

*Exxon Valdez* Oil Spill  
State/Federal Natural Resource Damage Assessment Final Report

Observations of Peale's Peregrine Falcons, *Falco peregrinus pealei*,  
on the Northern Gulf of Alaska Coast

Bird Study Number 5  
Final Report

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**Study History:** Field work for Natural Resource Damage Assessment Bird Study 5 was conducted from May through July 1989, to determine the locations of nest sites within the trajectory of the spill, to study peregrine productivity, to determine the presence of spill-related contaminants in feather samples, to collect prey remains at nest sites, to determine levels of pesticides in eggs, and to identify methods to mitigate potential injury from the spill. An annual report on the 1989 field work dated January 12, 1990 was submitted. Field work continued in 1990, resulting in another interim report dated November 27, 1990. On February 19, 1998, the *Exxon Valdez* Oil Spill Trustee Council contracted with Gerald A. Sanger (former U.S. Fish and Wildlife Service seabird biologist, and Principal Investigator for Restoration Project 93034) to review the two 1990 peregrine reports, and integrate them into a final report in a format suitable for publication in the scientific literature. Efforts to locate a table missing from the January 1990 report or other pertinent field data were unsuccessful. Existing copies of topographic maps had been inscribed with the 1990 data. As advised by the Science Coordinator, Sanger tabulated the data on the maps as a basis for this report. Data from the 1990 reports are included for comparison, when pertinent. The report is presented in the format of the journal, *The Canadian Field-Naturalist*.

**Abstract:** A survey of Peale's peregrine falcons on the northern Gulf of Alaska coast in 1990, the year after oil spilled by the T/V *Exxon Valdez* swept through the area, revealed a nominal minimum population of 114 adults and chick productivity within normal bounds. Prey remains collected at nest sites showed the peregrines had eaten mostly aquatic birds, with alcidæ predominating.

**Key Words:** *Falco peregrinus pealei*, Gulf of Alaska, Kenai Peninsula, nesting territories, Peale's peregrine falcon, population size, prey, Prince William Sound, productivity.

**Project Data:** Copies of topographic maps inscribed with 1990 field data were subsequently turned over to the USFWS raptor management project in Fairbanks (Ted Swem), who loaned them to Sanger for this contract. No other project data have been located as of this report date. Contact Celia Rozen, Librarian, Alaska Department of Fish and Game, for more information: (907) 267-2314.

**Citation:**

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## **Introduction**

The Peale's peregrine falcon (*Falco peregrinus pealei*) occurs along coastal Alaska from Cape Lisburne on the Chukchi Sea, southward intermittently through the Aleutians (Roseneau, Springer and Swartz, in Fyfe et. al. [1976]) and the Gulf of Alaska and southeastern Alaska to British Columbia (White, Roseneau and Hehnke, in Fyfe et. al. [1976]). They nest in suitable cliff habitat, usually at widely scattered sites, often in close proximity to seabird colonies (White et al. loc. cit.; Islieb and Kessel 1973; Janik and Schempf 1985).

Before the oil spill of the T/V *Exxon Valdez* in Prince William Sound in March 1989, observations of Peale's falcons on the northern Gulf of Alaska coast had been few and inconsistent (Bailey, E. P. 1977; Nishimoto and Rice 1987; Islieb and Kessel loc. cit.; Janik and Schempf loc. cit.). Thus, as with most populations of marine fauna in the path of the spill, the *Exxon Valdez* Oil Spill Trustee Council contracted biologists to assess the spill's affects on the Peale's falcon population.

The first author (JHH) conducted an initial reconnaissance of Peale's falcons along the northern Gulf of Alaska coast between May and July, 1989. The main objective of this initial survey was to determine the status of peregrines in the spill zone and whether the spill had impacted them. Based on the 1989 reconnaissance survey, a more complete survey was done in 1990. This paper reports the results of the 1990 work.

