FINAL REPORT

GRAY WHALE PHOTOGRAPHIC IDENTIFICATION IN 1999: COLLABORATIVE RESEARCH BY CASCADIA RESEARCH, THE NATIONAL MARINE MAMMAL LABORATORY, AND HUMBOLDT STATE UNIVERSITY

John Calambokidis and Lisa Schlender
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

Dawn Goley and Caitlyn Toropova
Humboldt State University
1 Harpst Street
Arcata, California 95521

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

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EXECUTIVE SUMMARY

This report summarizes activities and results of gray whale photographic identification research conducted by Cascadia Research in collaboration with the National Marine Mammal Laboratory and Humboldt State University in 1999. This represents a continuation of photographic identification surveys for gray whales that have been conducted annually in the Pacific Northwest since 1991. 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 (so-called "seasonal residents"). A broader ongoing effort has also been conducted in collaboration with researchers from a number of other organizations.

Research effort by the three groups centered in different areas. Between 14 March and 30 October 1999, Cascadia personnel conducted a total of 45 boat and land surveys for gray whales (dedicated and opportunistic) in the waters off northern California, Oregon, and Washington. Biologists from the National Marine Mammal Laboratory (NMML) provided identification photographs from surveys they conducted between 16 April and 23 November 1999 off the Washington outer coast, the western Strait of Juan de Fuca, northern Puget Sound and along the west coast of Vancouver Island, British Columbia. Identification photographs provided by Humboldt State University were from their work conducted off northern California and surveys off whale-watching boats out of Depoe Bay, Oregon from 7 July to 11 October 1999. On 516 occasions good quality identification photographs were obtained of 216 different gray whales. Individuals were seen up to 8 times with a mean of 2.4 (SD= 2.1). Overall 84 (39%) of the whales identified in 1999 were known from previous years.

There were dramatic differences in resighting rates among whales identified in different regions and time periods. Results off Vancouver Island were generally consistent with past years with large numbers of whales identified and high resighting rates both within season and between years. Identifications from other areas were more varied. Very few gray whales were seen off the Washington coast in the summer, but a limited effort in May (immediately after the Makah whale hunt) yielded identifications of a large number of whales that included a small number of known seasonal residents but mostly animals not previously identified. In Washington inland waters, unusually high numbers of gray whales were seen including sightings in areas where whales have not been generally observed previously. Other than six regular returning animals in northern Puget Sound, however, none of these animals were known from previous years and only a few were seen outside this region. Results from Oregon and California were more mixed, with a inter-year resighting rates high off Oregon but low off California.

Mark-recapture estimates of abundance made using annual samples (excluding identifications from early season and inland waters) from 1998 and 1999 yielded an estimate of 269 gray whales, higher than estimates made previously. One reason for the higher estimate was due to the 1999 sample from California, where only 9 of the 39 whales identified had been seen in a previous year. Exclusion of California data from the 1999 sample dropped the estimates to 222; more similar to the estimates obtained previously.

INTRODUCTION

This report summarizes activities and results of gray whale photographic identification research conducted by Cascadia Research in collaboration with the National Marine Mammal Laboratory and Humboldt State University in 1999. This represents a continuation of photographic identification surveys for gray whales that has been conducted annually in the Pacific Northwest (Calambokidis *et al*. 1994, 1999, Calambokidis 1996, Calambokidis and Quan 1997, Calambokidis and Schlender 1998). 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 (which we refer to as seasonal residents in this report). 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).

The issue of "seasonal resident" whales has gained significance due to the resumption of whaling for gray whales by the Makah Tribe of Washington State. Although the whaling Management Plan calls for targeting migratory whales, there remains concern over the possible management implications of the hunt on seasonal resident whales (Quan 2000). Limited genetic testing has not revealed a difference in mtDNA haplotypes between seasonal resident and migratory gray whales off Vancouver Island although samples sizes were small (Steeves 1998). Genetic differences may not be detected even when sub-populations are distinct enough to warrant management as separate units (Taylor 1997).

In addition to the research reported here, other researchers continue photographic identification studies from British Columbia to southwestern Alaska. Starting in 1998, there has been a collaborative effort among these groups to conduct an expanded photographic identification comparison. In addition to the research reported here by Cascadia Research, the National Marine Mammal Laboratory, and Humboldt State University, 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). Results of the larger effort from California to Alaska for 1998 (Calambokidis *et al.* 2000) have been summarized in a draft manuscript and efforts to complete this larger comparison for 1999 are planned.

METHODS

Surveys were conducted by three organizations from northern California to British Columbia (Figure 1). Between 14 March and 30 October 1999, Cascadia personnel conducted a total of 45 boat and land surveys for gray whales (dedicated and opportunistic) in the waters off northern California, Oregon, and Washington (Table 1 and 2). These surveys were conducted in a number of regions and utilized several platforms including:

- small boat surveys in southern and northern Puget Sound, the Straight of Juan de Fuca, and Grays Harbor, primarily using Cascadia's RHIB and other platforms of opportunity (including whale watch boats out of Everett and Port Townsend) on 14 days between 2 April and 13 August 1999,
- small boat surveys of the Washington Coast using both Cascadia's RHIB and some opportunistic effort in association surveys conducted with the Olympic Coast National Marine Sanctuary on 4 days between 20 May and 20 October 1999,
- small boat surveys using Cascadia's RHIB off Oregon including a search from Tillamook Bay to south of Newport on 5 days from 6 September to 13 October 1999,
- small boat surveys using Cascadia's RHIB off northern California in association with humpback whale effort on 5 days from 14 September to 30 October 1999,
- placing observers on the whale watch boat, the *Victoria Express*, operating out of Westport, WA on 12 days between 14 March and 25 April 1999,
- effort from land photographing gray whales in Discovery Bay, southern Puget Sound and near Neah Bay on 5 days between 1 and 18 April 1999,
- opportunistic photographs were also provided to us by other naturalists and researchers who opportunistically photographed gray whales in Puget Sound including Dyanna Lambourn, Mark Sears, and Mike Felber.

Biologists from the National Marine Mammal Laboratory (NMML) provided identification photographs from surveys they conducted between 16 April and 23 November 1999 (Tables 2 and 3). 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.

Identification photographs were provided by Humboldt State University from their work conducted off northern California and Oregon (Tables 2 and 4). Identifications off northern California were primarily made out of Trinidad and Crescent City from 12 July to 11 October 1999 aboard a 16 ft inflatable. Identifications off Oregon were made primarily aboard Tradewind Charter company whale watch boats operating out of Depoe Bay from 7 July to 6 October 1999.

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

On 477 occasions, good quality identification photographs were obtained of 216 different gray whales by Cascadia Research, NMML, and Humboldt State University in 1999 (Table 2). Whales were seen up to 8 times with a mean of 2.4 (SD= 2.1). Overall, 84 (39%) of the whales identified in 1999 were known from previous years. Identifications, including sighting history, are summarized by organization (Tables 3 and 4).

Resighting rates were different among whales identified in different regions and time periods (Tables 5 and 6). Results from off Vancouver Island were generally consistent with past years with large number of identifications and high resighting rates both within season and between years. The number of newly identified whales and the resighting rates from other areas were more varied than off Vancouver Island. Very few gray whales were seen off the Washington coast in the summer. A limited effort in May immediately after the Makah whale hunt, yielded identifications of a large number of whales which included only a small number of known seasonal residents; most of the whales during this time period had not been previously identified. In Washington inland waters (including Puget Sound and Hood Canal) there were unusually high numbers of gray whales and newly identified individuals. Furthermore, whales were concentrated in a number of infrequently used areas. Aside from six regular returning animals in northern Puget sound, however, none of these were previously identified animals and few were seen outside this region again. Results from Oregon and California were more varied, with inter-year resighting rates high off Oregon but low off California. The different findings by broad region are described in more detail below.

From matching photographs of identified animals, we documented the overall movement patterns throughout the study season in 1999 (Figure 2). While these patterns are partly biased by the timing of effort in different locations, they do reveal movements of some known individuals. In general, a northward shift in areas of use by some gray whales was noted from May to August with identified gray whales moving from the Washington coast, southern Vancouver Island, and the Strait of Juan de Fuca northward to areas off central and northern Vancouver Island. From August to October, movements in the opposite direction predominated with whales identified off Vancouver Island being photographed in the Strait of Juan de Fuca and off the Washington coast in August and September, and then off Oregon in September and October. Despite these overall patterns, there were also movements opposite to those described above, indicating variability in the behavior of animals and not a unified migration or shift.

Identifications off Vancouver Island

Identifications of gray whales reported here were obtained from along the western and northern Vancouver Island regions during two region-wide surveys conducted by NMML in early August and September as well as more frequent coverage of southern Vancouver Island. This report does not include results from survey effort along Vancouver Island obtained by other research groups affiliated with West Coast Whale Research Foundation, University of Victoria, University of British Columbia, Coastal Ecosystems Research Foundation, and Juan de Fuca Express. Because photographic matching between the samples reported here and those from these other groups have not been completed, the results for this region are preliminary.

These relatively few surveys yielded a large number of identifications from broad coverage of most of the outside coastal waters of Vancouver island. In total, 18 individual gray whales were identified off southern Vancouver Island, 48 from western Vancouver Island (from Barkley Sound to Cape Scott), and 10 from northern Vancouver Island. In all three areas, a high proportion of the animals (65-100%) were individuals identified in previous years including a high proportion (60-94%) identified in 1998 (Table 6).

Early season identifications off the northern Washington coast

A large number of identifications of whales came from an early season sample taken on a single day off the Washington Coast. A total of 71 identifications of 45 different individuals were made on 20 May 1999, 5 nmi north of La Push on the Washington outer coast. An estimated 50 to 100 gray whales were in this general area, a larger concentration than we generally encounter. This was less than 10 nmi south and a week after the successful Makah take of a whale. In past years, identifications were generally not made in this area early in the season because it is in the migratory corridor and would likely include migratory animals. This sample in 1999, however, is of interest because of the similar timing and location to the area of the Makah hunt.

Although this large group of whales was in the migratory corridor, their behavior was more suggestive of feeding than of migrating. Of the 60 groups (singles or pairs) of gray whales made that day, all but two groups were judged to be milling rather than travelling in a consistent direction. Surface direction of animals was recorded on 54 occasions and varied widely. Similar proportions of animals had a southerly direction (SW, S, or SE) compared to a northernly direction (35% vs. 44%). Similarly, multiple identifications of 15 of the 45 individuals photographed during the day indicated little movement with again a roughly equal split between those that had shifted slightly to the north or south.

Only 6 of the 45 (or 13%) identifications made off northern Washington in May were individuals known from previous years, a lower percentage than was found for most other areas. These six whales had been first identified between 1994 and 1998. Five were seen in 1998; four had been seen off southern and central Vancouver Island, two off Oregon, and one off the Washington coast. Even though only one was seen in 1998 off northern Washington, two others had been seen there in previous years. One of the six gray whales that we had identified from past years (ID# 191) was a whale seen only in 1996 once again in the early season but this time off Grays Harbor. This whale was identified six times between 7 April and 12 May 1996 in an area off Grays Harbor called the "Whale Hole". Although this spot is in the migratory corridor, it is an area where feeding whales, some of which are seen later in the season, have been identified (Calambokidis and Quan 1997).

Similarly, only 4 of the 45 whale identified off the Washington coast in May 1998 were seen later in the season in the effort by Cascadia, NMML, and HSU. All four of these whales were also whales that had been documented in previous years. Three of these whales were seen later in the season in July and August off central Vancouver Island and one was seen beginning in July off Oregon.

These findings indicate that seasonal resident whales are present during the time and in the area of the Makah whale hunt but are a relatively small proportion of the animals. There did not appear to be any clear way to distinguish between those whales that remained in the Pacific Northwest and those that moved out of the area. These results should be treated cautiously, however, since 1999 appeared to have been an anomalous year in a number of respects including unusually large numbers of whales apparently feeding in atypical areas and high observed mortality.

Identifications in Washington inside waters

A higher than usual number of whales was seen in a number of areas of Puget Sound in spring 1999 (Table 5). These included sightings of multiple whales in Discovery Bay, around northern and southern Puget Sound, around the San Juan Islands, and in Hood Canal. A total of 95 identifications of 33 different whales were made in these combined regions with only six known from previous years (Table 6).

Some of these sightings in inland waters were in unusual areas. In Discovery Bay, six whales were identified in April 1999 near Adelma Beach, an area where gray whales have not generally been seen in past years. None of these whales had been identified previously but several were seen in other regions later in the season. Two (ID# 350 and 396) were seen in Admiralty Inlet later in April and May; one of these was seen off west Seattle in June. Another whale (ID# 351) seen in Discovery Bay was later identified at the very end of Hood Canal near Belfair on 29 April and then was seen by NMML off Bajo Reef, off western Vancouver Island on 8 August.

Although spring-time sightings have been common in past years off Whidbey Island in northern Puget Sound, there were differences in the locations and resighting rates of animals seen in 1999 compared to past years. Many of these whales were feeding in shallow waters of the Snohomish Delta in April and May. Although our effort did not continue through the summer, gray whales were reported in this region through the summer. Five of the 19 whales identified in this region were animals that had been seen in this same areas most years since 1991, one other individual was known from a sighting in a previous year elsewhere and the remaining 13 had not been seen previously. Unlike the whales that we have identified in the past in this region, which we rarely see in other areas, four of these whales were seen elsewhere in 1999, one in southern Puget Sound and around the San Juan Islands, another off west Seattle, a third in Hood Canal and off western Vancouver Island, and a fourth off Oregon.

Sightings around southern Puget Sound were reported through the spring and summer and identifications were obtained of six whales between 4 April and 8 July. Two of these whales were seen near Purdy in early April. One of these was seen only once and the other (ID 459) was seen multiple times later in April and in May in northern Puget Sound and then in June in the San Juan Islands. Two other whales gathered considerable attention when they swam under the 4th Avenue bridge on 8 July and spent most of the day gathering crowds of several hundred people in downtown Olympia. Neither of these two whales has been seen at any other time.

