33.2
166			6-Sep-97	1997 NML-2	SJF	49 48 18.4 124 25.2
175			22-Jul-95	1995 NOV-12	NWA	99 48 21.5 124 42.9
175			23-Jul-95	1995 NOV-15	NWA	99 48 22.3 124 43.9
175			13-Jun-96	1996 NMM-1	SJF	49 48 21.0 124 31.5
175			16-Aug-96	1996 NMM-1	NWA	99 48 17.6 124 41.5
175			27-Aug-96	1996 NMM-4	NWA	99 48 17.7 124 41.5
175			28-Aug-96	1996 NMM-1	NWA	99 48 17.6 124 41.5
175			26-Sep-96	1996 NMM-1	SJF	49 48 21.1 124 34.8
175			5-Oct-96	1996 N2-2	SJF	49 48 21.3 124 31.7
175			27-Jun-97	1997 DIS-1	SJF	49 48 21.3 124 32.7
175			27-Jun-97	1997 N2-1	SJF	49 48 22.5 124 35.3
175			27-Jun-97	1997 N2-3	SJF	49 48 21.9 124 33.6
175			27-Jun-97	1997 N2-5	SJF	49 48 21.4 124 32.7
175			28-Jun-97	1997 N2-1	SJF	49 48 21.6 124 33.1
175			28-Jun-97	1997 N2-8	SJF	49 48 21.5 124 32.8
175			1-Jul-97	1997 NML-1	SJF	49 48 21.7 124 32.7
175			1-Jul-97	1997 NML-3	SJF	49 48 20.3 124 29.5
175			3-Jul-97	1997 NML-2	SJF	49 48 21.7 124 32.7
175			29-Jul-97	1997 NML-4	SJF	49 48 23.5 124 42.5
175			1-Aug-97	1997 NML-1B	SJF	49 48 23.3 124 42.4
175			2-Aug-97	1997 NML-1	NWA	99 48 23.4 124 43.5
175			24-Aug-97	1997 NML-1	SJF	49 48 20.2 124 29.6
175			27-Aug-97	1997 NML-3	SJF	49 48 20.6 124 30.3

ID	Other-ID	Collec Date	Year	Sight#	Region	Location
175		6-Sep-97	1997	NML-1	SJF	49 48 21.7 124 33.2
175		6-Sep-97	1997	NML-2	SJF	49 48 18.4 124 25.2
186	JD9422	6-Aug-94	1994	JD-	WVI	59 49 17 126 15
186		27-Jul-96	1996	NMM-2	SVI	59 48 40.5 124 51.2
186	JD9422	13-Aug-96	1996	JD-	SVI	59 48 42 124 57
186		6-Oct-96	1996	N2-7	NWA	99 48 21.3 124 43.2
186		19-Jul-97	1997	N2-6	SVI	59 48 44.5 125 07.0
187		13-Jun-96	1996	NMM-1	SJF	49 48 21.0 124 31.5
187	188	5-Aug-96	1996	NMM-1	SJF	49 48 21.2 124 32.8
187	188	27-Aug-96	1996	NMM-3	NWA	99 48 18.9 124 42.0
187		12-Jul-97	1997	NML-1	NWA	99 48 09.1 124 44.7
