AN ASSESSMENT OF WATERBIRD POPULATIONS WINTERING IN PORT FREDERICK, CHICHAGOF ISLAND, ALASKA

19-23 FEBRUARY 1982

BOAT SURVEYS

by

John L. Trapp

Key Words: Waterbirds, Waterfowl, Marine Birds;
Gulf of Alaska, Southeast Alaska
Port Frederick;
Abundance, Winter Populations

U.S. Fish and Wildlife Service
Wildlife Operations
Marine Bird Management Project
1011 E. Tudor Road
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Abstract.--Information is presented on the waterbird population of Port Frederick, Chichagof Island, Alaska, as revealed by small boat surveys during February 1982. The accuracy and reliability of the boat surveys is discussed. The technique provides reasonably accurate estimates of waterbird populations and is useful in determining visibility correction factors for aerial surveys.

Anecdotal information has long suggested that the relatively protected marine waters of southeast Alaska support large numbers of wintering waterbirds, especially seaducks (Gabrielson and Lincoln 1959, Bellrose 1976). However, precise information on the numerical abundance of wintering waterbirds has been lacking until recently. Winter waterfowl surveys, using a random stratified plot sampling scheme, were initiated in February 1980 (Conant et al. 1980) and were expanded in February 1981 (Conant and King 1981). Conant and King (1981) recognized the need to conduct helicopter, boat, or ground surveys in conjunction with the aerial surveys. Aerial surveys do not detect all birds present in an area. The purpose of the project described in this report was to conduct small boat surveys simultaneously with aerial surveys. The primary objective of the project was to obtain visibility correction factors which could be applied to the aerial survey data.

METHODS

Boat surveys were conducted in the Port Frederick area, Chichagof Island, Alaska on five days, February 19-23, 1982. The methods used corresponded as closely as possible to the methods employed in the aerial surveys (Conant and King 1981). Quarter-sections of U.S. Geological Survey quadrangle (1:63,000 scale) maps were used for plots. Port Frederick is encompassed by seven of these plots (Fig. 1). Habitat variables for each of these plots are summarized in Table 1.

Primary effort was concentrated on the southwest one-quarter of the Juneau (A-5) quadrangle map. This plot (denoted as Plot No. 113) was one of the 16 plots surveyed by Conant and King (1981), who subjectively place it in the "High"-density stratum because of the diversity of habitat types available to waterbirds.

Shoreline Surveys

Bird use of Nearshore Waters (marine bird habitats designated by capital letters follow the classification of Kessel 1979) was surveyed by using two small skiffs. The skiffs paralleled the shoreline at a distance of approximately 0.125 mi offshore. This cruise track coincided approximately with the 60 ft contour line (Fig. 2). The primary observer counted and recorded all birds observed between the mean high tide line and the skiff. The boat operator/secondary observer counted all birds within about 0.125 mi of the opposite side of the skiff. Thus, the maximum width of the transect was approximately 0.25 mi. John L. Trapp and Patrick J. Gould were primary observers; John I. Hodges and Phillip F. Schempf were boat operators/secondary observers; and Karen S. Bollinger was recorder/secondary observer. The speed of the skiffs varied: when large concentrations of birds were encountered, the skiff was slowed down or stopped momentarily to allow the observers to get an accurate count; sections of coastline having few birds were traversed more rapidly. The speed of the skiffs averaged about 8.7 mi/hr (range 5.7-20.4) during the shoreline surveys. The survey crews emphasized accurate counts and identification of birds to the lowest taxon possible; 7 x 35 and 10 x 50 binoculars were frequently used to confirm species identification.

Three shoreline surveys of Plot No. 113 were completed, two on February 19 and one on February 20. Two survey crews took part in each survey. Working in opposite directions, each team surveyed all of the shoreline in the plot. The shoreline was divided into eight segments to compare variability in counts

between survey teams. Aerial shoreline surveys were conducted simultaneously with the skiff surveys on both days. All of the remaining shoreline in Port Frederick was surveyed once. All shoreline surveys were completed within two hours of high tide.

Open Water Surveys

Bird use of Inshore Waters (beyond 0.25 mi of the mean high tide line) was sampled by using the 65-ft M/V Surfbird. Seven transects, each following one-minute parallels of latitude, were conducted across the open waters of Plot No. 113. We recorded all birds observed within a 0.25 mi transect (0.125 mi on each side of the vessel).

RESULTS AND DISCUSSION

We estimated that about 14,300 waterbirds of about 37 species, representing 10 families distributed among 7 orders, were present in Port Frederick in mid-February 1982 (Table 2). The majority (86%) were waterfowl, followed by gulls (7%) and alcids (5%). No other group made up more than 1% of the population.