## **Materials and Methods**

The first author and an assistant used a chartered helicopter and an outboard-powered inflatable skiff between April 20 and May 19, 1990 to locate active peregrine sites, and to collect prey remains and eggs for contaminant analysis. A second survey by helicopter was conducted between June 23 and July 28, focusing on the sites discovered to be occupied in April and May. Disturbance to the peregrines from the helicopter was minimized by landing as far away as possible, and then reaching the nest sites on foot.

The locations of sites were recorded on 1:63,360 scale U. S. Geological Survey topographic maps. The date, and number and sex of adults and numbers of eggs and chicks were recorded directly on the maps. Because of the very wide geographic extent of the survey, it necessarily bracketed the entire breeding season. Thus, we visited different sites at different stages of the breeding cycle.

We collected any skeletal prey remains present at the sites for subsequent laboratory analysis.

## **Results**

Appendix 1 lists field data by nest site, and by map quadrangle name and series number. Figure 1 shows the study area, and indicates the locations and identifying numbers of map quadrangles with occupied sites. We considered a site to be "occupied" when one or

more of adults, eggs, or chicks were present at a nest site. The April and May surveys covered approximately 396 miles of coastline in the path of the spill, plus some of the adjacent coastline, between the western end of the Kenai Peninsula and the vicinity of Cordova in the east.

There were 35 adults and 61 chicks at 57 occupied nest sites throughout the study area (Table 1). There were several locations where eggs or chicks were present, but the sampling schedule did not allow us to remain at the site long enough to verify the presence of the parents. Thirty-seven (65%) of the occupied nest sites had one or more chicks. Overall, there was an average of one site for slightly less than each seven miles surveyed. The highest density of sites occurred in the Seldovia (1 per 5.1 miles) and Blying Sound (1 per 7.5 miles) quadrangles. Essentially, this is that portion of the study area west of Prince William Sound. The lowest densities (Cordova and Seward quadrangles -- 1 nest per 11.2 and 13.2 miles, respectively) were in Prince William Sound.

Forty-two chicks fledged within the study area, for averages of 1.31 ( $\pm 0.32$  S.D.) chicks per occupied territory, and 2.47 ( $\pm 0.31$  S.D.) chicks per successful nest (Table 2).

Skeletal remains of 117 prey were found at 16 sites (Table 3). Remains of alcids (Alcidae) comprised nearly half (45%) of the prey items, and they occurred at 14 (88%) of the sites. Gulls (Laridae) and shorebirds (Charadriiformes) were next in importance, followed by storm petrels (Hydrobatidae) and passerines (Passeriiformes).

## Discussion

These observations represent the most comprehensive survey of peregrine falcons to date in the north coastal Gulf of Alaska. Total occupied nest sites ( $N = 57$ , Table 1) suggest that a nominal minimum population of 114 adult peregrine falcons existed in the study area in 1990. Prior, largely speculative, estimates placed the population in the study area at 12 to 20 pairs (Islieb and Kessel loc. cit.), and, for the area represented here as the Seldovia and western Blying Sound quadrangles (Figure 1), 30 peregrines at 25 sites (Janik and Schempf loc. cit.).

The highest density of nest sites occurred in the Blying Sound and Seldovia quadrangles, while sites in Prince William Sound were more scattered. Two factors could be responsible for this: There is both more nesting habitat, and more and larger seabird colonies along the Kenai Peninsula than in Prince William Sound. Janik and Schempf (loc. cit.) noted five sites near the seabird colonies at the Chiswell Islands in 1985, which was the densest concentration they had discovered in their survey of the Kenai Peninsula coast.

Table 2 indicates that peregrine chick productivity ranged from a low of 0.88 chicks per occupied territory in the Blying Sound quadrangle to highs of 1.40 to 1.60 in the other quadrangles. The average was 1.31 ( $\pm 0.32$  S.D.) chicks per occupied territory. Chicks produced per successful nest ranged from 2.00 to 2.67, and averaged 2.47 ( $\pm 0.31$  S.D.).