Similarly, of the two whales seen off west Seattle in early June, one was not seen at any other time and the other was a whale seen prior to this in the Discovery Bay area.

The frequent sightings and identifications of a few gray whales in the San Juan Island area in 1999 were also unusual because gray whales have previously been uncommon in these waters. The 40 identifications made from 4 April to 18 June were all of five whales seen up to 20 times each. None had been seen in a previous year and only one had been seen in a different area (the animal mentioned above identified in southern and northern Puget Sound in April and May).

Many of the areas where we identified gray whales in inside waters were near areas where we had strandings of gray whales in 1999. Ten gray whale strandings were recorded between 18 April and 6 July 1999 in Washington inside waters including six in northern Puget Sound, two in the San Juan Islands, and one each in southern Puget Sound and Hood Canal. In many cases, suitable identification photographs of stranded animals could not be obtained and did not allow us to make a positive match between live and stranded whales.

In past years, high rates of gray whale mortality have corresponded with years of high numbers of animals sighted in inside waters (for example 1990 and 1991, Calambokidis *et al.* 1994). As in past years, of the stranded gray whales from which we could get suitable photographs, none matched those of previously known seasonal resident whales. The high mortality in 1999 in Washington State was consistent with elevated mortality of gray whales documented from Mexico to Alaska. We suspect that gray whales that came into many areas of Puget Sound were primarily stragglers from the migration that were not in good health.

Identifications in Oregon and California

Identifications by Humboldt State University and Cascadia yielded 31 unique animals from 51 identifications off central Oregon and 36 individuals from 59 identifications off northern California in July through October (Table 5). Identifications in Oregon were made from July to October with most made in October. A high proportion of the gray whales identified off Oregon were known from previous years (19 / 31 or 61%). Most of these had been seen in other regions with only five whales identified in past years off Oregon.

Results from California were different than from Oregon. Most of the whales were identified off California in July and August. Only six of the 36 (17%) were known from previous years and only two of these from California. Similarly, there was relatively little interchange with other areas documented with this region in 1999. Only five of the whales identified in California were seen in other areas that year and all these were whales that moved between northern California and central Oregon.

Estimates of abundance

Mark-recapture estimates of abundance made using annual samples from 1998 and 1999 yielded higher estimates than using previous years (Table 7). The 1998 sample encompassed broad coverage of a number of areas from California to southeastern Alaska gathered by a number of collaborating organizations (Calambokidis *et al*. 2000). Data from 1999, while not

quite as large or as complete geographically, still provided broad coverage from northern California to north of Vancouver Island. To insure identifications were of seasonal resident whales, only identifications taken from 1 June or later were used and identifications from inland waters of Washington were excluded (see Table 7).

The abundance estimate based on 1998 and 1999 samples was 269 (Table 7). This is higher than the estimates of 169 and 175 obtained using 1996 and 1997 annual samples, respectively, in conjunction with 1998 (Calambokidis *et al.* 2000). One reason for the higher estimate using the 1999 data is the sample from California, where there were 39 identifications but only 9 matched a previous year. Exclusion of California from the 1999 sample dropped the estimates to 222 (Table 7). It is unclear why the 1999 California sample was so different. It could be part of the high mortality and unusual distribution of gray whales seen in 1999 resulting in an anomalous occurrence of whales that were stragglers from the main migration.

These mark-recapture estimates should be viewed as tentative until more is learned about the range and movements of these whales to allow testing of some of the assumptions behind mark-recapture estimates. The 1999 sample used here, does not yet include identifications from some of the other collaborating researchers participating in the 1998 comparison.

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TABLES AND FIGURES

Tables

Figures

Appendix Tables

Table 1. Summary of field effort by Cascadia Research personnel off California, Oregon and Washington in 1999.

			Time			Dist	Latitude		Gray whale		
Date	**Vessel**	**Region**	**Start**	**End**	**Duration**	**nmi**	**South**	**North**	**Sit #**	**An #**	**Pho #**
Washington outer coast											
20-May-99	N1	OC	8:20	18:05	9.8	70	47.849	48.390	61	86	66
4-Aug-99	OC2	OC	13:10	19:58	6.8	58	48.159	48.387	2	3	3
10-Oct-99	N2	OC	8:45	19:00	10.3	108	48.305	48.498	2	2	1
20-Oct-99	N2	OC	8:04	18:05	10.0	150	47.859	48.385			
Total		4	days		36.8	386			65	91	70
Washington inside waters											
2-Apr-99	PAT	NPS	10:27	17:00	6.6	25	48.102	48.267	2	2	2
4-Apr-99	N1	SPS	13:30	19:00	5.5	31	47.165	47.381	1	2	1
6-Apr-99	N1	NPS	11:35	19:45	8.2	48	47.980	48.142	12	19	16
9-Apr-99	GS	NPS	9:41	9:41	0.0	-	48.257	48.257	1	1	1
14-Apr-99	GS	NPS	9:30	9:30	0.0		48.257	48.257	1	1	
20-Apr-99	MIS	NPS	15:00	15:45	0.8		47.967	47.971	1	1	1
9-May-99	WB	NPS	10:12	19:38	9.4	34	47.943	48.103	6	9	7
20-May-99	GS	NPS	8:45	18:48	10.1	70	48.112	48.517	2	4	3
23-May-99	N1	NPS	11:25	17:50	6.4	39	47.987	48.159	5	8	4
28-Jun-99	OOS	OC	8:00	17:06	9.1	80	47.995	48.398	3	4	2
8-Jul-99	N1	SPS	12:10	16:00	3.8	2	47.043	47.062	1	2	2
21-Aug-99	N2	GH	13:11	16:00	2.8	11	46.905	46.968	2	2	2
27-Aug-99	RAV	NPS	5:02	14:34	9.5	121	48.156	48.368			
31-Aug-99	RAV	GH	9:50	9:50	0.0	-	46.907	46.907	1	1	
Total		14			72.2	462			38	56	41
Opportunistic effort from Grays Harbor whalewatching boats											
14-Mar-99	VE	GH	13:54	16:14	2.3	10	46.907	46.942			
20-Mar-99	VE	GH	14:02	16:36	2.6	9	46.907	46.943	2	2	-
27-Mar-99	VE	GH	14:02	16:28	2.4	6	46.907	46.933	1	1	-
28-Mar-99	VE	GH	13:59	16:20	2.4	5	46.907	46.924	1	1	-
3-Apr-99	VE	GH	11:01	16:14	5.2	17	46.907	46.932			
4-Apr-99	VE	GH	14:01	16:44	2.7	8	46.908	46.923	6	8	3
10-Apr-99	VE	GH	11:00	16:32	5.5	16	46.900	46.938	22	23	12
11-Apr-99	VE	GH	14:07	16:48	2.7	9	46.911	46.928	13	16	13
17-Apr-99	VE	GH	11:02	13:29	2.5	6	46.907	46.924	3	5	4
18-Apr-99	VE	GH	11:01	16:32	5.5	25	46.903	46.953	8	9	8
24-Apr-99	VE	GH	11:06	13:25	2.3	6	46.911	46.938	2	2	2
25-Apr-99	VE	GH	11:01	16:33	5.5	13	46.908	46.962	10	11	7
Total		12	days		41.7	131.1			68	78	49
Oregon											
6-Sep-99	RAV	Southern	12:52	19:44	6.9	46	44.184	44.608			
8-Sep-99	RAV	Southern	8:33	18:33	10.0	49	42.908	43.370			
13-Sep-99	N1	Central	11:37	19:54	8.3	82	44.488	45.598	9	12	10
12-Oct-99	N2	Central	8:17	19:15	11.0	96	44.411	44.837	12	20	16
13-Oct-99	N2	Central	8:03	18:10	10.1	90	44.399	44.651			
Total		5	days		46.2	363			21	32	26
California											
14-Sep-99	N1	CA	11:00	13:15	2.3	10	41.742	41.790			
20-Sep-99	N2	CA	9:00	19:58	11.0	82	37.862	38.323	1	1	1
23-Sep-99	N2	CA	16:48	19:41	2.9	37	41.737	41.872			
11-Oct-99	N2	CA	7:51	18:13	10.4	124	41.449	42.107	1	1	1
30-Oct-99	N1	CA	10:17	17:46	7.5	112	41.516	42.083	3	4	3
Total		5	days		34.0	365			5	6	5
Supplemental identifications made from land											
1-Apr-99	LND	SJF	13:30	17:40	4.2		48.358	48.358	3	7	1
10-Apr-99	LND	SJF	11:00	12:30	1.5		48.044	48.044	1	3	3
13-Apr-99	LND	SPS	18:00	19:15	1.3		47.118	47.118	1	1	1
14-Apr-99	LND	SJF	10:09	19:00	8.9		48.044	48.044	1	5	
18-Apr-99	LND	SJF	13:00	15:00	2.0		48.044	48.044	1	4	3
Total		5	days		17.8	-			7	20	8
Total all area		45	days		248.6	1,707			204	283	199

Table 2. Summary of effort and identifications of gray whales off California, Oregon, Washington, and British Columbia by organization for 1999.

Collection	Identifications	Unique IDs	Start	End
Cascadia Research	233	115	3/14/99	10/30/99
Humboldt State University	89	49	7/7/99	10/11/99
National Marine Mammal Laboratory	194	78	4/16/99	11/23/99
All	516	216	3/14/99	11/23/99

Unique IDs for all is adjusted for whales seen by multiple organizations

Table 3. Summary of regions, dates, and sighting histories of whales identified by NMML in 1999.

	Times seen by org.				Times seen in 1999 by region								Dates in 1999		1st yr	
ID	CRC	NMML	HSU	Total	OR	NWA	SJF	HC	NPS	SVI	WVI	NBC	First	Last	seen	Regions seen in 1998
15			2	2						2			8/4/99	8/14/99	1984	NWA,SVI
21	3		1	4					4				4/6/99	5/21/99	1990	NPS
22	3		1	4					4				4/6/99	5/21/99	1990	NPS
30			5	5							5		8/7/99	9/12/99	1983	SJF,SVI
32			2	2								2	8/11/99	8/11/99	1985	NBC
37			2	2							2		8/8/99	8/8/99	1988	NWA,SVI,WVI
41			2	2						1		1	6/30/99	8/10/99	1990	SJF,SVI,WVI
42			10	10			6			3	1		7/23/99	10/19/99	1984	SJF,SVI,WVI
43	3	2	3	8	5					3			7/23/99	10/12/99	1984	NWA,SVI
67	3		1	4	3	1							9/13/99	11/23/99	1992	
79			1	1		1							6/29/99	6/29/99	1993	NWA,SVI
80			3	3		2				1			7/23/99	10/13/99	1993	NWA,SVI,WVI
81			5	5		1					4		8/8/99	9/29/99	1993	NWA,SVI,WVI
83	1	1	2	4	2						2		8/12/99	10/12/99	1993	NWA,WVI
84	1	1	3	5	2						3		8/7/99	9/19/99	1990	OR,SVI
86			3	3							2	1	8/10/99	9/12/99	1975	NBC
87	1		4	5	1						4		8/7/99	10/12/99	1993	CVI,WVI
92			5	5						1	4		6/30/99	9/11/99	1993	NWA,SVI
94		1	1	2	1						1		8/13/99	10/5/99	1993	WVI
98			1	1								1	8/10/99	8/10/99	1992	
105			1	1								1	8/10/99	8/10/99	1994	OR,SVI,WVI
123			1	1						1			7/23/99	7/23/99	1984	SVI
135			5	5							5		8/8/99	9/12/99	1990	SVI,WVI
136			1	1							1		8/8/99	8/8/99	1990	WVI
138			2	2								2	8/11/99	8/11/99	1979	SVI,WVI
141			4	4		1					3		8/7/99	9/29/99	1976	SVI,WVI,NBC
143			5	5						1	4		6/30/99	9/12/99	1990	SVI,WVI,NBC
144			1	1							1		8/13/99	8/13/99	1990	SVI,WVI
152			2	2							2		8/13/99	9/12/99	1995	
153			1	1								1	8/10/99	8/10/99	1994	
166			2	2						2			8/4/99	8/4/99	1995	NWA,SVI
175			3	3							3		8/7/99	9/11/99	1995	NWA,SVI,WVI
177	1		8	9		3				6			5/20/99	10/18/99	1995	SVI,WVI
178	2		1	3		2					1		5/20/99	8/7/99	1995	WVI
185			6	6			4			1	1		6/30/99	10/19/99	1994	SVI,WVI
186	1		1	2	1						1		8/13/99	10/12/99	1994	OR,SVI,WVI
187			4	4						3	1		7/23/99	9/12/99	1996	NWA,SJF,SVI
192			3	3						3			6/30/99	8/4/99	1996	NWA,SVI,WVI
205			6	6		6							8/28/99	11/2/99	1996	
212			2	2						2			7/23/99	9/10/99	1996	SVI
219			2	2						2			7/23/99	8/14/99	1997	SVI
229			3	3							3		8/8/99	8/12/99	1998	SJF
231			3	3						3			6/30/99	8/14/99	1998	SVI
236	1		1	2	1							1	8/10/99	9/13/99	1996	SVI,WVI,NBC
238			2	2								2	8/11/99	8/11/99	1996	SVI,WVI
242			8	8			5			3			7/23/99	11/3/99	1998	NWA,SJF,SVI
244			3	3							3		8/8/99	8/13/99	1998	SVI,WVI
254			4	4							4		8/7/99	9/12/99	1998	SVI,WVI
273			2	2					2				4/16/99	5/21/99	1998	GH
281	1	1	3	5	2						3		8/8/99	10/12/99	1991	
296			2	2							2		8/13/99	9/12/99	1998	OR
300	1		2	3		1					2		5/20/99	9/11/99	1998	OR,WVI
309	1		1	2	1						1		8/13/99	9/13/99	1998	WVI
315			1	1								1	8/11/99	8/11/99	1996	WVI,NBC
317			1	1							1		8/13/99	8/13/99	1998	WVI
320			1	1							1		8/13/99	8/13/99	1994	WVI,NBC
328			3	3							3		8/13/99	9/12/99	1996	NBC
351	3		2	5				1	2		2		4/14/99	8/8/99		
355			1	1			1						7/28/99	7/28/99		
372		2	4	6	2					4			7/23/99	10/5/99		
382			3	3							3		8/8/99	9/12/99		
384			2	2							2		8/8/99	8/8/99		
385			2	2							2		8/12/99	8/12/99		
386			3	3							3		8/13/99	9/12/99		
392			4	4							4		8/7/99	8/13/99		
393			2	2							2		8/8/99	8/12/99		
424			1	1							1		8/13/99	8/13/99		
425			1	1					1				5/21/99	5/21/99		
427			1	1							1		8/12/99	8/12/99		
433			1	1							1		8/8/99	8/8/99		
434			1	1							1		8/13/99	8/13/99		
451			1	1							1		8/8/99	8/8/99		
467			1	1					1				5/21/99	5/21/99		
477			1	1							1		8/8/99	8/8/99		
480			1	1							1		9/12/99	9/12/99		
483			1	1							1		8/13/99	8/13/99		
485			2	2							2		8/8/99	8/8/99		
490			1	1							1		8/13/99	8/13/99		

Table 4. Summary of regions, dates, and sighting histories of whales identified by HSU in 1999.