Nearshore Waters (Shoreline Surveys)

About 94% (13,500) of the birds were encountered in Nearshore Waters of less than 60 ft depth. This translates to a mean abundance of 122 birds/mi of shoreline, or a density of 496 birds/mi^2. Coefficients of variation of birds/mi and birds/mi^2 among the seven plots were 42% and 39%, respectively. Nearshore Waters (including Tidal Flats) make up about 47% of the surface area of Port Frederick. All species groups except alcids reached their greatest densities in Nearshore Waters. Combining all species, bird densities in Nearshore Waters were about 20 times greater than bird densities in Inshore Waters.

All birds were closely associated with the shoreline, with essentially all birds occurring within 0.125 mi of the mean high tide line.

Inshore Waters (Open Water Surveys)

Bird densities within the protected Inshore Waters of Port Frederick were relatively low (about 25 birds/mi^2, Table 2), and variability between transects was quite high (coefficient of variation = 49% for all species combined). Eleven species were recorded in Inshore Waters compared with 32 species in Nearshore Waters. Common Murres were nearly 8 times more abundant in Inshore Waters than Nearshore Waters, and accounted for the predominance of alcids in this habitat.

Accuracy and Reliability of Shoreline Surveys

Since the primary purpose of this survey was to obtain visibility correction factors for application to aerial survey data, it is important to assess how accurate and reliable the skiff survey was in estimating the number of birds present. We assumed, a priori, that the shoreline skiff surveys would detect a significant proportion of the waterbirds actually present.

The accuracy and reliability of the surveys is dependent upon many variables, including: (1) the experience of the observers and their ability to identify birds to species and to estimate the size of aggregations, (2) the natural behavior of the birds (i.e. frequent diving for food in deep water, foraging high on tidal flats, etc.), (3) the reactions of the birds to the skiffs and observers, and (4) weather factors and their effect upon both the birds and the observers.

We can get some idea of the accuracy of the surveys by comparing the results of the three replicate surveys in Plot No. 113 (Table 3). The coefficient of variation for all waterbirds was 18%; it was low for scoters (7%), mergansers (7%), sea ducks (9%), diving ducks (10%), gulls (12%) and total ducks (18%), but was quite high for all other species groups.

Double-counting of birds, or "roll-up," a potential source of error in surveys such as this, did not appear to be a major problem. We approached large flocks at slow to moderate speeds and tried to navigate around rather than through flocks. These "avoidance" techniques helped to reduce the amount of disturbance and the incidence of birds flying ahead of the boat.

What percentage of the waterbird population was detected by the skiff surveys? To determine this I divided the average number of birds tallied during the three surveys of Plot No. 113 by the maximum number of birds observed. This method is crude but should indicate the relative efficiency of the skiff surveys in detecting the various groups of birds, and in fact yielded results similar to what one would intuitively expect (Table 3). The analyses suggest that for all waterbirds combined, the skiff surveys detected about 88% of the birds present. Skiff surveys were highly efficient (85%+) in detecting goldeneyes, diving ducks, scoters, mergansers, sea ducks, and gulls; moderately efficient (70-85%) in detecting cormorants and dabbling ducks; and relatively inefficient (50-70%) in detecting loons, grebes, shorebirds, and alcids.

CONCLUSIONS AND RECOMMENDATIONS

I feel that small boat surveys, such as those conducted at Port Frederick, provide a fairly accurate and reliable estimate of the number of waterbirds present. When compared with aerial surveys conducted concurrently on the same plots, they should yield reliable visibility correction factors.

Boat and aerial surveys of Port Frederick should be repeated in February 1983 to provide additional information on the repeatability of the technique and to better establish the degree of variation inherent in the boat and aerial surveys. It would also be desirable to conduct concurrent boat and aerial surveys on other plots in southeast Alaska, particularly those in the "Low" and "Medium" density strata. The visibility correction factors may vary according to the density or species composition of birds on a plot. Additional comparisons of open water transects would also be of value.

ACKNOWLEDGMENTS

This survey could not have been completed without the invaluable assistance of Andy Anderson, Karen S. Bollinger, Patrick J. Gould, John I. Hodges, and Phillip F. Schempf. Debbie Amos and Patrick J. Gould provided helpful suggestions on study design and survey techniques. Bruce Conant and James G. King helped coordiante the boat surveys with the aerial surveys, and Dirk V. Derksen offered encouragement and moral support.