187		19-Jul-97	1997	N2-3	SVI	59 48 41.4 124 56.3
187		1-Aug-97	1997	NML-1B	SJF	49 48 23.3 124 42.4
187		28-Aug-97	1997	NML-3	NWA	99 48 09.8 124 45.3
187		20-Sep-97	1997	NML-5	SJF	49 48 17.7 124 21.8
187		20-Sep-97	1997	NML-4	SJF	49 48 18.6 124 22.7
190		28-Jul-96	1996	NOV-1	GH	91 46 57.1 124 04.8
192		6-Oct-96	1996	N2-10	NWA	99 48 11.1 124 44.1
192		19-Jul-97	1997	N2-4	SVI	59 48 41.4 124 56.1
192		2-Sep-97	1997	NML-4B	NWA	99 48 09.2 124 45.4
209		6-Oct-96	1996	N2-4	SVI	59 48 44.9 125 08.8
209		20-Jun-97	1997	NML-3	SJF	49 48 23.4 124 37.8
209		3-Jul-97	1997	NML-1	SJF	49 48 23.7 124 38.1
209		3-Jul-97	1997	NML-3	SJF	49 48 23.6 124 41.0
209		6-Jul-97	1997	NML-1	SJF	49 48 23.7 124 40.0
209		10-Jul-97	1997	NML-1	SJF	49 48 23.2 124 42.4
209		18-Jul-97	1997	N2-6	SJF	49 48 23.5 124 41.6
209		18-Jul-97	1997	NML-1	SJF	49 48 23.4 124 37.6
209		18-Jul-97	1997	NML-2	SJF	49 48 23.6 124 39.4
209		1-Aug-97	1997	NML-1B	SJF	49 48 23.3 124 42.4
209		2-Aug-97	1997	NML-1	NWA	99 48 23.4 124 43.5
209		4-Aug-97	1997	NML-2	SJF	49 48 23.5 124 41.3
209		16-Aug-97	1997	NML-1	NWA	99 48 22.5 124 44.0
209		17-Aug-97	1997	NML-2	NWA	99 48 22.7 124 44.3
209		22-Aug-97	1997	NML-2	NWA	99 48 09.2 124 45.2
209		28-Aug-97	1997	NML-4	NWA	99 48 08.1 124 03.9
209		2-Sep-97	1997	NML-1	SJF	49 48 23.5 124 39.7
212		12-Sep-96	1996	NMM-1	NWA	99 48 21.0 124 43.0
212		18-Sep-96	1996	NMM-4	NWA	99 48 17.6 124 41.5
212		12-Jun-97	1997	NML-1	SJF	49 48 21.6 124 33.1
212		13-Jun-97	1997	NML-2	SJF	49 48 23.3 124 42.4
212		28-Jun-97	1997	N2-4	SJF	49 48 20.6 124 30.6
212		28-Jun-97	1997	N2-6	SJF	49 48 19.5 124 27.6
212		1-Jul-97	1997	NML-5	SJF	49 48 18.4 124 25.4
219		31-May-97	1997	NML-1	SJF	49 48 23.6 124 38.1
219		31-May-97	1997	NML-2	SJF	49 48 23.6 124 40.7
219		1-Jun-97	1997	NML-1	SJF	49 48 23.5 124 35.9
219		2-Jun-97	1997	NML-1	SJF	