	Times seen by org.				Times seen in 1999 by region						Dates in 1999		1st yr	
ID	CRC	NMML	HSU	Total	CA	OR	NWA	SVI	WVI	NBC	First	Last	seen	Regions seen in 1998
43	3	2	3	8		5		3			7/23/99	10/12/99	1984	NWA,SVI
83	1	1	2	4		2			2		8/12/99	10/12/99	1993	NWA,WVI
84	1	1	3	5		2			3		8/7/99	9/19/99	1990	OR,SVI
85	1	1		2		2					8/10/99	9/13/99	1984	NWA,SVI,WVI
93		2		2	1	1					7/30/99	10/11/99	1984	NWA,SVI
94		1	1	2		1			1		8/13/99	10/5/99	1993	WVI
206		2		2	2						7/12/99	7/12/99	1996	CA
237		1		1		1					10/5/99	10/5/99	1997	SVI,WVI,NBC
274		1		1	1						8/24/99	8/24/99	1991	CA
276		1		1	1						7/18/99	7/18/99	1991	CA
281	1	1	3	5		2			3		8/8/99	10/12/99	1991	
291		2		2	2						7/12/99	10/11/99	1998	CA
301	1	2		3	1	2					7/12/99	10/12/99	1998	OR
302	5	3		8		4	4				5/20/99	9/13/99	1998	OR
303	1	1		2		2					9/13/99	9/19/99	1998	OR
310		1		1	1						8/24/99	8/24/99	1998	CBC
361		2		2	2						7/12/99	8/17/99		
362		1		1	1						8/24/99	8/24/99		
363	1	2		3	3						8/20/99	10/30/99		
372		2	4	6		2		4			7/23/99	10/5/99		
373		2		2		2					7/7/99	7/8/99		
374		2		2	1	1					8/10/99	8/24/99		
375		2		2	2						7/12/99	7/12/99		
376		1		1		1					9/19/99	9/19/99		
377		6		6	6						7/12/99	7/18/99		
378		2		2	2						7/12/99	7/17/99		
379		4		4	4						7/12/99	7/18/99		
380		3		3	3						7/17/99	7/18/99		
407		1		1	1						7/12/99	7/12/99		
408		1		1		1					10/6/99	10/6/99		
412		2		2	2						7/12/99	8/24/99		
419		1		1		1					9/19/99	9/19/99		
428		1		1	1						7/12/99	7/12/99		
429		4		4	3	1					8/20/99	10/6/99		
432		1		1	1						7/12/99	7/12/99		
439		2		2	2						7/18/99	7/18/99		
440		2		2	2						7/12/99	7/12/99		
444		3		3	3						7/12/99	7/18/99		
448		5		5	5						7/12/99	7/18/99		
449		2		2	2						7/12/99	7/18/99		
450		1		1	1						8/24/99	8/24/99		
460		1		1		1					9/19/99	9/19/99		
468		2		2	2						8/24/99	8/24/99		
470		1		1	1						8/24/99	8/24/99		
471		1		1	1						7/17/99	7/17/99		
474		1		1	1						7/12/99	7/12/99		
476		2		2	2						7/12/99	7/18/99		
478		1		1	1						7/12/99	7/12/99		
489		2		2	1	1					8/20/99	10/6/99		

Table 5. Summary of identifications of gray whales by Cascadia, NMML, and HSU by region and month in 1999. Resightings of individuals are counted.

	Month									
Region	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**Total**
N. Vancouver Island						13				13
W Vancouver Is. (central)						78	25			103
S Vancouver Is.				6	11	24	1			42
N Washington coast			71	1		2	6	3	2	85
Str. Juan de Fuca (US)					1	2	2	10	1	16
San Juan Islands		1	20	19						40
Hood Canal		2								2
N Puget Sound		31	16							47
S Puget Sound		2		2	2					6
Grays Harbor area	2	37			1					40
Oregon					5	3	18	25		51
N Califonria					46	16	2	7		71
All regions	2	73	107	28	66	138	54	45	3	516

Table 6. Summary of resighting rates by region of gray whales seen in 1999 by Cascadia, NMML, and HSU.

Region	Unique IDs 1999	Seen more than one day in 1999		Seen in another region in 1999		Seen in a previous year		Seen in 1998		Seen in 1998 in same area	
		#	%	#	%	#	%	#	%	#	%
N. Vancouver Island	10	3	30%	3	30%	10	100%	8	80%	4	40%
W. Vancouver Is. (central)	48	31	65%	18	38%	31	65%	29	60%	21	44%
S Vancouver Is.	18	16	89%	11	61%	17	94%	17	94%	17	94%
N. Washington coast (summer-fall	7	6	86%	5	71%	7	100%	5	71%	3	43%
N. Washington coast (May)	45	4	9%	4	9%	6	13%	5	11%	1	2%
Str. Juan de Fuca (US)	4	3	75%	3	75%	3	75%	3	75%	2	50%
San Juan Islands	5	5	100%	1	20%	0	0%	0	0%	0	0%
Hood Canal	2	1	50%	1	50%	0	0%	0	0%	0	0%
N. Puget Sound	24	9	38%	4	17%	6	25%	4	17%	3	13%
S. Puget Sound	6	2	33%	2	33%	0	0%	0	0%	0	0%
Grays Harbor area	17	6	35%	0	0%	6	35%	3	18%	3	18%
Oregon	31	22	71%	18	58%	19	61%	16	52%	5	16%
N Califonria	39	17	44%	5	13%	9	23%	9	23%	4	10%
All regions	216	85	39%	35	16%	84	39%	71	33%		

Table 7. Petersen capture-recapture estimates for seasonal resident gray whales. Both samples include only IDs after 1 June and exclude IDs from Puget Sound area and Grays Harbor.

Sample 1		Sample 2					
Year	**n**	**Year**	**n**	**Match**	**Est.**	**CV**	**Comments**
Estimates using 1999 data							
1999	127	1998	134	63	**269**	0.06	
1999	93	1998	134	56	**222**	0.06	Excluding 1999 California sample
Estimates based on previous years (from Calambokidis et al. In prep.)							
1997	29	1998	134	22	**175**	0.09	
1996	28	1998	134	22	**169**	0.09	

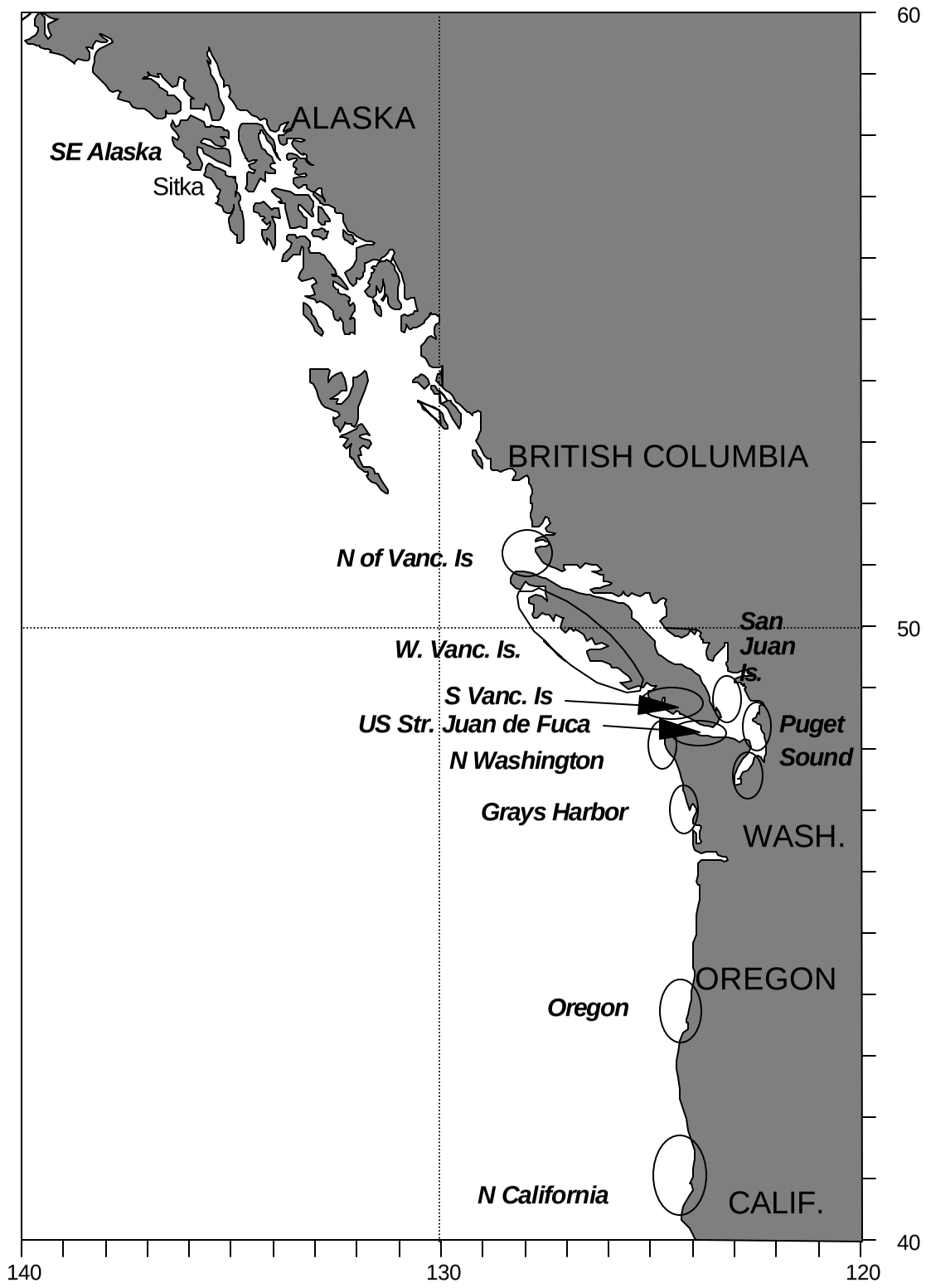

Figure 1. Study area showing regions and areas of effort in 1999.

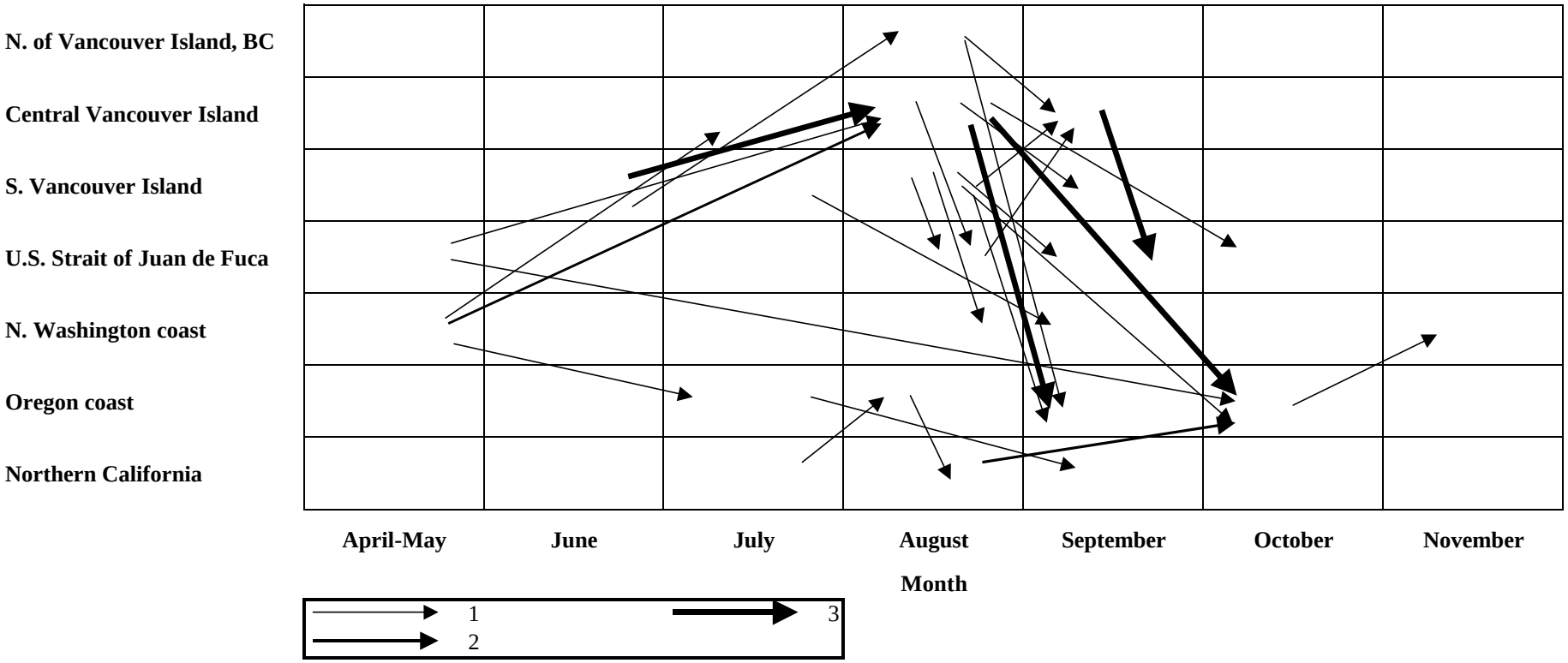

Figure 2. Movements of gray whales among locations in 1999 based only on CRC, NMML, and HSU data. Size of arrow indicates number of transits.