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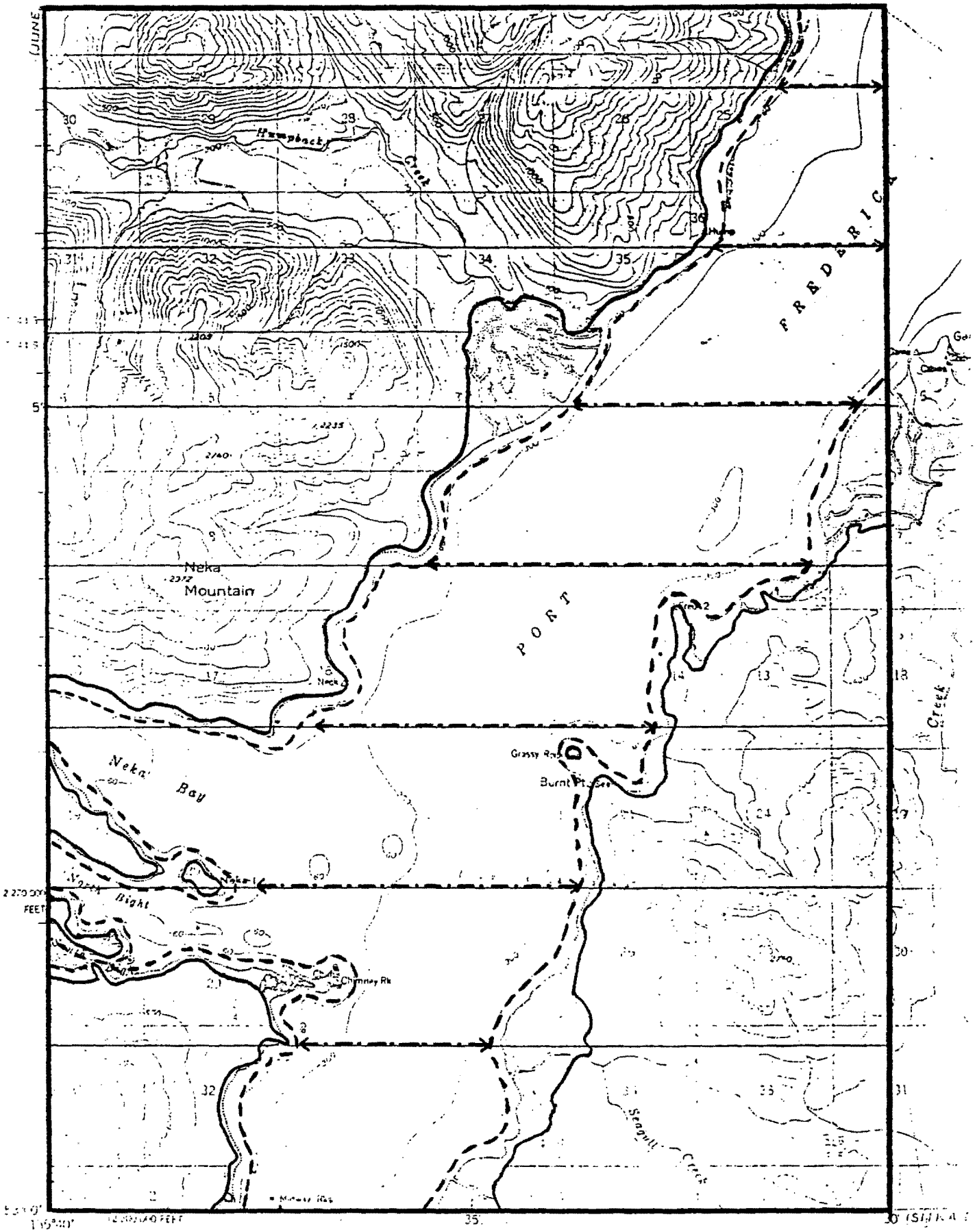

Fig. 2. Plot No. 113 (– – – – – – – indicates shoreline transects; ←·—·—·→ indicates open water transects).