Peregrine production in the study area was within the ranges observed elsewhere. e.g., average productivity and chicks per successful nest at Langara Island, British Columbia from 1968-1973 (Nelson and Myres loc. cit.) were 1.50 and 2.28, respectively, while at Amchitka Island in the Aleutian Islands from 1968 to 1975, these figures ranged from 0.83 - 2.17, and 1.67 - 2.75, respectively (C. M. White, in Fyfe et. al. loc. cit.).

Peregrine prey data pooled from 16 sites in the study area (Table 3) showed that, in general, marine birds were the most important prey. The variety of prey, however, including shorebirds, passerines, and even ptarmigan, showed that peregrines in the study area are avian generalists. Overall, alcids were the most important family. This could be a reflection of the widespread occurrence of marbled murrelets (*Brachyramphus marmoratus*) throughout the study area. The marbled murrelet is the most abundant and ubiquitous alcid in Prince William Sound (Agler et al. in press).

In summary, it appears that the population of peregrine falcons in the study area in 1990 was healthy, and production was within normal bounds. However, since peregrine's are top predators in the coastal food web (White et. al. loc. cit.), it could take several years for any possible contaminants from the *Exxon Valdez* oil spill to work through the food web to where they may affect peregrines. It would be very helpful to repeat this study soon to see if there has been an oil spill contaminant effect on peregrine falcons in the study area.

### **Acknowledgments**

The help of Tim Sell was invaluable in the field. John Wright also assisted with the boat-based surveys. Kenai Air provided valuable helicopter assistance. Ted Swem and Bob Ritchie assisted the senior author with identification of prey remains. The study was expedited with the administrative assistance of Stan Senner and Celia Rozen. Robert Spies and an anonymous reviewer offered helpful suggestions on an early draft. All phases of this study were funded by the *Exxon Valdez* Trustee Council.

### **Literature Cited**

- Agler, B.A., S.J. Kendall, and D.B. Irons. 1998. Abundance and distribution of marbled and Kittlitz's murrelets in south central and southeast Alaska. *Condor* 100(2):254-265.
- Bailey, E.P. 1977. Distribution and abundance of marine birds and mammals along the south side of the Alaska Peninsula, Alaska. *Murrelet* 58:58-72.
- Fyfe, R.W., S.A. Temple, and T.J. Cade. 1976. The 1975 North American peregrine falcon survey. *Canadian Field-Naturalist* 90:228-273.

- Hughes, J.H. 1990. NRDA Status Report, Bird Study Number 5. Alaska Department of Fish and Game. Unpublished administrative report, 6 pp., including 1 figure and 2 tables.
- Islieb, M.E., and B. Kessel. 1973. Birds of the north Gulf coast - Prince William Sound region, Alaska. Biological Papers of the University of Alaska, Number 14. 149 pp.
- Janik, C.A., and P.F. Schempf. 1985. Peale's peregrine falcon (*Falco peregrinus pealei*) studies in Alaska, June 12 - 24, 1985. U. S. Fish and Wildlife Service, Raptor Management Studies, Juneau, Alaska 99802. Unpublished administrative report, 10 pp., + 2 Appendices.
- Nelson, R.W., and M.T. Myres. 1976. Declines in populations of peregrine falcons and their seabird prey at Langara Island, British Columbia. Condor 78:281-293.
- Nishimoto, M., and B. Rice. 1987. A re-survey of seabirds and marine animals along the south coast of the Kenai Peninsula during the summer of 1986. U. S. Fish and Wildlife Service, Maritime National Wildlife Refuge, Homer, Alaska. Unpublished administrative report, 63 pp.
- Schempf, P.F. 1982. Peale's peregrine (*Falco peregrinus pealei*) prey items from southeast Alaska. U. S. Fish and Wildlife Service, Raptor Management Studies, Juneau, Alaska 99802. Unpublished administrative report, 4 pp.