Appendix Table 1. List of identifications by ID and date for Cascadia, NMML, and HSU in 1999.

ID	QL	QR	QF	Col	Pho	Roll	Frames	Date	Time	Sight#	No	Region	Location	Lat	Long	Comments
15	B	B		NMML	MG	12	01-14	8/4/99	18:44		1	SVI	WEST OF PACHENA PT	48 44.020	125 07.380	
15	B	B		NMML	MG	29	01-12	8/14/99	14:41		1	SVI	TSUSIAT PT.	48 40.77	124 54.66	Added late
21	B	B		CRC	JAC	4	5A-22A	4/6/99	12:37	N1-1	2	NPS		48 05.1	122 25.2	BIG, BRN. FCS COLL.
21		B	B	CRC	JAC	5	7A-10A	4/6/99	14:50	N1-4	2	NPS		48 06.4	122 28.5	22 LEAD; 21 TRAIL
21	A	C		CRC	JAC	4	31A-END	4/6/99	14:15	N1-3	2	NPS		48 06.9	122 28.1	SAME AS #1
21	B	A	C	NMML	MG	3	10-37	5/21/99			2	NPS	ELGER BAY	48 07.157	122 28.072	
22	A		B	CRC	JAC	4	31A-END	4/6/99	14:15	N1-3	2	NPS		48 06.9	122 28.1	SAME AS #1
22	A	B		CRC	JAC	4	5A-22A	4/6/99	12:37	N1-1	2	NPS		48 05.1	122 25.2	BIG, BRN. FCS COLL.
22		B		CRC	JAC	5	7A-10A	4/6/99	14:50	N1-4	2	NPS		48 06.4	122 28.5	22 LEAD; 21 TRAIL
22	B	B	B	NMML	MG	3	10-37	5/21/99			2	NPS	ELGER BAY	48 07.157	122 28.072	
30	A	B	C	NMML	MG	16	10-19	8/7/99	16:49		1	WVI	SOUTH OF ESCALANTE PT.	49 29.530	126 35.367	
30	B			NMML	MG	26	05A-21A	8/13/99			2	WVI	SO. OF ESCALANTE ROCKS	49 30.160	126 34.962	
30		B		NMML	PJG	9	29	9/11/99			1	WVI	SPLIT CAPE			
30	A	A		NMML	PJG	9,10	30-36,01A-04A	9/11/99			4	WVI	INSHORE OFF SPLIT CAPE			
30	A			NMML	PJG	10	19A-34A	9/12/99			4	WVI	OFF ESCALANTE (ROCKS)			
32		A		NMML	PJG	6	17-26	8/11/99			3	NBC	SOUTH CAPE CAUTION			
32	A	A		NMML	MG	23,24	14A-37A,01-22	8/11/99			3	NBC	WEST OF WILKIE POINT	51 07.837	127 42.962	
37		B	B	NMML	MG	16,17,18,19	20-37,01A-36A,01-36,01-0	8/8/99				WVI	OFF BAJO PT.	49 36.437	126 52.073	
37		B		NMML	PJG	5	01-24	8/8/99				WVI	BAJO REEF			
41	A	A		NMML	MG	4	14A-24A	6/30/99			1	SVI	NITINAT MOUTH	48 39.989	124 51.228	
41	A	B		NMML	MG	22	01-37	8/10/99			4	NBC	SE OF CHRISTENSEN POINT			
42	B	A		NMML	PJG	2	01-36	7/23/99			9	SVI	2 MI. W OF NITINAT			
42	B			NMML	PJG	3	33-35	8/4/99			2	SVI	KLANAWA RIVER			43 IS DIAMOND, 42 IS BUDDY
42	B	A		NMML	MG	9,10,11	23-37,01-37,01-12	8/4/99	16:44		2	SVI		48 42.188	124 59.705	
42	B	B		NMML	PJG	8	06-19	8/26/99			2	SJF	E. BULLMAN BEACH			Added late
42	A			NMML	PJG	11	01-07	9/12/99			3	WVI	N. OF SPLIT CAPE			
42	B	B		NMML	MG	30	04-20	9/29/99	10:46		2	SJF	OFF SNOW CREEK			BUDDY; Added late
42		B		NMML	PJG	13	08-23	10/4/99			3	SJF	THIRD BEACH			
42		A		NMML	MG	31	01-04	10/13/99	10:50		1	SJF	OFF SAIL RIVER MOUTH			BUDDY; Added late
42		B		NMML	MG	31	18-34	10/14/99	9:58		2	SJF	OFF SAIL RIVER			Added late
42	B			NMML	PJG	14	11-15	10/19/99			3	SJF	SAIL ROCK & RASMUSSEN			Added late
43	A	B		NMML	PJG	2	01-36	7/23/99			9	SVI	2 MI. W OF NITINAT			
43		A		NMML	PJG	3	33-35	8/4/99			2	SVI	KLANAWA RIVER			43 IS DIAMOND, 42 IS BUDDY
43	A	A		NMML	MG	9,10,11	23-37,01-37,01-12	8/4/99	16:44		2	SVI		48 42.188	124 59.705	
43	B	B		CRC	JAC	34	29-35	9/13/99	17:50	N1-8	1	OR		44 45.3	124 04.4	RLNG IN KELP, MED-L
43	A	B		HSU	CT	12	14,16	9/19/99				OR	Depoe Bay			
43	C			HSU	CT	15	14	10/5/99				OR	Depoe Bay			
43	B	C		CRC	TEC	57	16-17	10/12/99	12:00	N2-10	1	OR		44 46.9	124 04.6	
43	B	A		CRC	TEC	57	18	10/12/99	12:15	N2-12	1	OR		44 44.8	124 04.6	
44	B	A	C	CRC	JAC	6	14-END	4/6/99	18:15	N1-10	1	NPS		48 04.4	122 18.7	BIG,DUB-KNUK?
49	A	A	A	CRC	JAC	5,6	28A-END,1-5	4/6/99	16:50	N1-7	3	NPS		48 03.4	122 22.9	PATCH BIGGEST,LT MED
53	B	A		CRC	JAC	4	23A-30A	4/6/99	13:05	N1-2	1	NPS		48 04.0	122 26.0	WHT SPT L BHND HUMP
62	C	A		CRC	HS	I7	19-20	4/11/99	16:27	VE-18	1	GH		46 55.4	124 02.5	
62		C		CRC	HS	I8	01-08	4/17/99	11:18	VE-1	1	GH		46 55.0	124 06.4	HEADING INTO HARBOR
62	A			CRC	HS	I8	20-24	4/17/99	12:30	VE-5	2	GH		46 55.3	124 04.9	SAME AS S#3
62	B			CRC	HS	I8,I9	34-36,01-10	4/18/99	11:15	VE-1	2	GH		46 54.8	124 06.8	
64	B	B		CRC	HS	1	14-27	3/20/99	15:13	VE-4	2	GH		46 55.7	124 05.3	INSIDE HARBOR
64	C			CRC	SEL	I3	10-21	4/10/99	12:05	VE-6	1	GH		46 55.6	124 05.9	SMALL WHITE PATCH
64	B	B		CRC	SEL	I4	04-19	4/10/99	12:38	VE-7	1	GH		46 55.6	124 04.6	PROB SAME AS S#6
64	C			CRC	HS	I5,I6	31-36A,4-11	4/11/99	14:20	VE-1	1	GH		46 55.3	124 06.5	ENTRNG HRBR AGNST CR
66	B			CRC	HS	I9	17-27	4/18/99	12:20	VE-4	3	GH		46 55.6	124 02.2	ONE HAD TORN UP DRSL
67	B	B		CRC	JAC	34	13-24	9/13/99	17:20	N1-5	2	OR		44 45.7	124 04.2	FD ON SD IN KLP,LRG
67	C	C		CRC	TEC	57	12-15	10/12/99	11:45	N2-9	5	OR		44 49.3	124 04.1	
67	B	B		CRC	TEC	56,57	30-END,1-10	10/12/99	10:08	N2-6	3	OR		44 48.9	124 04.4	IN THICK KELP FOREST
67		A		NMML	PJG	16	01-03	11/23/99	12:44		1	NWA	GUANO ROCK TO CANNONBALL			Added late
74	C	C		CRC	LLF	I1,I2	02-36,01-03	4/3/99	11:48	VE-3	2	GH		46 55.3	124 02.0	ALL W/IN HARBOR
74	C			CRC	HS	I2	04-08	4/3/99	14:22	VE-4	1	GH		46 54.5	124 06.3	PROB. SAME AS S#3
74		B		CRC	HS	I4,I5	30-36,05	4/10/99	14:35	VE-13	1	GH		46 55.5	124 05.6	SCAR ON R SIDE
74	A	A		CRC	SEL	I10	13-24	4/18/99	15:41	VE-14	1	GH		46 56.6	124 05.9	
74	B			CRC	SEL	I10	25-30	4/18/99	16:21	VE-15	1	GH		46 56.3	124 04.6	SAW MUD PLUME
79	A	B		NMML	MG	4	01A-13A	6/29/99			1	NWA	SKAGWAY/MUSHROOM ROC	48 22.071	124 43.655	
80	B			NMML	PJG	2	01-36	7/23/99			9	SVI	2 MI. W OF NITINAT			
80	B	A		NMML	PJG	13	02-06	9/14/99			1	NWA	BODELTEH/GUANO RK.			
80	B	B		NMML	MG	31	05-17	10/13/99	12:24		1	NWA	BTWN GREEN BANK AND WA	ATCH PT.		BIOPSIED NB-45 Added late
81	A	A		NMML	MG	16,17,18,19	20-37,01A-36A,01-36,01-0	8/8/99				WVI	OFF BAJO PT.	49 36.437	126 52.073	
81	C			NMML	PJG	5	01-24	8/8/99				WVI	BAJO REEF			
81	B			NMML	PJG	9,10	30-36,01A-04A	9/11/99			4	WVI	INSHORE OFF SPLIT CAPE			
81	B			NMML	PJG	10	06A-18A	9/12/99			3	WVI	OFF BAJO REEF			
81	A	B	A	NMML	MG	30	21-END	9/29/99	14:30		2	NWA	OFF GUANO ROCK	48 11.96	124 44.22	Added late
83		A		NMML	PJG	6	34-36	8/12/99			1	WVI	1 MILE NORTH OF BAJO POINT			
83		A	B	NMML	MG	24,25,26	23-36,01-37,01A-04A	8/12/99			8	WVI	BAJO POINT	49 37.757	126 51.225	
83	A	A		HSU	CT	11;12	34;04	9/19/99				OR	DB			
83	A	A		CRC	TEC	58A	8-10	10/12/99	13:57	N2-18	1	OR		44 32.7	124 06.0	
84		B		NMML	MG	13	01-19	8/7/99	14:29		3	WVI	PEREZ ROCKS	49 23.955	126 35.501	
84	A	A	C	NMML	MG	15	14-37	8/7/99	15:43		2	WVI	W. OF ESTEVAN PT.			
84		B		NMML	MG	28	01-37	8/13/99			8	WVI	APPROX. 8 OFF MATLAHAW PT.			
84	A	A		CRC	JAC	34	1-12	9/13/99	16:30	N1-4	2	OR		44 46.2	124 04.6	FDNG SD IN KLP,MED.
84	A			HSU	CT	12	05,10	9/19/99				OR	Depoe Bay			Yo-Yo
85	B			HSU	DG?	3?	17,20,22	8/10/99				OR	OR?			
85	A	B		CRC	JAC	34,35	27-28,1	9/13/99	17:50	N1-7	1	OR		44 45.3	124 04.4	RLNG IN KELP,MED-L
86	A	A		NMML	MG	21	07-36	8/10/99			2	NBC	OFF NAHWITTI	50 48.514	128 16.223	
86	B	B		NMML	PJG	9	01-24	9/11/99			4	WVI	BARCHESTER BAY TO NW OF PEREZ RKS			
86	B	B		NMML	PJG	11	01-07	9/12/99			3	WVI	N. OF SPLIT CAPE			
87		C		NMML	PJG	4	19-25	8/7/99				WVI	PEREZ ROCKS, V. IS.			
87	A	B		NMML	MG	13	20-37	8/7/99	14:52		2	WVI	OUTSIDE			
87	B	B		NMML	MG	15	14-37	8/7/99	15:43		2	WVI	W. OF ESTEVAN PT.			
87	B	B	B	NMML	MG	14,15	15A-37,01-13	8/7/99	15:11		3	WVI	OUTSIDE PEREZ ROCKS			
87	A	B		CRC	TEC	56	15-24	10/12/99	8:37	N2-2	2	OR		44 38.1	124 05.5	
92	A	B		NMML	MG	4,5	25A-36A,01-09	6/30/99			2	SVI		48 40.319	124 52.539	

Appendix Table 1. List of identifications by ID and date for Cascadia, NMML, and HSU in 1999.