85		NMML	01-Jul-98	SVI	Carmanah Pt.
85		NMML	29-Jul-98	NWA	Greenbank
85		NMML	30-Jul-98	NWA	Greenbank
91		NMML	09-Jul-98	NWA	Waatch Pt.
91		NMML	31-Aug-98	WSJF	Shipwreck
92		NMML	01-Jul-98	SVI	Carmanah Pt.
92		NMML	03-Jul-98	SVI	E. Nitinat
92		NMML	30-Jul-98	NWA	ESE of White Rock
92		NMML	22-Sep-98	SVI	E. of Bonilla
93		NMML	21-Jul-98	SVI	Waterfall-Pachena Pt.
93		NMML	24-Aug-98	NWA	Yellow Banks
101		NMML	01-Jul-98	SVI	Tsusiatic Falls
101		NMML	03-Jul-98	SVI	E. Nitinat
101		NMML	25-Aug-98	SVI	.5 mi. W. Carmanah
101		NMML	25-Sep-98	WSJF	Jensen Creek
107		NMML	06-Jun-98	NWA	Waatch Pt.
123	T16	NMML	03-Jul-98	SVI	3.5 mi. SE Nitinat
130		NMML	03-Jul-98	SVI	3.5 mi. SE Nitinat
135		NMML	01-Jul-98	SVI	Tsusiatic Falls
138	T21	NMML	22-Sep-98	SVI	
140		NMML	17-Aug-98	WSJF	Warmhouse
141		NMML	01-Jul-98	SVI	Tsusiatic Falls
150	T27	NMML	01-Jul-98	SVI	Carmanah Pt.
150	T27	NMML	22-Sep-98	SVI	E. of Bonilla
166		CRC	14-Jul-98	D-2 NWA	Makaw Bay
166		NMML	30-Jul-98	NWA	Cannonball Bch.
166		NMML	01-Sep-98	NWA	E. Bodelteh
175		NMML	22-Jul-98	NWA	Skagway
175	T31	NMML	05-Sep-98	NWA	Portage Head-Shipwreck
175	T31	NMML	16-Oct-98	NWA	Portage Head
186		NMML	01-Jul-98	SVI	off Klanawa River
186		NMML	01-Jul-98	SVI	Tsusiatic Falls
187	T15	NMML	24-Jul-98	NWA	Portage Head
187	T15	NMML	30-Jul-98	NWA	Mad Bear Reef-Makah Bay
187	T15	NMML	06-Aug-98	NWA	Greenbank
187	T15	NMML	16-Aug-98	NWA	Portage Head
187		NMML	31-Aug-98	WSJF	Shipwreck
187	T15	NMML	05-Sep-98	NWA	NW of Cooke Rock
187	T15	NMML	06-Sep-98	NWA	Portage Head
187	T15	NMML	19-Sep-98	NWA	Mad Bear Reef-Makah Bay
187	T15	NMML	16-Oct-98	NWA	Cooke Rock
187		NMML	21-Oct-98	NWA	Father and Son
187	T15	NMML	18-Nov-98	NWA	Bodelteh-Ozette Is.
190		CRC	05-Apr-98	VE-2 GH	Inside
190		CRC	19-Apr-98	VE-3 GH	Inside
192		NMML	01-Jul-98	SVI	Tsusiatic Falls
192		NMML	25-Aug-98	SVI	W. Carmanah
192		CRC	27-Aug-98	N2-21 SVI	
192		NMML	05-Sep-98	NWA	NW of Cooke Rock
192		NMML	05-Sep-98	NWA	Father and Son
192		NMML	06-Sep-98	NWA	Cooke Rock
192		NMML	15-Sep-98	NWA	Cooke Rock
192		NMML	15-Sep-98	NWA	Father and Son
192		NMML	16-Sep-98	NWA	S. Father and Son
192		NMML	21-Oct-98	NWA	Bodelteh-Ozette Is.
209		NMML	22-Jul-98	NWA	Greenbank
212		NMML	01-Jul-98	SVI	Carmanah Pt.
212		NMML	25-Aug-98	SVI	.5 mi. W. Carmanah
212		CRC	27-Aug-98	N2-24 SVI	
212		NMML	28-Aug-98	SVI	Bonilla Pt.
212		NMML	04-Sep-98	SVI	NW of Carmanah
212		NMML	22-Sep-98	SVI	E. of Bonilla
212		CRC	29-Sep-98	N1-5 SVI	
219	T4	NMML	01-Jul-98	SVI	Tsusiatic Falls
219	T4	NMML	03-Jul-98	SVI	3.5 mi. SE Nitinat