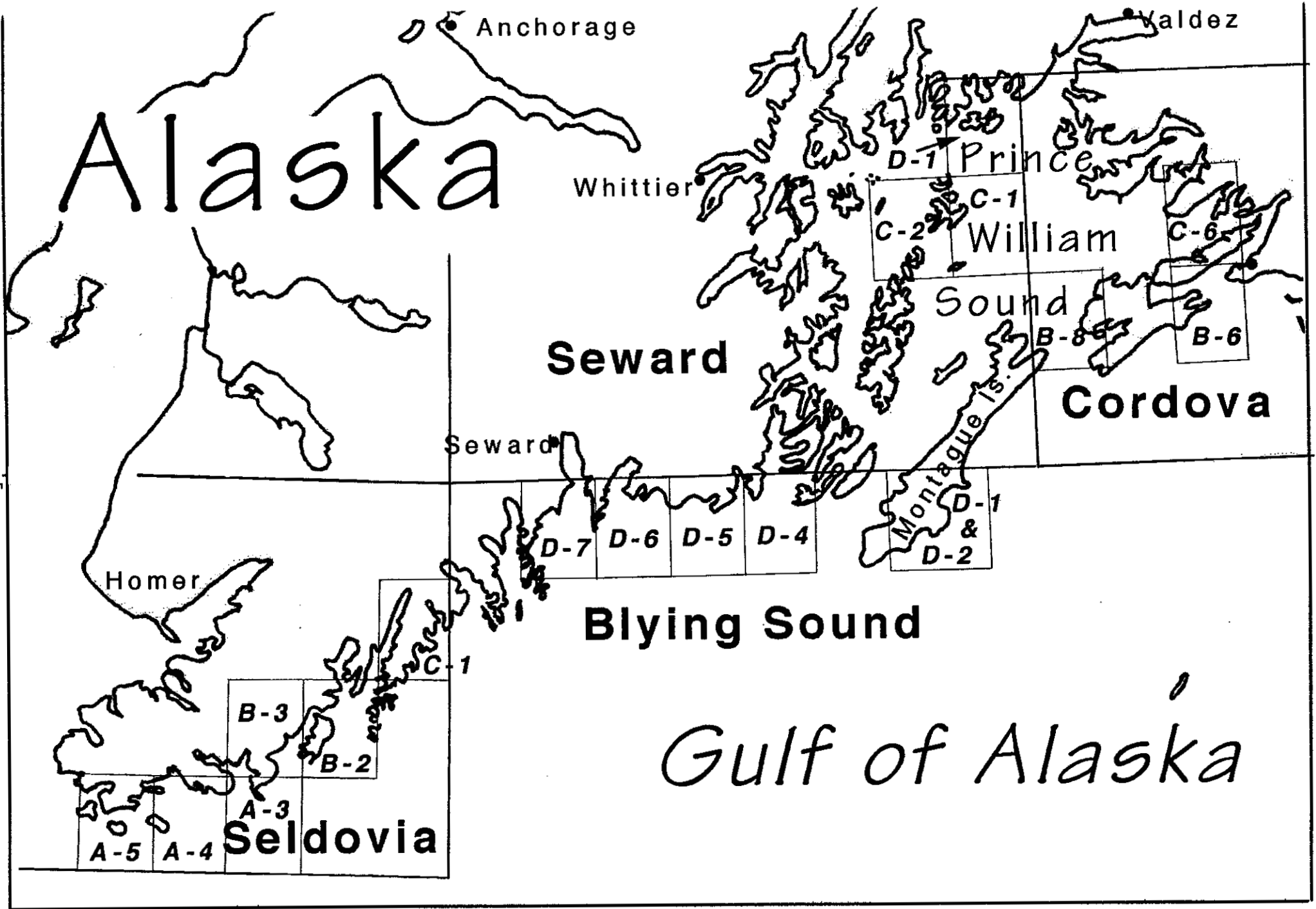


Figure 1. Northern Gulf of Alaska, indicating 1990 peregrine falcon study area, and locations of 1:63,360 topographic map quadrangles used for data comparison.