ID	QL	QR	QF	Col	Pho	Roll	Frames	Date	Time	Sight#	No	Region	Location	Lat	Long	Comments
92		B		NMML	MG	16	07-09	8/7/99	16:45		1	WVI		49 26.319	126 35.340	
92	A			NMML	MG	27	22-36	8/13/99			3	WVI		49 23.922	126 36.018	
92		B		NMML	MG	27	07-21	8/13/99			3	WVI		49 23.922	126 36.018	
92	A	B		NMML	PJG	9	01-24	9/11/99			4	WVI	BARCHESTER BAY TO NW OF PEREZ RKS			
93		C		HSU	JH	1	23,26	7/30/99				OR	Depoe Bay			BC055
93	A	B		HSU	RJ	3	15,13	10/11/99				CA	Crescent City			BC055
94	B		C	NMML	MG	28	01-37	8/13/99			8	WVI	APPROX. 8 OFF MATLAHAW PT.			
94	C			HSU	CT	15	18	10/5/99				OR	DB			
98		B		NMML	MG	22	01-37	8/10/99			4	NBC	SE OF CHRISTENSEN POINT			
105	A	B	C	NMML	MG	21	07-36	8/10/99			2	NBC	OFF NAHWITTI	50 48.514	128 16.223	
106	B	C		CRC	JAC	33	15-END	9/13/99	15:51	N1-3	2	OR		44 49.7	124 04.1	ROLLING,PLYNG W/KELP
107	A			CRC	JAC	11	35-END	5/20/99	12:30	N1-22	2	OC		47 58.5	124 42.6	FORMER RESIDENT?
123	B			NMML	PJG	2	01-36	7/23/99			9	SVI	2 MI. W OF NITINAT			
127	B	B		CRC	JAC	33	15-END	9/13/99	15:51	N1-3	2	OR		44 49.7	124 04.1	ROLLING,PLYNG W/KELP
127	A	B		CRC	TEC	56,57	30-END,1-10	10/12/99	10:08	N2-6	3	OR		44 48.9	124 04.4	IN THICK KELP FOREST
127		A		CRC	TEC	57	12-15	10/12/99	11:45	N2-9	5	OR		44 49.3	124 04.1	
135		A	B	NMML	MG	16,17,18,19	20-37,01A-36A,01-36,01-0	8/8/99				WVI	OFF BAJO PT.	49 36.437	126 52.073	
135		B		NMML	PJG	5	01-24	8/8/99				WVI	BAJO REEF			
135		A		NMML	MG	24,25,26	23-36,01-37,01A-04A	8/12/99			8	WVI	BAJO POINT	49 37.757	126 51.225	
135	B	A		NMML	PJG	9	25-28	9/11/99			1	WVI	OFF SPLIT CAPE			
135	A	B		NMML	PJG	10	19A-34A	9/12/99			4	WVI	OFF ESCALANTE (ROCKS)			
136	A	A	B	NMML	MG	19	04-37	8/8/99	13:13		3	WVI	NEAR BAJO PT.			
138	A	B	B	NMML	MG	23,24	14A-37A,01-22	8/11/99			3	NBC	WEST OF WILKIE POINT	51 07.837	127 42.962	
138		B		NMML	PJG	6	17-26	8/11/99			3	NBC	SOUTH CAPE CAUTION			
140	B	B		CRC	TEC	62	1A-28A	10/30/99	16:22	N1-6	2	CA		41 47.7	124 16.0	MATING BEH.,FR 7&8=6
141	B	A		NMML	MG	14	01A-14A	8/7/99	15:05		1	WVI				
141		A		NMML	MG	28	01-37	8/13/99			8	WVI	APPROX. 8 OFF MATLAHAW PT.			
141		B		NMML	PJG	11	01-07	9/12/99			3	WVI	N. OF SPLIT CAPE			
141	A	B		NMML	MG	30	21-END	9/29/99	14:30		2	NWA	OFF GUANO ROCK	48 11.96	124 44.22	Added late
143	A	B		NMML	MG	5	39-37	6/30/99			1	SVI		48 42.138	125 00.635	
143	B	B		NMML	PJG	5	01-24	8/8/99				WVI	BAJO REEF			
143	B	A	B	NMML	MG	20	24-37	8/8/99	13:52		3	WVI				
143	B	B	C	NMML	MG	24,25,26	23-36,01-37,01A-04A	8/12/99			8	WVI	BAJO POINT	49 37.757	126 51.225	
143	A	A		NMML	PJG	10	06A-18A	9/12/99			3	WVI	OFF BAJO REEF			
144	B	B		NMML	MG	26,27	32A-37A,01-06	8/13/99			2	WVI	NORTH PEREZ ROCK	49 25.938	126 35.549	
152	B	C		NMML	MG	28	01-37	8/13/99			8	WVI	APPROX. 8 OFF MATLAHAW PT.			
152	B	A		NMML	PJG	11	08-27	9/12/99			8	WVI	S. OF SPLIT CAPE			
153	A	B		NMML	MG	22	01-37	8/10/99			4	NBC	SE OF CHRISTENSEN POINT			
166	B	B		NMML	MG	11	13-21	8/4/99	18:05		1	SVI	IN 18' WATER	48 42.658	125 02.042	
166	C		B	NMML	MG	7,8	22-37,01-37	8/4/99	15:09		4	SVI		48 41.321	124 56.391	
175	B	B		NMML	MG	12	28-37	8/7/99	10:51		1	WVI	BETW RAPHAEL PT. & SIWASH			
175		B	C	NMML	PJG	7	01-17	8/13/99			2	WVI	SIWASH PT.			
175	B			NMML	PJG	9,10	30-36,01A-04A	9/11/99			4	WVI	INSHORE OFF SPLIT CAPE			
177	C	C	C	CRC	JAC	14	19-22	5/20/99	14:57	N1-57	3	OC		48 04.0	124 43.5	HEADING E & N
177	C	B		NMML	PJG	3	01-13	7/23/99			2	SVI		48 42.490	125 00.69	
177		A		NMML	PJG	3	29-31	8/4/99			1	SVI	3 MI. W OF TSUSIAT FALLS			
177		A		NMML	MG	9	01-22	8/4/99	16:19		2	SVI		48 41.931	124 57.920	
177		B		NMML	MG	7,8	22-37,01-37	8/4/99	15:09		4	SVI		48 41.321	124 56.391	
177	B	B	C	NMML	MG	9,10,11	23-37,01-37,01-12	8/4/99	16:44		2	SVI		48 42.188	124 59.705	
177	B	B		NMML	PJG	7	23-36	8/14/99			4	SVI	1/4 MI. W. OF PACHENA PT.	48 42.227	124 59.656	
177		A		NMML	MG	29,30	32-END,01-02	9/28/99	14:26		2	NWA	GUANO ROCK	48 10.77	124 44.96	Added late
177	B	B		NMML	PJG	14	02-10	10/18/99			2	NWA	1 MI. N WHITE ROCK			Added late
178	B	A	C	CRC	JAC	10	1-9	5/20/99	9:55	N1-4	1	OC		47 56.5	124 40.7	BIG, HEADING NW
178		B		CRC	JAC	10	14-15	5/20/99	10:32	N1-6A	1	OC		47 58.1	124 42.4	6-8WHLS IN AREA, MED
178	B	A	B	NMML	MG	14,15	15A-37,01-13	8/7/99	15:11		3	WVI	OUTSIDE PEREZ ROCKS			
185	B	B		NMML	MG	6	01-37	6/30/99			2	SVI		48 42.924	125 03.348	
185	B	A		NMML	MG	12	15-27	8/7/99	10:30		1	WVI	SIWASH COVER			
185	C	A		NMML	PJG	8	06-19	8/26/99			2	SJF	E. BULLMAN BEACH			Added late
185	A	A		NMML	PJG	13	08-23	10/4/99			3	SJF	THIRD BEACH			
185	B			NMML	MG	31	18-34	10/14/99	9:58		2	SJF	OFF SAIL RIVER			Added late
185		C		NMML	PJG	14	11-15	10/19/99			3	SJF	SAIL ROCK & RASMUSSEN			Added late
186	A			NMML	MG	26	05A-21A	8/13/99			2	WVI	SO. OF ESCALANTE ROCKS	49 30.160	126 34.962	
186		B		CRC	TEC	57	12-15	10/12/99	11:45	N2-9	5	OR		44 49.3	124 04.1	
187	B	B		NMML	PJG	2	01-36	7/23/99			9	SVI	2 MI. W OF NITINAT			
187	B			NMML	MG	9	01-22	8/4/99	16:19		2	SVI		48 41.931	124 57.920	
187	B	B		NMML	MG	7,8	22-37,01-37	8/4/99	15:09		4	SVI		48 41.321	124 56.391	
187	C	A		NMML	PJG	10	35A-36A	9/12/99			1	WVI	2 MI. NW OF SPLIT CAPE			
191	B		C	CRC	JAC	13	34-35	5/20/99	14:10	N1-48	2	OC		48 00.0	124 43.6	
192	B	A	C	NMML	MG	6	01-37	6/30/99			2	SVI		48 42.924	125 03.348	
192	A	A		NMML	PJG	3	01-13	7/23/99			2	SVI		48 42.490	125 00.69	
192	B	B		NMML	MG	11	22-36	8/4/99	18:15		1	SVI	EAST OF PACHENA POINT	48 42.852	125 03.041	
205	C	C		NMML	PJG	8	20-21	8/28/99			1	NWA	WAATCH POINT			Added late
205	B	A		NMML	MG	29	23-38	8/29/99	10:45		1	NWA	GREEN BANK/WAATCH PT.	48 20.44	124 42.43	Added late
205	C			NMML	MG	29	29-31	9/28/99	12:22		1	NWA	GUANO ROCK	48 10.75	124 45.06	Added late
205		A		NMML	MG	29,30	32-END,01-02	9/28/99	14:26		2	NWA	GUANO ROCK	48 10.77	124 44.96	Added late
205	B	B		NMML	PJG	14	02-10	10/18/99			2	NWA	1 MI. N WHITE ROCK			Added late
205	B	B		NMML	PJG	14	16-19	11/2/99			1	NWA	NORTH WHITE RK			Added late
206		A		HSU	CT	6;7	33;04A	7/12/99				CA	TH			
206	B			HSU	CT	4;5;7	5A,32A;20;31A,33A	7/12/99				CA	TH			
212	A	B		NMML	PJG	3	14-18	7/23/99			1	SVI	1 mi W of Pachena			
212		C		NMML	PJG	8	22-23	9/10/99			1	SVI	PACHENA PT.			Added late
219	B	B		NMML	PJG	1	31-36	7/23/99			1	SVI	1 MILE WEST OF NITINAT			
219	B	B		NMML	PJG	7	23-36	8/14/99			4	SVI	1/4 MI. W. OF PACHENA PT.	48 42.227	124 59.656	
226	A	B		CRC	TEC	55	12-15	10/11/99	9:14	N2-1	1	CA		41 36.0	124 07.6	
229		A		NMML	MG	20	24-37	8/8/99	13:52		3	WVI				
229		B		NMML	PJG	5	01-24	8/8/99				WVI	BAJO REEF			
229	B		B	NMML	MG	24,25,26	23-36,01-37,01A-04A	8/12/99			8	WVI	BAJO POINT	49 37.757	126 51.225	
231	A	A		NMML	MG	5	10-28	6/30/99			1	SVI	SMALL, 1/4 MI. EAST OF WA1	48 41.088	124 55.414	
231	C	A		NMML	MG	7	09-21	8/4/99	13:08		1	SVI	EAST OF BONILLA PT.	48 35.050	124 42.017	

Appendix Table 1. List of identifications by ID and date for Cascadia, NMML, and HSU in 1999.