219	T4	NMML	21-Jul-98		SVI	Carmanah Pt.
219	T4	NMML	25-Aug-98		SVI	.5 mi. W. Carmanah
219	T4	CRC	27-Aug-98	N2-24	SVI	
219	T4	NMML	04-Sep-98		SVI	W. of Carmanah
219	T4	CRC	29-Sep-98	N1-4	SVI	
227	T2	NMML	01-Jul-98		SVI	Carmanah Pt.
227	T2	NMML	03-Jul-98		SVI	Nitinat
228	T5	NMML	01-Nov-98		WSJF	Jensen Creek
228	T5	NMML	04-Nov-98		WSJF	off Seal/Sail Rk. Area
231	T10	NMML	01-Jul-98		SVI	Carmanah Pt.
231	T10	NMML	03-Jul-98		SVI	W. of Carmanah Pt
231	T10	NMML	21-Jul-98		SVI	Carmanah Pt.
231	T10	NMML	25-Aug-98		SVI	Carmanah Pt.
231	T10	CRC	27-Aug-98	N2-22	SVI	
231	T10	NMML	04-Sep-98		SVI	Carmanah Pt.
231	T10	NMML	22-Sep-98		SVI	E. Nitinat
231	T10	CRC	29-Sep-98	N1-6	SVI	
232	T11	NMML	17-Jul-98		SVI	E. Carmanah
232	T11	NMML	25-Aug-98		SVI	E. Carmanah
232	T11	CRC	27-Aug-98	N2-24	SVI	
233	T12	NMML	01-Jul-98		SVI	Carmanah Pt.
233	T12	NMML	03-Jul-98		SVI	W. Carmanah
234	T14	NMML	01-Jul-98		SVI	off Klanawa River
236	T19	NMML	25-Aug-98		SVI	E. Carmanah
236	T19	CRC	27-Aug-98	N2-18	SVI	
236	T19	NMML	28-Aug-98		SVI	Bonilla Pt.
237	T26	CRC	27-Aug-98	N2-25	SVI	
239	T35	NMML	14-Oct-98		WSJF	Jensen Creek
239	T35	NMML	15-Oct-98		WSJF	Rasmussen Creek
239	T35	NMML	15-Oct-98		WSJF	Seal/Sail Rock
239	T35	NMML	22-Oct-98		WSJF	Snow Creek
242	T39	NMML	17-Jul-98		SVI	E. Carmanah
242	T39	NMML	21-Sep-98		NWA	Sand Pt.
242	T39	NMML	18-Oct-98		WSJF	Seal Rock
242	T39	NMML	21-Oct-98		NWA	Father and Son
242	T39	NMML	21-Oct-98		WSJF	Snow Creek
242	T39	NMML	31-Oct-98		WSJF	Sail River
242	T39	NMML	05-Nov-98		WSJF	off Sail River area
243	T41	NMML	17-Jul-98		SVI	E. Carmanah
244	T44	NMML	22-Sep-98		SVI	E. of Bonilla
246	T54	NMML	03-Jul-98		SVI	Campers Crk. Near Owen Pt.
248	T58	NMML	01-Jul-98		SVI	Tsusiat Falls
249	T65	NMML	14-Oct-98		WSJF	Rasmussen Creek
249	T65	NMML	15-Oct-98		WSJF	Seal Rock
249	T65	NMML	15-Oct-98		WSJF	Seal/Sail Rock
249	T65	NMML	18-Oct-98		WSJF	Seal Rock
249	T65	CRC	21-Oct-98	W-1	ESJF	Green Pt.
250	T67	NMML	07-Nov-98		WSJF	Sail Rock
251	T71	NMML	09-Jul-98		NWA	Guano Rock
252	T72	NMML	05-Nov-98		WSJF	Sail River
253	T73	NMML	31-Oct-98		WSJF	Sail River
254	T74	NMML	01-Sep-98		SVI	E. Pachena
255	T75	NMML	14-Oct-98		WSJF	Jensen Creek
255	T75	NMML	15-Oct-98		WSJF	Seal/Sail Rock
255	T75	NMML	17-Oct-98		WSJF	Chito Beach
255	T75	NMML	18-Oct-98		WSJF	Seal Rock
255	T75	NMML	21-Oct-98		WSJF	Snow Creek
255	T75	NMML	22-Oct-98		WSJF	E. Bullman Bch.
255	T75	NMML	28-Oct-98		WSJF	Rasmussen Creek
258	T82	CRC	15-Oct-98	N1-1	SPS	Nisqually
259	T83	CRC	12-Nov-98	N1-1	SPS	Nisqually
259	T83	CRC	17-Nov-98	DE-3	SPS	Nisqually
260	T84	CRC	17-Nov-98	DE-4	SPS	Nisqually
262	T87	CRC	18-Mar-98		N-1	SPS
262	T87	CRC	26-Mar-98		N-1	SPS