Table 1. 1990 peregrine falcon observations on the northern Gulf of Alaska coast (see Fig. 1 and Apx 1).

Map quadrangle and Number	Miles Surveyed	Peregrine falcons:						Nest sites:	
		Per map section			Per survey mile			Occupied*	With chicks
		Adults	Eggs	Chicks	Adults	Eggs	Chicks		
<b>Blying Sound</b>									
D-1/D-2	23		6	4		0.26	0.17	3	2
D-4	28	3			0.11			2	
D-5	36	2		3	0.06		0.08	4	3
D-6	3			2			0.67	2	2
D-7	38	3		8	0.08		0.21	6	5
<b>Totals:</b>	<b>128</b>	<b>8</b>	<b>6</b>	<b>17</b>	<b>0.06</b>	<b>0.05</b>	<b>0.13</b>	<b>17</b>	<b>12</b>
<b>Seldovia</b>									
A-3	22	1		6	0.05		0.27	5	4
A-4	21	4		12	0.19		0.57	6	6
A-5	32	2		6	0.06		0.19	5	3
B-2	49	3		12	0.06		0.24	8	7
B-3	25	2		5	0.08		0.20	5	4
C-1	10	4			0.40			2	
<b>Totals:</b>	<b>159</b>	<b>16</b>	<b>0</b>	<b>41</b>	<b>0.10</b>		<b>0.26</b>	<b>31</b>	<b>24</b>
<b>Cordova</b>									
B-6	24	4	1		0.17	0.04		3	
B-8	20			3			0.15	1	1
C-6	12	2			0.17			1	
<b>Totals:</b>	<b>56</b>	<b>6</b>	<b>1</b>	<b>3</b>	<b>0.11</b>	<b>0.02</b>	<b>0.05</b>	<b>5</b>	<b>1</b>
<b>Seward</b>									
C-1	18	1			0.06			1	
C-2	19	3			0.16			2	
D-1	16	1						1	
<b>Totals:</b>	<b>53</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0.09</b>			<b>4</b>	<b>0</b>
<b>RAND TOTAL:</b>	<b>396</b>	<b>35</b>	<b>7</b>	<b>61</b>	<b>0.09</b>	<b>0.02</b>	<b>0.15</b>	<b>57</b>	<b>37</b>

\*"Occupied" is occurrence of one or more each of adults, eggs or chicks per quadrangle.

Table 2. Productivity of Peale's peregrine falcons on the northern Gulf of Alaska coast, 1990. (adapted from Hughes 1990).

<b>Map</b>	<b>Sites</b>		<b>Chicks</b>	<b>Chick production per:</b>	
	<b>Occupied</b>	<b>w/chicks</b>		<b>Occupied</b>	<b>Successful</b>
<b>Quadrangle</b>			<b>Fledged</b>	<b>territory</b>	<b>nest</b>
Cordova	5	3	8	1.60	2.67
Seward	4	3	6	1.50	2.00
Blying Sound	8	3	7	0.88	2.33
Seldovia	15	8	21	1.40	2.63
<b>TOTALS</b>	<b>32</b>	<b>17</b>	<b>42</b>	<b>1.31</b>	<b>2.47</b>
			<b>Standard Deviation:</b>	<b>±0.32</b>	<b>±0.31</b>

Table 3. Prey remains at 16 nesting sites of Peale's peregrine falcons on the northern Gulf of Alaska coast, 1990 (Hughes 1990).

Prey Type	Relative abundance		Occurrence at sites	
	Number	%	Sites	%
Storm petrels	10	8.5	7	43.8
Waterfowl	3	2.6	3	18.8
Ptarmigan	2	1.7	2	12.5
Shorebirds	20	17.1	8	50.0
Gulls	19	16.2	9	56.3
Alcids	53	45.3	14	87.5
Passerines	10	8.5	5	31.3
<b>TOTALS</b>	<b>117</b>	<b>100.0</b>	<b>16</b>	<b>-</b>

Appendix 1. Observations of peregrine falcons on the northern Gulf of Alaska coast, 1990. Map quadrangle names and series numbers refer to U.S. Geological Survey 1:63,360 scale topographic maps.