ID	QL	QR	QF	Col	Pho	Roll	Frames	Date	Time	Sight#	No	Region	Location	Lat	Long	Comments
231	B	A		NMML	MG	29	13-22	8/14/99			1	SVI	W. OF BONILLA PT.	48 37.93	124 41.37	Added late
236	B	A		NMML	MG	22	01-37	8/10/99			4	NBC	SE OF CHRISTENSEN POINT			
236	B	B		CRC	JAC	34	13-24	9/13/99	17:20	N1-5	2	OR		44 45.7	124 04.2	FD ON SD IN KLP,LRG
237	B			HSU	CT	15	20	10/5/99				OR	DB			
238	A	A	B	NMML	MG	23,24	14A-37A,01-22	8/11/99			3	NBC	WEST OF WILKIE POINT	51 07.837	127 42.962	
238	B	B		NMML	PJG	6	17-26	8/11/99			3	NBC	SOUTH CAPE CAUTION			
242	B			NMML	PJG	2	01-36	7/23/99			9	SVI	2 MI. W OF NITINAT			
242	B	B		NMML	MG	9,10,11	23-37,01-37,01-12	8/4/99	16:44		2	SVI		48 42.188	124 59.705	
242	B	B		NMML	PJG	7	23-36	8/14/99			4	SVI	1/4 MI. W. OF PACHENA PT.	48 42.227	124 59.656	
242	C	B		NMML	MG	30	04-20	9/29/99	10:46		2	SJF	OFF SNOW CREEK			Added late
242	A	B		NMML	PJG	13	08-23	10/4/99			3	SJF	THIRD BEACH			
242	B	B		NMML	MG	31	18-34	10/14/99	9:58		2	SJF	OFF SAIL RIVER			Added late
242	B			NMML	PJG	14	11-15	10/19/99			3	SJF	SAIL ROCK & RASMUSSEN			Added late
242	B	C		NMML	PJG	15	17-19	11/3/99			1	SJF	JENSEN CREEK			Added late
244	A	A		NMML	MG	16,17,18,19	20-37,01A-36A,01-36,01-0	8/8/99				WVI	OFF BAJO PT.	49 36.437	126 52.073	
244	A	B		NMML	PJG	5	01-24	8/8/99				WVI	BAJO REEF			
244	B	B		NMML	MG	26	28A-31A	8/13/99			1	WVI	BARCRSTE BAY	49 26.550	126 34.700	
254	B			NMML	MG	13	20-37	8/7/99	14:52		2	WVI	OUTSIDE			
254	B	C		NMML	PJG	4	19-25	8/7/99				WVI	PEREZ ROCKS, V. IS.			
254	A	A	B	NMML	MG	27	22-36	8/13/99			3	WVI		49 23.922	126 36.018	
254	A			NMML	PJG	11	08-27	9/12/99			8	WVI	S. OF SPLIT CAPE			
269		B		CRC	HS	I2	10-23	4/4/99	14:30	VE-2	1	GH		46 55.0	124 03.2	
269		B		CRC	HS	I5	18-19	4/10/99	15:51	VE-23	1	GH		46 55.9	124 05.2	
269		B		CRC	HS	I5	20-29	4/10/99	15:57	VE-24	1	GH		46 55.9	124 05.6	APR STY IN SML AREA
269	C	B		CRC	LF	I11	12-36	4/24/99	11:42	VE-2	1	GH		46 56.0	124 04.6	SML WHL 30FT,HR OFTN
270	C			CRC	LF	I12	08A-26A	4/24/99	12:45	VE-3	2	GH		46 56.0	124 05.8	COW W/LST YEAR CALF?
273	C	B		NMML	MG	1	01A-10A	4/16/99			1	NPS	EVERETT, OUTSIDE JETTY	48 00.129	122 15.176	
273			C	NMML	MG	2	01-28	5/21/99			2	NPS	EVERETT, NW OF JETTY	48 00.855	122 15.980	
274	B	A		HSU	DG	6	25a,28a	8/24/99				CA	Crescent City			Added late, missing negs
276		C		HSU	RJ	2a	03	7/18/99				CA	Trinidad Head			Added late, missing negs
281	B	A	C	NMML	MG	16,17,18,19	20-37,01A-36A,01-36,01-0	8/8/99				WVI	OFF BAJO PT.	49 36.437	126 52.073	
281		A		NMML	PJG	5	01-24	8/8/99				WVI	BAJO REEF			
281		B		NMML	MG	24,25,26	23-36,01-37,01A-04A	8/12/99			8	WVI	BAJO POINT	49 37.757	126 51.225	
281		A		HSU	CT	15	11	10/5/99				OR	DB			
281	B			CRC	TEC	56,57	30-END,1-10	10/12/99	10:08	N2-6	3	OR		44 48.9	124 04.4	IN THICK KELP FOREST
291	C			HSU	CT	5	19	7/12/99				CA	TH			
291	B	B		HSU	RJ	3	10,17	10/11/99				CA	Crescent City			
296		B		NMML	MG	28	01-37	8/13/99			8	WVI	APPROX. 8 OFF MATLAHAW PT.			
296	A	A		NMML	PJG	11	08-27	9/12/99			8	WVI	S. OF SPLIT CAPE			
297		B		CRC	TEC	57	24-28	10/12/99	12:52	N2-15	1	OR		44 40.8	124 04.8	
297		A		CRC	TEC	57,58	29-END,1-7	10/12/99	13:37	N2-17	2	OR		44 32.7	124 05.8	FR33<>32,FR36=35
300	A		C	CRC	JAC	11	35-END	5/20/99	12:30	N1-22	2	OC		47 58.5	124 42.6	FORMER RESIDENT?
300	A	A		NMML	MG	13	01-19	8/7/99	14:29		3	WVI	PEREZ ROCKS	49 23.955	126 35.501	
300	A	B	B	NMML	PJG	9	01-24	9/11/99			4	WVI	BARCHESTER BAY TO NW OF PEREZ RKS			
301	B	B		HSU	CT	4;6;7;8	35A;27,28;26A;5A,6A	7/12/99				CA	TH			
301	C			HSU	CT	12	20	9/19/99				OR	Depoe Bay			Whaley
301	B	C		CRC	TEC	57	19-22	10/12/99	12:38	N2-13	1	OR		44 44.6	124 04.0	
302	B		B	CRC	JAC	11	27-34	5/20/99	12:20	N1-21	3	OC		47 58.6	124 42.8	ALL MEDIUMISH
302	A		B	CRC	JAC	12	20-22	5/20/99	12:50	N1-30	1	OC		47 59.1	124 43.0	
302	A		B	CRC	JAC	12	23-24	5/20/99	12:58	N1-31	1	OC		47 59.3	124 43.1	
302	A	C		CRC	JAC	13	7-9	5/20/99	13:19	N1-39	1	OC		47 59.3	124 43.8	COULD BE 2 ANIMALS
302	B	B	C	HSU	CT	1	2,4,6,8,9,10,11,17,18,21	7/7/99				OR	DB			
302	C	C		HSU	CT	2	17,27,28	7/8/99				OR	DB			
302	C	A		HSU	DG	3	4,6,9,25	8/10/99				OR	OR			
302	B	B		CRC	JAC	34	25-26	9/13/99	17:31	N1-6	1	OR		44 45.7	124 04.7	
303	B			CRC	JAC	35	2-4	9/13/99	18:02	N1-9	1	OR		44 44.5	124 04.3	MED
303	B			HSU	CT	12	21	9/19/99				OR	DB			
309	B	C		NMML	MG	27	07-21	8/13/99			3	WVI		49 23.922	126 36.018	
309	B	B		CRC	JAC	34	1-12	9/13/99	16:30	N1-4	2	OR		44 46.2	124 04.6	FDNG SD IN KLP,MED.
310	A			HSU	DG	6	18a	8/24/99				CA	Crescent City			Added late, missing negs
315	A	A	C	NMML	MG	23	01A-13A	8/11/99			1	NBC	OFF WILKIE POINT	51 08.000	127 42.146	
317		B		NMML	MG	28	01-37	8/13/99			8	WVI	APPROX. 8 OFF MATLAHAW PT.			
320	A	A		NMML	PJG	7	01-17	8/13/99			2	WVI	SIWASH PT.			
328	B	B	B	NMML	MG	26	22A-27A	8/13/99			1	WVI		49 28.073	126 35.373	
328		B		NMML	PJG	9	01-24	9/11/99			4	WVI	BARCHESTER BAY TO NW OF PEREZ RKS			
328	C	B		NMML	PJG	11	08-27	9/12/99			8	WVI	S. OF SPLIT CAPE			
350	B	B		CRC	HH	6	15-END	4/10/99	11:00	LND-1	3	NPS	Disco Bay	48 02.6	122 49.5	ALSO 2 ROLLS COLOR
350	B	B		CRC	SEL	1-4	1-END (ALL)	4/14/99	12:34	LND-1	5	NPS	Disco Bay	48 02.6	122 49.5	
350		C		CRC	HS	CRC1	21-36	4/20/99	15:15	LND-1	1	NPS		47 58.0	122 40.2	
350	B			CRC	HH	COLOR	22-30	5/9/99	11:07	WB-1	2	NPS		47 56.7	122 39.9	
351	C	C		CRC	SEL	1-4	1-END (ALL)	4/14/99	12:34	LND-1	5	NPS	Disco Bay	48 02.6	122 49.5	
351	B			CRC	MF			4/16/99		LND-1	6	NPS	Disco Bay	48 03.0	122 50.0	
351	B	B		CRC	JAC	8	1-END	4/29/99	14:15	BSP-1	2	HC		47 23.5	122 55.4	
351	A			NMML	MG	20	07-13	8/8/99	13:39		1	WVI	STILL AT BAJO PT.			
351	C			NMML	PJG	5	01-24	8/8/99				WVI	BAJO REEF			
352	B	C		CRC	LF	I6	28-36	4/11/99	15:50	VE-10	2	GH		46 55.6	124 00.9	SAME SIZE,CLS TOGTHR
352	B	C	B	CRC	HS	I7	03-08	4/11/99	16:00	VE-11	1	GH		46 55.6	124 00.9	WHITE PATCH
352	B			CRC	HS	I7	09-10	4/11/99	16:07	VE-12	1	GH		46 55.6	124 01.0	WATR DPTH 15-17 FT
352	C			CRC	HS	I7	11-12,14	4/11/99	16:12	VE-13	1	GH		46 55.6	124 00.8	
353	B	B	B	CRC	HH	7,CLR	1-6,31-36	5/9/99	12:00	WB-2	2	NPS		47 56.6	122 40.2	
353	B			CRC	HH	7	7	5/9/99	12:18	WB-3	1	NPS		47 56.6	122 40.3	PROB DUPE
353	B	B		CRC	HH	COLOR	22-30	5/9/99	11:07	WB-1	2	NPS		47 56.7	122 39.9	
354	B	B		CRC	JAC	15	1A-6A	5/23/99	11:53	N1-1	3	NPS		48 00.9	122 15.9	MED-LARGE,SIDE FDNG
355	B	C		NMML	PJG	3	19-28	7/28/99			1	SJF	KOITLAH JETTY			
356	B	B		CRC	HH	6	2-5	4/2/99	12:52	PAT-6	1	NPS		48 13.9	122 46.5	
356	B	B	C	CRC	TEC	56	25-29	10/12/99	9:31	N2-5	1	OR		44 45.7	124 04.7	SMALL
357	B	C		CRC	JAC	FUJI	1-22	7/8/99	12:28	N1-1	2	SPS	Olympia	47 02.6	122 54.6	BCK&FRTH UNDR BRDG
358	C	B		CRC	JAC	FUJI	1-22	7/8/99	12:28	N1-1	2	SPS	Olympia	47 02.6	122 54.6	BCK&FRTH UNDR BRDG
359	B	C		CRC	JAC	3,4	14-ND,1A-3A	4/4/99	14:30	N1-1	2	SPS	Purdy	47 22.8	122 37.7	FR.33 SMALLER,OTH MD

Appendix Table 1. List of identifications by ID and date for Cascadia, NMML, and HSU in 1999.