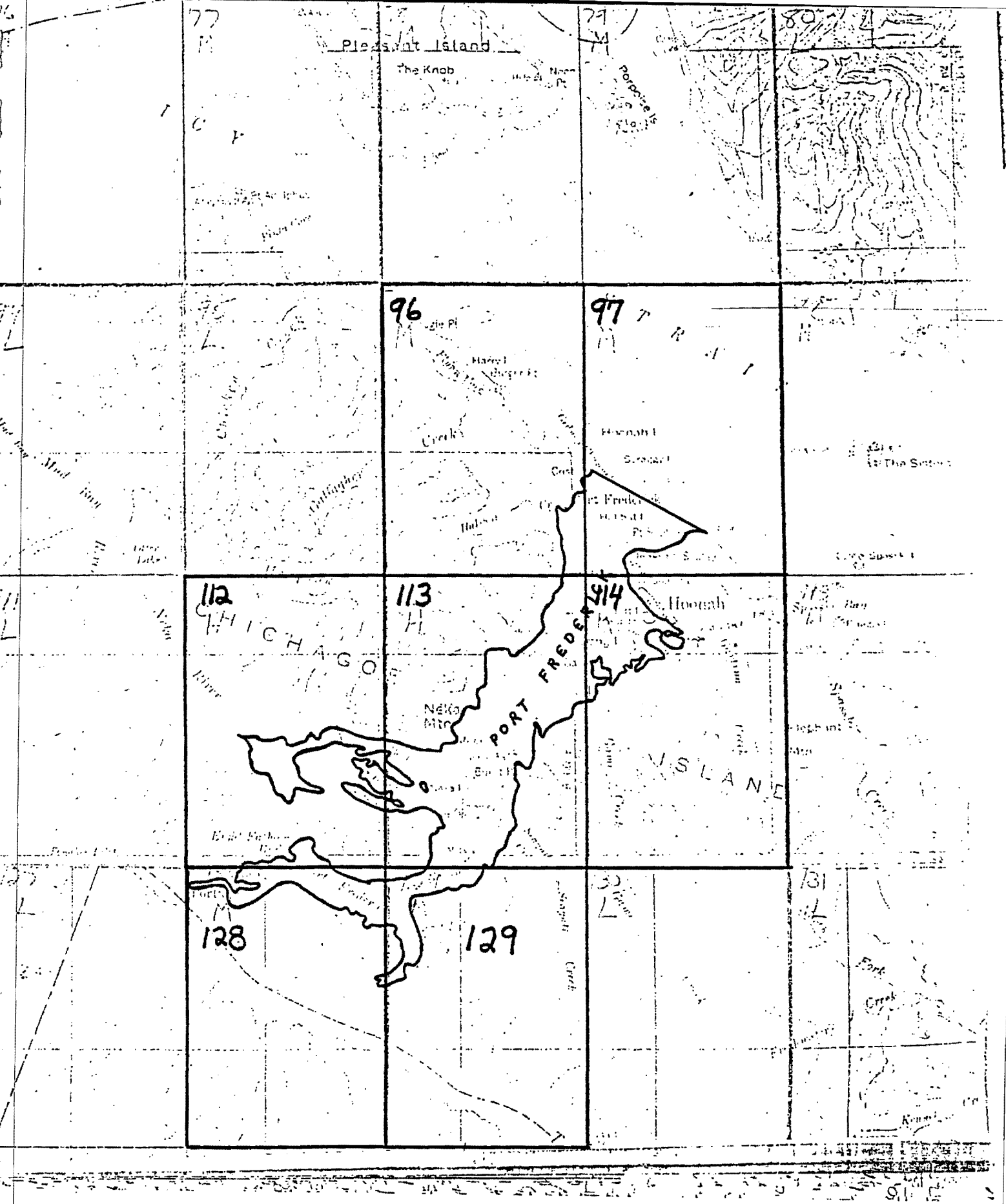

Fig. 1. Port Frederick study area.

Table 1. Summary of coastal waterbird habitat within Port Frederick, Chichagof Island, Alaska.

	Total Shoreline	Nearshore Waters (mi^2)			Inshore Waters[c]
Plot Number	(mi)	Tidal Flats[a]	60 ft.[b]	TOTAL	(mi^2)
96	4.09	0.43	0.80	1.23	0.85
97	3.98	0.16	1.04	1.20	4.60
112	28.25	3.67	4.70	8.37	0.28
113	27.84	2.49	5.44	7.93	17.08
114	17.94	1.54	2.74	4.28	3.05
128	17.96	0.60	1.93	2.53	3.12
129	10.60	0.53	1.24	1.77	2.29
TOTALS	110.66	9.42	17.89	27.31	31.27

[a]Includes that area between the line of mean high water and the line of mean lower low water.

[b]Includes that area between the line of mean lower low water and the 60 ft isobath.

[c]Includes all waters beyond the 60 ft isobath.