264	T89	CRC	21-Mar-98	T1-16 NPS	
264	T89	CRC	22-Mar-98	T1-3 NPS	
264	T89	CRC	27-Mar-98	N-3 NPS	
264	T89	CRC	15-Apr-98	DS-2 NPS	
264	T89	CRC	16-Apr-98	N-13 NPS	
264	T89	CRC	23-Apr-98	DS-4 NPS	
264	T89	CRC	20-May-98	DS-1 NPS	
267	T94	CRC	21-Oct-98	W-4 ESJF	Green Pt.
267	T94	CRC	11-Nov-98	W-6 ESJF	Green Pt.
268	T95	CRC	28-Oct-98	W-2 ESJF	Green Pt.
268	T95	CRC	11-Nov-98	W-3 ESJF	Green Pt.
269	T102	CRC	22-Mar-98	VE-3 GH	Inside
269	T102	CRC	28-Mar-98	VE-7 GH	Inside
269	T102	CRC	28-Mar-98	VE-5B GH	Inside
269	T102	CRC	28-Mar-98	VE-8 GH	Inside
269	T102	CRC	02-Apr-98	VE-4 GH	Inside
269	T102	CRC	04-Apr-98	VE-9 GH	Inside
269	T102	CRC	16-Apr-98	VE-2 GH	Inside
269	T102	CRC	18-Apr-98	VE-15 GH	Inside
269	T102	CRC	19-Apr-98	VE-6 GH	Inside
269	T102	CRC	19-Apr-98	VE-4 GH+	Entrance
270	T106	CRC	22-Mar-98	VE-3 GH	Inside
270	T106	CRC	02-Apr-98	VE-2 GH+	Entrance
270	T106	CRC	04-Apr-98	VE-4 GH+	Entrance
270	T106	CRC	05-Apr-98	VE-3 GH	Inside
270	T106	CRC	05-Apr-98	VE-4 GH	Inside
270	T106	CRC	09-Apr-98	VE-1 GH	Inside
270	T106	CRC	10-Apr-98	VE-1 GH	Inside
270	T106	CRC	11-Apr-98	VE-3 GH	Inside
270	T106	CRC	12-Apr-98	VE-6 GH	Inside
270	T106	CRC	18-Apr-98	VE-12 GH	Inside
270	T106	CRC	18-Apr-98	VE-10 GH	Inside
271	T109	CRC	04-Apr-98	VE-2 GH	Inside
271	T109	CRC	17-Apr-98	VE-3 GH	Inside
271	T109	CRC	18-Apr-98	VE-16 GH	Inside
271	T109	CRC	19-Apr-98	VE-5 GH	Inside
271	T109	CRC	19-Apr-98	VE-7 GH	Inside
271	T109	CRC	19-Apr-98	VE-9 GH	Inside
271	T109	CRC	24-Apr-98	VE-1 GH	Inside
271	T109	CRC	25-Apr-98	VE-3 GH	Inside
271	T109	CRC	25-Apr-98	VE-4 GH	Inside
271	T109	CRC	26-Apr-98	VE-7 GH	Inside
271	T109	CRC	01-May-98	VE-1 GH	Inside
271	T109	CRC	03-May-98	VE-1 GH	Inside
271	T109	CRC	03-May-98	VE-2 GH	Inside
271	T109	CRC	11-May-98	DLX-1 GH	Inside
272	T110	NMML	31-Aug-98	NWA	Shi Shi
273	T111	CRC	21-Mar-98	VE-4 GH	Inside
273	T111	CRC	11-Apr-98	VE-2 GH	Inside
273	T111	CRC	17-Apr-98	VE-2 GH	Inside
273	T111	CRC	19-Apr-98	VE-9 GH	Inside
273	T111	CRC	25-Apr-98	VE-5 GH	Inside
273	T111	CRC	26-Apr-98	VE-1 GH	Inside
304	T201	NMML	15-Sep-98	NWA	Cooke Rock
304	T201	NMML	19-Sep-98	NWA	W. Cannonball Rock
304	T201	NMML	21-Oct-98	NWA	Bodelteh-Ozette Is.
305	T205	CRC	27-Mar-98	N-5 NPS	