ID	QL	QR	QF	Col	Pho	Roll	Frames	Date	Time	Sight#	No	Region	Location	Lat	Long	Comments
359	C			CRC	HS	CRC1	21-36	4/20/99	15:15	LND-1	1	NPS		47 58.0	122 40.2	
359		C		CRC	HH	COLOR	22-30	5/9/99	11:07	WB-1	2	NPS		47 56.7	122 39.9	
359	B	B	C	CRC	HH	8,9	30-ND,1A-4A	5/22/99	15:15	WB-2	1	NPS		47 59.9	122 40.6	
359		C		CRC	HH	11	13-22	6/5/99	13:00	GS-1	2	SJI		48 27.4	122 48.3	
360	B	B		CRC	HH	8	10-29	5/20/99	10:19	GS-3	3	SJI		48 28.6	122 50.4	
360	B	B		CRC	HH	8	10-29	5/20/99	10:19	GS-3	3	SJI		48 28.6	122 50.4	
360	B			CRC	HH	9	06A-27A	5/24/99	11:00	GS-2	3	SJI		48 27.8	122 48.4	
360		B		CRC	HH	9	28A-35A	5/27/99	10:19	GS-1	3	SJI		48 28.2	122 48.3	
360		C		CRC	HH	10	19A-31A	6/2/99	16:30	GS-2	2	SJI		48 28.2	122 48.3	
360		A		CRC	HH	11	23-END	6/6/99	10:30	GS-1	2	SJI		48 28.3	122 48.3	
360		B		CRC	HH	12	11A-12A	6/14/99	10:30	GS-1	2	SJI		48 27.6	122 48.3	
360		B		CRC	HH	12	14A-19A	6/17/99	10:30	GS-2	2	SJI		48 27.6	122 48.3	
361	A	B	A	HSU	CT	6;8	32;7A,8A,10A,13A,28A,30A	7/12/99				CA	TH			
361	A			HSU	RJ	1	34,36	8/17/99				CA	TH			
362	A	B		HSU	DG	5	5,10	8/24/99				CA	CC			
363	B			HSU	DG	2	03,20	8/20/99				CA	TH			
363		B		HSU	DG	2	17	8/20/99				CA	TH			
363	A		B	CRC	TEC	62	1A-28A	10/30/99	16:22	N1-6	2	CA		41 47.7	124 16.0	MATING BEH.,FR 7&8=6
364	B	A	B	CRC	TEC	57,58	29-END,1-7	10/12/99	13:37	N2-17	2	OR		44 32.7	124 05.8	FR33<>32,FR36=35
365	A	B	C	CRC	TEC	62	1A-28A	10/30/99	16:22	N1-6	2	CA		41 47.7	124 16.0	MATING BEH.,FR 7&8=6
366	A	A	C	CRC	TEC	56	15-24	10/12/99	8:37	N2-2	2	OR		44 38.1	124 05.5	
367	C			CRC	SEL	I3	03-09	4/10/99	11:54	VE-5	1	GH		46 55.6	124 05.9	
367	B			CRC	HS	I5	16-17	4/10/99	15:47	VE-22	1	GH		46 56.0	124 05.8	
367	A	C		CRC	HS	I8	09-18	4/17/99	11:48	VE-3	2	GH		46 55.4	124 04.3	ONE WHALE LRG,ONE SM
367		B		CRC	SEL	I10	31-34	4/18/99	16:21	VE-16	1	GH		46 56.3	124 04.6	
367		B		CRC	SEL	I10	35-36	4/18/99	16:21	VE-17	1	GH		46 56.3	124 04.6	
367	C			CRC	HS	I13	23-27	4/25/99	15:18	VE-8	1	GH		46 57.7	124 05.4	
368	C	B		CRC	HS	I9	29-30,32-33	4/18/99	13:12	VE-6	1	GH		46 56.9	124 05.9	WHITE PATCH
368		C		CRC	DL			7/16/99	12:00	-1	1	GH		46 55.0	124 07.0	
369	C	B		CRC	HS	I12	28A-END	4/25/99	12:09	VE-4	1	GH		46 55.7	124 03.3	SPYHPD 5-6X
370	A		B	CRC	JAC	12	29-33	5/20/99	13:03	N1-34	3	OC		47 59.3	124 43.2	
371	B		B	CRC	JAC	12	11-12	5/20/99	12:45	N1-27	1	OC		47 59.0	124 43.1	HEADING N
371	B	A		CRC	JAC	13	3-5	5/20/99	13:15	N1-37	1	OC		47 59.2	124 43.3	
372	B	A		NMML	PJG	2	01-36	7/23/99			9	SVI	2 MI. W OF NITINAT			
372	B	B	C	NMML	MG	7,8	22-37,01-37	8/4/99	15:09		4	SVI		48 41.321	124 56.391	
372	C	B		NMML	MG	9	01-22	8/4/99	16:19		2	SVI		48 41.931	124 57.920	
372	A	B		NMML	PJG	7	23-36	8/14/99			4	SVI	1/4 MI. W. OF PACHENA PT.	48 42.227	124 59.656	
372	B	B		HSU	CT	15	17 (CRC adds 16)	10/5/99				OR	Depoe Bay			BC013
372		C		HSU	CT	15	15	10/5/99				OR	DB			
373	A	B		HSU	CT	1,2	34,36,4	7/7/99				OR	DB			
373		B		HSU	CT	2	22	7/8/99				OR	DB			
374	B		C	HSU	DG	3	06,04,35,26 (CRC not 04,0	8/10/99				OR	Depoe Bay			*Chg date/initials
374	B	B		HSU	DG	5	34,33, 27, 12(CRC adds)	8/24/99				CA	Crescent City			*Chg date/initials
375		B		HSU	CT	7;8	13A;15A	7/12/99				CA	TH			
375	B			HSU	CT	7	22A	7/12/99				CA	TH			
376		C		HSU	CT	12	12	9/19/99				OR	DB			
377		B		HSU	CT	6	14	7/12/99				CA	TH			
377	A	A		HSU	CT	4;6;8	16A,34A;18,21;12A	7/12/99				CA	TH			
377		A		HSU	RJ	1	22,23	7/17/99				CA	TH			
377	B	B		HSU	RJ	1	4,12,14,19,32,35	7/17/99				CA	TH			
377	B			HSU	DG	1	6	7/18/99				CA	TH			
377		C		HSU	RJ	2b	28	7/18/99				CA	Trinidad Head			Added late, missing negs
378	A	A	B	HSU	CT	4;5;6;7	10A;4;8,12,13,17,25,34;1A	7/12/99				CA	TH			
378	B	B		HSU	RJ	1	7,27	7/17/99				CA	TH			
379	A			HSU	CT	8	22A	7/12/99				CA	TH			
379		A		HSU	CT	4;7	24A;28A	7/12/99				CA	TH			
379	B			HSU	RJ	1	11,15	7/17/99				CA	TH			
379		B		HSU	RJ	2b	11	7/18/99				CA	Trinidad Head			Added late, missing negs
380	B	B		HSU	RJ	1	03,05,08,09	7/17/99				CA	TH			
380		A		HSU	DG	1	1	7/18/99				CA	TH			
380		A		HSU	RJ	2b	09	7/18/99				CA	Trinidad Head			Added late, missing negs
381		B		CRC	JAC	10	29-31	5/20/99	11:03	N1-10	2	OC		47 58.2	124 42.3	381 SMALLER, HDNG S
381	B	B		CRC	JAC	10	35-END	5/20/99	11:15	N1-12	1	OC		47 58.1	124 42.3	MED, CLS TO BT,HD SW
381	B	A		CRC	JAC	11	2-8	5/20/99	11:20	N1-14	3	OC		47 57.5	124 41.8	HEADING E & N
382	A	A		NMML	MG	16,17,18,19	20-37,01A-36A,01-36,01-0	8/8/99				WVI	OFF BAJO PT.	49 36.437	126 52.073	
382	A			NMML	PJG	5	01-24	8/8/99				WVI	BAJO REEF			
382	B	B		NMML	PJG	10	19A-34A	9/12/99			4	WVI	OFF ESCALANTE (ROCKS)			
383	B	B	B	CRC	JAC	5	11A-27A	4/6/99	15:58	N1-6	2	NPS		48 04.1	122 23.6	LIKELY SAME AS #5
383		A		CRC	JAC	5,6	28A-END,1-5	4/6/99	16:50	N1-7	3	NPS		48 03.4	122 22.9	PATCH BIGGEST,LT MED
384		A		NMML	MG	20	24-37	8/8/99	13:52		3	WVI				
384	B	A		NMML	PJG	5	01-24	8/8/99				WVI	BAJO REEF			
385	A	A		NMML	PJG	6	34-36	8/12/99			1	WVI	1 MILE NORTH OF BAJO POINT			
385	A	A		NMML	MG	24,25,26	23-36,01-37,01A-04A	8/12/99			8	WVI	BAJO POINT	49 37.757	126 51.225	
386	A	A	B	NMML	MG	26,27	32A-37A,01-06	8/13/99			2	WVI	NORTH PEREZ ROCK	49 25.938	126 35.549	
386		A		NMML	PJG	9,10	30-36,01A-04A	9/11/99			4	WVI	INSHORE OFF SPLIT CAPE			
386	A	A		NMML	PJG	10	06A-18A	9/12/99			3	WVI	OFF BAJO REEF			
387	A	B	B	CRC	JAC	12	14-19	5/20/99	12:48	N1-29	2	OC		47 59.2	124 43.1	
388		A		CRC	JAC	10	20-26	5/20/99	10:57	N1-8	3	OC		47 58.2	124 42.3	MED, HEADING W
388	B			CRC	JAC	10	27-28	5/20/99	11:00	N1-9	2	OC		47 58.3	124 42.3	MED, HEADING N & S
389		A	B	CRC	JAC	12	25-27	5/20/99	13:01	N1-32	2	OC		47 59.3	124 43.2	HEADING NE
389	B	B	B	CRC	JAC	12	34-END	5/20/99	13:08	N1-35	1	OC		47 59.4	124 43.2	
390	B			CRC	JAC	10	34	5/20/99	11:20	N1-13	1	OC		47 57.9	124 42.0	LRG WHT PATCH, HD SW
390	B	B		CRC	JAC	11	9-12	5/20/99	11:50	N1-15	2	OC		47 57.6	124 41.6	LRG WHT PTCH NR DRSL
390		B		CRC	JAC	11	13-14	5/20/99	11:53	N1-16	1	OC		47 57.5	124 41.7	HEADING S
390		C	A	CRC	JAC	11	2-8	5/20/99	11:20	N1-14	3	OC		47 57.5	124 41.8	HEADING E & N
391	A	B	B	CRC	JAC	12	3-6	5/20/99	12:38	N1-24	1	OC		47 58.8	124 43.0	SML-MED, LKD FMLIAR
392	B	A	B	NMML	MG	14,15	15A-37,01-13	8/7/99	15:11		3	WVI	OUTSIDE			
392	A		B	NMML	MG	16	01-06	8/7/99			1	WVI		49 24.996	126 36.420	
392		C		NMML	PJG	4	19-25	8/7/99				WVI	PEREZ ROCKS, V. IS.			

Appendix Table 1. List of identifications by ID and date for Cascadia, NMML, and HSU in 1999.

ID	QL	QR	QF	Col	Pho	Roll	Frames	Date	Time	Sight#	No	Region	Location	Lat	Long	Comments
392	A	A	B	NMML	MG	27	07-21	8/13/99			3	WVI		49 23.922	126 36.018	
393		B	C	NMML	MG	20	14-23	8/8/99	13:48		1	WVI		49 38.353	126 53.222	
393	A			NMML	MG	24,25,26	23-36,01-37,01A-04A	8/12/99			8	WVI	BAJO POINT	49 37.757	126 51.225	
394	B		C	CRC	JAC	6	6-12	4/6/99	17:50	N1-8	1	NPS		48 03.3	122 17.9	SMALL, LT. COLOR
394	B	B		CRC	JAC	7	3-11	4/6/99	19:05	N1-11	1	NPS		48 01.5	122 16.1	SMALL
395	B	B		CRC	HH	6	15-END	4/10/99	11:00	LND-1	3	NPS	Disco Bay	48 02.6	122 49.5	ALSO 2 ROLLS COLOR
396	C			CRC	SEL	1-4	1-END (ALL)	4/14/99	12:34	LND-1	5	NPS	Disco Bay	48 02.6	122 49.5	
396	B			CRC	MF			4/16/99		LND-1	6	NPS	Disco Bay	48 03.0	122 50.0	
396	C	C		CRC	HH			4/18/99	13:00	LND-1	4	NPS	Disco Bay	48 02.6	122 49.5	NO FILM INFO
396		B		CRC	HS	CRC1	21-36	4/20/99	15:15	LND-1	1	NPS		47 58.0	122 40.2	
396	B	B		CRC	MS	SL		6/7/99	11:30	MS-99J	1	SPS	W Seattle	47 32	122 24	
397	B	C		CRC	MS	SL		6/2/99	19:00	MS-99J	1	SPS	W Seattle	47 31	122 24	
398	B	B		CRC	JAC	5	11A-27A	4/6/99	15:58	N1-6	2	NPS		48 04.1	122 23.6	LIKELY SAME AS #5
398	C	A		CRC	JAC	5,6	28A-END,1-5	4/6/99	16:50	N1-7	3	NPS		48 03.4	122 22.9	PATCH BIGGEST,LT MED
399	C	B		CRC	HH	SL	15-20	4/30/99	10:30	GS-1	1	SJI		48 28.1	122 48.3	
399	C	B		CRC	HH	7	19A-23A	5/14/99	10:30	GS-1	2	SJI		48 27.4	122 48.0	
399	B	A		CRC	HH	7,8	24-END,1-4	5/16/99	10:30	GS-1	2	SJI		48 27.6	122 48.5	MUD ON EVERY SRFCNG
399	C	B		CRC	HH	8	05-09	5/17/99	10:30	GS-1	2	SJI		48 27.4	122 48.5	
399		B		CRC	HH	8	10-29	5/20/99	10:19	GS-3	3	SJI		48 28.6	122 50.4	
399		B		CRC	HH	8	10-29	5/20/99	10:19	GS-3	3	SJI		48 28.6	122 50.4	
399	B			CRC	HH	9	06A-27A	5/24/99	11:00	GS-2	3	SJI		48 27.8	122 48.4	
399	C			CRC	HH	9	28A-35A	5/27/99	10:19	GS-1	3	SJI		48 28.2	122 48.3	
399		B		CRC	HH	10	01A-03A	5/28/99	10:30	GS-1	3	SJI		48 28	122 48	
399		A		CRC	HH	10	14A-18A	5/30/99	10:00	GS-1	2	SJI		48 28	122 48	
399	B	B		CRC	HH	10	19A-31A	6/2/99	16:30	GS-2	2	SJI		48 28.2	122 48.3	
399	B	A	C	CRC	HH	10,11	32A-ND,1-12	6/3/99	10:30	GS-1	2	SJI		48 27.4	122 48.3	
399	C	B	C	CRC	HH	11	13-22	6/5/99	13:00	GS-1	2	SJI		48 27.4	122 48.3	
399	C	A		CRC	HH	11	23-END	6/6/99	10:30	GS-1	2	SJI		48 28.3	122 48.3	
399		B		CRC	HH	12	01A-02A	6/7/99	10:15	GS-1	1	SJI		48 28.3	122 48.3	
399	C	B		CRC	HH	12	03A-07A	6/10/99	10:00	GS-2	1	SJI		48 27.1	122 48.3	
399	C			CRC	HH	12	08A-10A	6/12/99	10:00	GS-1	2	SJI		48 27.5	122 48.2	
399	B			CRC	HH	12	11A-12A	6/14/99	10:30	GS-1	2	SJI		48 27.6	122 48.3	
399	B			CRC	HH	12	14A-19A	6/17/99	10:30	GS-2	2	SJI		48 27.6	122 48.3	
399		A		CRC	HH	12	21A-24A	6/18/99		GS-1	2	SJI		48 27.6	122 48.4	
400	B		A	CRC	JAC	14	23-25	5/20/99	15:03	N1-58	1	OC		48 04.0	124 43.6	HEADING NW
400		A		CRC	JAC	14	28-29	5/20/99	15:23	N1-61	1	OC		48 04.2	124 43.6	MEDIUM, HEADING N
401	B		B	CRC	JAC	14	1-2	5/20/99	14:13	N1-49	1	OC		48 01.0	124 43.4	HEADING E
401	A			CRC	JAC	10	20-26	5/20/99	10:57	N1-8	3	OC		47 58.2	124 42.3	MED, HEADING W
401	A			CRC	JAC	11	2-8	5/20/99	11:20	N1-14	3	OC		47 57.5	124 41.8	HEADING E & N
402	B			CRC	JAC	14	15-17	5/20/99	14:37	N1-55	2	OC		48 01.9	124 43.5	HEADING N
403	A		B	CRC	JAC	14	5-7	5/20/99	14:22	N1-51	1	OC		48 01.1	124 43.6	MED SIZE, HEAD NE
404	B			CRC	JAC	13	6	5/20/99	13:17	N1-38	2	OC		47 59.3	124 43.6	
405	A		B	CRC	JAC	11	21-23	5/20/99	12:12	N1-19	1	OC		47 58.2	124 42.4	BIG, HEADING NW
405			B	CRC	JAC	12	29-33	5/20/99	13:03	N1-34	3	OC		47 59.3	124 43.2	
406	B			CRC	SEL	I9,10	34-36,01-12	4/18/99	14:54	VE-10	1	GH+		46 54.1	124 12.8	OUTSIDE HARBOR
407	A			HSU	CT	8	19A	7/12/99				CA	TH			
408	B			HSU	CT	13	4,18	10/6/99				OR	Depoe Bay			
409	A	B		CRC	JAC	8	1-END	4/29/99	14:15	BSP-1	2	HC		47 23.5	122 55.4	
410	C			CRC	TEC	51	20-21	9/20/99	11:04	N1-6	1	CA		38 13.0	123 20.1	
410	B			CRC	JAC	40	23-26	9/20/99	11:23	N2-5	1	CA		38 12.1	123 19.6	W/N1 V.SM,CLF OR YRL
411	B			CRC	TEC	62	29A-30A	10/30/99	17:09	N1-7	1	CA		41 47.6	124 16.0	
412	A			HSU	CT	5;7	15;7,18A	7/12/99				CA	TH			
412	B			HSU	DG	5	6,7	8/24/99				CA	CC			
413	B			CRC	JAC	10	19	5/20/99	10:53	N1-7	1	OC		47 58.2	124 42.3	MED, HEADING SW
413	A		C	CRC	JAC	10	32-33	5/20/99	11:10	N1-11	2	OC		47 58.0	124 42.2	HEADING S
413		B		CRC	JAC	10	27-28	5/20/99	11:00	N1-9	2	OC		47 58.3	124 42.3	MED, HEADING N & S
413		B	B	CRC	JAC	10	29-31	5/20/99	11:03	N1-10	2	OC		47 58.2	124 42.3	381 SMALLER, HDNG S
413		B		CRC	JAC	11	9-12	5/20/99	11:50	N1-15	2	OC		47 57.6	124 41.6	LRG WHT PTCH NR DRSL
413	B			CRC	JAC	11	2-8	5/20/99	11:20	N1-14	3	OC		47 57.5	124 41.8	HEADING E & N
414	A		C	CRC	JAC	13	12-19	5/20/99	13:33	N1-42	3	OC		47 59.9	124 43.9	GO IN DIFF DIR.
415	A			CRC	JAC	13	30-33	5/20/99	14:03	N1-47	3	OC		48 00.7	124 43.6	HEADING N & E
416	B			CRC	JAC	13	12-19	5/20/99	13:33	N1-42	3	OC		47 59.9	124 43.9	GO IN DIFF DIR.
417	B		A	CRC	JAC	13	1-2	5/20/99	13:10	N1-36	1	OC		47 59.4	124 43.2	SMALL
418	B			CRC	JAC	14	27	5/20/99	15:19	N1-60	1	OC		48 04.1	124 43.5	HEADING W
419	B			HSU	CT	11	2	9/19/99				OR	DB			
420	B			CRC	HS	I13	14-18	4/25/99	14:21	VE-5	1	GH		46 55.4	124 06.9	
421	B			CRC	HS	1	05-08	3/14/99	14:13	VE-1	1	GH		46 55.1	124 06.3	SMALL,BTWN HRB & OCN
423	B			CRC	JAC	14	1-2	5/20/99	14:17	N1-50	1	OC		48 01.3	124 43.5	HEADING E
423	A			CRC	JAC	14	8-9	5/20/99	14:24	N1-52	1	OC		48 01.2	124 43.6	MED, HEADING SW
424	B		C	NMML	MG	28	01-37	8/13/99			8	WVI	APPROX. 8 OFF MATLAHAW PT.			
425	B	B		NMML	MG	2,3	29-37,01-09	5/21/99			1	NPS	NORTH OF SANDY PT.	48 02.519	122 24.082	
426	A		C	CRC	JAC	11	24-26	5/20/99	12:16	N1-20	1	OC		47 58.2	124 42.5	LOOKED SML, HEAD SW
427	B		C	NMML	MG	24,25,26	23-36,01-37,01A-04A	8/12/99			8	WVI	BAJO POINT	49 37.757	126 51.225	
428	A		B	HSU	CT	5;6;7	18,33,34,35;6;30A	7/12/99				CA	TH			
429	B			HSU	DG	2	9	8/20/99				CA	TH			*Chg date/initials
429	B			HSU	DG	2	21	8/20/99				CA	TH			
429	B			HSU	DG	6	31a	8/24/99				CA	Crescent City			Added late, missing negs
429	B			HSU	CT	13	09,03,01	10/6/99				OR	Depoe Bay			*Chg date/initials
430	B	B		CRC	HH	6	15-END	4/10/99	11:00	LND-1	3	NPS	Disco Bay	48 02.6	122 49.5	ALSO 2 ROLLS COLOR
430	C	C		CRC	SEL	1-4	1-END (ALL)	4/14/99	12:34	LND-1	5	NPS	Disco Bay	48 02.6	122 49.5	
431	B			CRC	JAC	3,4	14-ND,1A-3A	4/4/99	14:30	N1-1	2	SPS	Purdy	47 22.8	122 37.7	FR.33 SMALLER,OTH MD
432	B			HSU	CT	4;7	13A;35A	7/12/99				CA	TH			
433	B		B	NMML	MG	20	01-06	8/8/99	13:33		1	WVI	STILL AT BAJO PT.			
434	B		C	NMML	MG	28	01-37	8/13/99			8	WVI	APPROX. 8 OFF MATLAHAW PT.			
435	B			CRC	JAC	13	12-19	5/20/99	13:33	N1-42	3	OC		47 59.9	124 43.9	GO IN DIFF DIR.
436	B	B	B	CRC	JAC	14	30-34	5/20/99	15:30	N1-62	1	OC		48 04.6	124 43.8	SMALL, HEADING NE
437	B			CRC	HH	6	15-END	4/10/99	11:00	LND-1	3	NPS	Disco Bay	48 02.6	122 49.5	ALSO 2 ROLLS COLOR
438	C			CRC	HH	9	06A-27A	5/24/99	11:00	GS-2	3	SJI		48 27.8	122 48.4	
438	A			CRC	HH	9	28A-35A	5/27/99	10:19	GS-1	3	SJI		48 28.2	122 48.3	