Miles		USFWS			Peregrine falcon:				
Surveyed		Date	Site	Geographic Reference	Adults		Egg	Chicks	Notes
Air	Boat		I. D.		M	F			
<b>Blying Sound Quadrangle</b>									
<i>Map Series D-1/D-2</i>									
		?	551	Wooded Isls.			3	1	
		23 Jun	553	Jeanie Pt.				3	
			554	Neck Pt.			3		Abandoned
<i>Map Series D-4</i>									
12	16	22 Apr	555	Elrington I.	1				
		22 Apr	556	Cape Puget	1	1			
<i>Map Series D-5</i>									
24	12	23 Apr	557	Cape Junken	1	1			
		27 Jul	558	NW Cape Junken				1	
		27 Jul	559	NW Cape Junken				1	
		27 Jul	560	NE Johnstone Bay				1	
		27 Jul	561	SW Johnstone Bay					Empty nest
<i>Map Series D-6</i>									
	3	27 Jul	563	NE of Cape Mansfield					1989: ad pr, w/ young
		27 Jul	564	Cape Mansfield					1989: ad, 5-18-89
		27 Jul	565	Day Harbor, vabm 62				1	
		27 Jul	566	Day Harbor, nw Anchr Cv				1	
<i>Map Series D-7</i>									
	38	27 Jul	568	NW Cape Resurrection					Inactive
		27 Jul	569	Hat I.				1	
		27 Jul	570	Sandspit Pt				2	
		27 Jul	572	S Renard I., vabm Black					Empty
		27 Jul	573	N Rugged I.				2	2 old, empty nests in same tree
		24 Apr	575	SE Rugged I.	1				Assume "3 young" = immatures
		24 Apr	576	N Cheval I.	1	1			copulating
		27 Jul	585	E Pt, Porcupine Cove					Empty
		27 Jul	586	Bear Glacier Pt				1	
		27 Jul	587	Caines Head				2	
<b>Summary, Blying Sound:</b>				<i>Adults, 8; chicks, 17; chicks fldg, 7 (Hughes 1990). Occ sites, 18. site w/ chicks, 12</i>					

Appendix 1 (continued). Observations of peregrine falcons on the northern Gulf of Alaska coast, 1990. Map quadrangle names and series numbers refer to U.S. Geological Survey 1:63,360 scale topographic maps.

Miles		USFWS		Peregrine falcon:					Notes
Surveyed		Site		Adults		Egg	Chicks		
Air	Boat	Date	I. D.	Geographic Reference	M			F	
<b>Seldovia Quadrangle</b>									
<i>Map Series A-3</i>									
12	10	26 Apr	588	NE Gore Bay	1				defensive behavior
		02 Jul	589	S of Gore Peak				2	2 chicks banded
		26 Jul	590	NW of Gore Peak				2	
		26 Jul	591	NW of Gore Peak				1	
		26 Jul	593	W Port Dick #1				1	
<i>Map Series A-4</i>									
12	9	June ?	596	Port Dick W	1			3	3 chicks banded
		28 Jul	597	Mid Port Dick W & Rome				1	
		02 Jul	598	NE of Rome B.M.	1	1		3	3 chicks banded; ad. on Apr 30
		28 Jul	600	NE Windy Bay				2	2 chicks banded
		26 Jul	601	Mid Windy Bay				2	2 chicks banded
		? July	603	E Chugach I. E					2 ad 6/25/89
		? July	604			1		1	
<i>Map Series A-5</i>									
15	17	26 Jul	606	Windy Bay, Head				1	
		26 Jul	615	Elizabeth I., E2					Empty
		26 Jul	617	Elizabeth I., S2				2	2 chicks banded
		26 Jul	618	Elizabeth I., S3					Empty
		19 Jul	619	Elizabeth I., S4				3	3 chicks banded
		28 Apr	620	Perl I. SW	1				Defensive behavior
		28 Apr	621	Perl I. SE	1				Dfnsv. behav.; seen May, Jun too
<i>Map Series B-2</i>									
25	24	27 Jul	625	Rabbit I., W					Empty
		27 Jul	631	Surprise Bay, N				2	
		27 Jul	632	Surprise Bay, S				1	
		02 Jul	636	Yalik Pt.				2	2 chicks banded
		26 Jul	637	Nuka Bay, Land B.M.					Empty
		26 Jul	638	Yalik Glacier, SE				1	
		26 Jul	639	Nuka Bay, Nuka B.M.				1	
		19 Jun	640	Nuka I., N		1		4	
		30 Apr	641	Nuka I. N, S of					
		23 May	642	Nuka Pt., NE	1	1			
		26 Jul	643	Nuka Pt., W				1	
		28 Jul	645	Nuka I., Nika Bay					Empty
		28 Jul	646	Nuka Passage, Home Cove					3 sites marked on map

Appendix 1 (continued). Observations of peregrine falcons on the northern Gulf of Alaska coast, 1990. Map quadrangle names and series numbers refer to U.S. Geological Survey 1:63,360 scale topographic maps.

Miles		USFWS		Peregrine falcon:					
Surveyed		Site		Adults				Chicks	Notes
Air	Boat	Date	I. D.	Geographic Reference	M	F	Egg		
<i>Map Series B-3</i>									
12	13	28 Jul	648	Nuka I., Westdahl Cove N					Empty
		28 Jul	650	Nuka Passage, N					Empty
		25 Jul	651	Nuka Passage, Brown Mtn				2	
		26 Jul	652	Tonsina Bay, NE1				1	
		26 Jul	655	Tonsina Bay, Long Is				1	
		26 Apr	656	Nuka Passage, Front Pt	1	1			"2+ young," 7/2/90
		26 Jul	657	Nuka Passage, Front Pt, S					Empty
		26 Jul	659	Port Dick, W Arm SE				1	
		26 Jul	660	Port Dick, Taylor Bay					Empty
<i>Map Series C-1</i>									
	10		667	Cloudy Cape	1	1			Count may be 86 FWS survey
		25 Apr	668	Cloudy Cape, W1	1	1			
<b>Summary, Seldovia</b> Adults, 16; chicks, 41; chicks fldg, 8 (Hughes 1990). Occ sites, 31. site w/ chicks, 24									
<b>Cordova Quadrangle</b>									
<i>Map Series B-6</i>									
18	6	17 May	673	Hawkins I., Canoe Passage W	1				
		18 May	674	Hinchinbrook I., Boswell Rk	1	1	1		
		19 May	675	Hinchinbrook I., Pt Steele	1				
<i>Map Series B-8</i>									
11	9	23 Jun	676	Hinchinbrook I., Bear Cape				3	
<i>Map Series C-6</i>									
6	6	20 Apr	677	Hawkins I., Canoe Passage E	1	1			same count 5/17
<b>Summary, Cordova</b> Adults, 6; chicks, 3; chicks fldg, 8 (Hughes 1990). Occ sites, 5. site w/ chicks, 1									
<b>Seward Quadrangle</b>									
<i>Map Series C-1</i>									
13	5	21 Apr	678	Smith I. E	1				
<i>Map Series C-2</i>									
7	12	21 Apr	680	Naked I., SW	1				
		21 Apr	681	Eleanor I., S	1	1			8/11/89, 1 ad, 2 chicks
<i>Map Series D-1</i>									
10	6	02 May	683	Glacier I., Chamberlain Bay		1			
<b>Summary, Seward:</b> Adults, 1; chicks, 0; chicks fldg, 0 (Hughes 1990). Occ sites, 1. site w/ chicks, 0									