Appendix Table 1. List of identifications by ID and date for Cascadia, NMML, and HSU in 1999.

ID	QL	QR	QF	Col	Pho	Roll	Frames	Date	Time	Sight#	No	Region	Location	Lat	Long	Comments
438	C			CRC	HH	10,11	32A-ND,1-12	6/3/99	10:30	GS-1	2	SJI		48 27.4	122 48.3	
438	C			CRC	HH	11	23-END	6/6/99	10:30	GS-1	2	SJI		48 28.3	122 48.3	
438	C			CRC	HH	12	14A-19A	6/17/99	10:30	GS-2	2	SJI		48 27.6	122 48.3	
438	A			CRC	HH	12	21A-24A	6/18/99		GS-1	2	SJI		48 27.6	122 48.4	
439	A		A	HSU	DG	1	9	7/18/99				CA	TH			
439	B			HSU	RJ	2b	30	7/18/99				CA	Trinidad Head			Added late, missing negs
440	B			HSU	CT	6;7	03,19,23;06A,24A	7/12/99				CA	TH			
440	A			HSU	CT	7	15A	7/12/99				CA	TH			
441	B			CRC	SEL	I9,10	34-36,01-12	4/18/99	14:54	VE-10	1	GH+		46 54.1	124 12.8	OUTSIDE HARBOR
444		B		HSU	CT	8	2A	7/12/99				CA	TH			
444		B		HSU	RJ	1	16	7/17/99				CA	TH			
444		B		HSU	RJ	2b	17	7/18/99				CA	Trinidad Head			Added late, missing negs
445		B	B	CRC	JAC	11	15-17	5/20/99	11:59	N1-17	1	OC		47 57.4	124 41.5	POSS W/PTCH, HD N
446		A	B	CRC	JAC	12	1-2	5/20/99	12:30	N1-23	1	OC		47 58.5	124 42.6	MEDIUM, HEADING E
446		A	A	CRC	JAC	11	27-34	5/20/99	12:20	N1-21	3	OC		47 58.6	124 42.8	ALL MEDIUMISH
447		B		CRC	JAC	13	10	5/20/99	13:26	N1-40	1	OC		47 59.6	124 44.0	
448		B		HSU	CT	4;6	36A;01	7/12/99				CA	TH			
448	B			HSU	CT	8	20A,24A	7/12/99				CA	TH			
448		B		HSU	RJ	1	17	7/17/99				CA	TH			
448	B			HSU	RJ	1	24,29,30	7/17/99				CA	TH			
448		A		HSU	DG	1	3	7/18/99				CA	TH			
449		B		HSU	CT	4;8	19A;26A	7/12/99				CA	TH			
449		C		HSU	RJ	2b	20	7/18/99				CA	Trinidad Head			Added late, missing negs
450		B		HSU	DG	5	14,22	8/24/99				CA	CC			
451		B		NMML	MG	16,17,18,19	20-37,01A-36A,01-36,01-0	8/8/99				WVI	OFF BAJO PT.	49 36.437	126 52.073	
452		B		CRC	JAC	12	13	5/20/99	12:46	N1-28	1	OC		47 59.1	124 43.1	MED SIZE, HEADING NW
453		A		CRC	JAC	11	18-20	5/20/99	12:03	N1-18	1	OC		47 57.6	124 41.5	HEADING NW
454		B	B	CRC	JAC	10	10-13	5/20/99	10:28	N1-5	1	OC		47 58.0	124 42.2	MEDIUM
454		B	C	CRC	JAC	10	16-18	5/20/99	10:44	N1-6B	1	OC		47 57.9	124 42.1	HEADING SOUTH
455		B	B	CRC	JAC	13	20-22	5/20/99	13:43	N1-43	1	OC		47 59.9	124 43.8	HEADING S
456		A	C	CRC	JAC	14	12-14	5/20/99	14:30	N1-54	1	OC		48 01.2	124 43.6	
456		B		CRC	JAC	10	20-26	5/20/99	10:57	N1-8	3	OC		47 58.2	124 42.3	MED, HEADING W
457		B		CRC	HS	I4	22-29	4/10/99	14:18	VE-11	1	GH		46 55.3	124 06.0	SHWD FLK FDNG
459		B	B	CRC	JAC	14	10-11	5/20/99	14:27	N1-53	1	OC		48 01.1	124 43.6	SMALL, HEADING SE
460		B		HSU	CT	11	04,06	9/19/99				OR	DB			
461		B		CRC	JAC	14	18	5/20/99	14:44	N1-56	1	OC		48 01.2	124 43.5	HEADING E
462		B		CRC	HS	I9	11-16	4/18/99	11:51	VE-3	1	GH		46 55.4	124 05.9	
463		C		CRC	HS	I6	13	4/11/99	14:50	VE-2	1	GH		46 55.3	124 05.9	
463		A		CRC	HS	I6	14-19	4/11/99	15:12	VE-3	1	GH		46 55.3	124 03.9	POSS SAME AS S#2
466		B	C	CRC	JAC	11	27-34	5/20/99	12:20	N1-21	3	OC		47 58.6	124 42.8	ALL MEDIUMISH
467		B		NMML	MG	2	01-28	5/21/99			2	NPS	EVERETT, NW OF JETTY	48 00.855	122 15.980	
468		B		HSU	DG	5	16	8/24/99				CA	CC			
468	B			HSU	DG	6	01a	8/24/99				CA	Crescent City			Added late, missing negs
470		B		HSU	DG	5	11	8/24/99				CA	CC			
471		B		HSU	RJ	1	13	7/17/99				CA	TH			
472		A		CRC	JAC	14	15-17	5/20/99	14:37	N1-55	2	OC		48 01.9	124 43.5	HEADING N
473		B		CRC	JAC	14	26	5/20/99	15:11	N1-59	1	OC		48 03.8	124 43.8	SMALL, HEADING SE
474		B		HSU	CT	5	12,27	7/12/99				CA	TH			
476		B		HSU	CT	5	31	7/12/99				CA	TH			
476		A		HSU	RJ	2b	34	7/18/99				CA	Trinidad Head			Added late, missing negs
477		B		NMML	MG	19	04-37	8/8/99	13:13		3	WVI	NEAR BAJO PT.			
478		B		HSU	CT	8	14A,17A	7/12/99				CA	TH			
479		B		CRC	JAC	13	11	5/20/99	13:30	N1-41	1	OC		47 59.9	124 43.9	
479		B		CRC	JAC	13	26-28	5/20/99	13:52	N1-45	2	OC		48 00.1	124 43.8	HEADING NE & S
480		A		NMML	PJG	10	19A-34A	9/12/99			4	WVI	OFF ESCALANTE (ROCKS)			
481		B		CRC	JAC	15	9A	5/23/99	13:50	N1-3	1	NPS		48 09.5	122 23.1	MED
482		C		CRC	JAC	15	7A-8A	5/23/99	13:03	N1-2	2	NPS		48 01.5	122 15.8	MED-LARGE,SIDE FDNG
482		A		CRC	JAC	15	15A-16A	5/23/99	17:17	N1-5	1	NPS		48 00.4	122 16.0	
483		B		NMML	MG	28	01-37	8/13/99			8	WVI	APPROX. 8 OFF MATLAHAW PT.			
484		B	B	CRC	JAC	12	8-9	5/20/99	12:41	N1-25	1	OC		47 58.9	124 43.1	MED SIZE, HD NE
485		B		NMML	MG	19	04-37	8/8/99	13:13		3	WVI	NEAR BAJO PT.			
485		B		NMML	PJG	5	01-24	8/8/99				WVI	BAJO REEF			
487		A		CRC	HH	7,8	24-END,1-4	5/16/99	10:30	GS-1	2	SJI		48 27.6	122 48.5	MUD ON EVERY SRFCNG
487		C		CRC	HH	8	05-09	5/17/99	10:30	GS-1	2	SJI		48 27.4	122 48.5	
487		B		CRC	HH	8	10-29	5/20/99	10:19	GS-3	3	SJI		48 28.6	122 50.4	
487		B		CRC	HH	8	10-29	5/20/99	10:19	GS-3	3	SJI		48 28.6	122 50.4	
487		C		CRC	HH	9	06A-27A	5/24/99	11:00	GS-2	3	SJI		48 27.8	122 48.4	
488		B		CRC	HH	10	04A-13A	5/29/99	9:27	SH-1	3	NPS		48 00.9	122 17.9	
489		B		HSU	DG	2	14	8/20/99				CA	TH			*Chg date/initials
489		B		HSU	CT	13	8	10/6/99				OR	Depoe Bay			
490	B			NMML	MG	28	01-37	8/13/99			8	WVI	APPROX. 8 OFF MATLAHAW PT.			