Table 2. Estimated numbers and calculated densities of waterbird populations in two habitat types, Port Frederick, Chichagof Island, Alaska, 19-22 February 1982

Species/Species Group	Nearshore Waters[a] Total Birds[c]	Nearshore Waters[a] Birds/mi	Nearshore Waters[a] Birds/mi^2	Inshore Waters[b] Total[d]	Inshore Waters[b] Birds/mi^2	Grand Total[e]
Red-throated Loon	0			0		*[f]
Arctic Loon	2			0		2
Common Loon	3			14		17
Yellow-billed Loon	0			0		*
Unidentified Loons	41			14		55
Total Loons	(46)[g]	0.42	1.68	(28)[g]	0.89	(74)[g]
Red-necked Grebe	37			10		47
Horned Grebe	48			0		48
Unidentified Grebes	3			0		3
Total Grebes	(88)	0.79	3.22	(10)	0.32	(98)
Double-crested Cormorant	1			0		1
Pelagic Cormorant	62			5		67
Total Cormorants	(63)	0.57	2.31	(5)	0.16	(68)
Great Blue Heron	2	0.02	0.07	0	0.00	2
Canada Goose	997	9.01	36.51	0	0.00	997
Green-winged Teal	12			0		12
Mallard	2925	(26.43)[h]	(107.10)[h]	0	(0.00)[h]	2925
Pintail	221			0		221
Unidentified Dabbling Ducks	209			0		209
Total Dabbling Ducks	(3367)	30.43	123.29	(0)		(3367)
Greater Scaup	373	(3.37)	(13.66)	0	(0.00)	373
Bufflehead	640	(5.78)	(23.43)	0	(0.00)	640
Barrow's Goldeneye	55			0		55
Common Goldeneye	1			0		1
Unidentified Goldeneyes	1921			0		1921
Total Goldeneyes	(1977)	(17.87)	(72.39)	(0)	(0.00)	(1977)
Unidentified Diving Ducks	14			0		14
Total Diving Ducks	(3004)	27.15	110.00	(0)	0.00	(3004)

(Continued)

Table 2. Con't

Species/Species Group	Nearshore Waters[a]			Inshore Waters[b]		Grand Total[e]
	Total Birds[c]	Birds/mi	Birds/mi^2	Total[d]	Birds/mi^2	
Harlequin Duck	636	(5.75)	(23.29)	0	(0.00)	636
Oldsquaw	107	(0.97)	(3.92)	67	(2.14)	174
Black Scoter	25			0		25
Surf Scoter	2106			0		2106
White-winged Scoter	645			0		645
Unidentified Scoters	1137			19		1156
Total Scoters	(3913)	(35.36)	(143.28)	(19)	(0.61)	(3932)
Hooded Merganser	1			0		1
Red-breasted Merganser	41			0		41
Common Merganser	62			10		72
Unidentified Mergansers	61			0		61
Total Mergansers	(165)	(1.49)	(6.04)	(10)	(0.32)	(175)
Total Sea Ducks	(4821)	43.57	176.53	(96)	3.07	(4917)
Total Ducks	(11,192)	(101.14)	(409.81)	(96)	(3.07)	(11,288)
Total Waterfowl	(12,189)	(110.15)	(446.32)	(96)	(3.07)	(12,285)
Surfbird	27			0		27
Dunlin	17			0		17
Unidentified Shorebirds	67			0		67
Total Shorebirds	(111)	1.00	4.06	(0)	0.00	(111)
Mew Gull	348	(3.14)	(12.74)	14	(0.45)	362
Herring Gull	1			0		1
Glaucous-winged Gull	425	(3.84)	(15.56)	135	(4.32)	560
Glaucous Gull	1			0		1
Unidentified Gulls	27			0		27
Total Gulls	(802)	7.25	29.37	(149)	4.76	(951)
Common Murre	29			101		130
Unidentified Murres	15			293		308
Total Murres	(44)	0.40	1.61	(394)	12.60	(438)

(Continued)

Table 2. Con't

Species/Species Group	Nearshore Waters[a]			Inshore Waters[b]		Grand Total[e]
	Total Birds[c]	Birds/mi	Birds/mi^2	Total[d]	Birds/mi^2	
Pigeon Guillemot	33	(0.30)	(1.21)	5	(0.16)	38
Marbled Murrelet	169	(1.53)	(6.19)	106	(3.39)	275
Kittlitz's Murrelet	0			0		*
Brachyramphus Murrelet	1			0		1
Rhinoceros Auklet	0			0		*
Total Alcids	(247)	2.23	9.04	(505)	16.15	(752)
Belted Kingfisher	0	0.00	0.00	0	0.00	*
TOTAL WATERBIRDS	13,548	122.43	496.08	793	25.36	14,341

[a]All marine waters between the line of mean high water and the 60 ft. isobath.
[b]All marine waters beyond the 60 ft. isobath.
[c]Figures in this column are the absolute numbers of birds observed during shoreline skiff surveys of the entire bay. These figures are assumed to represent the actual numbers of birds present, but in fact they are probably minimum estimates for most species.
[d]Figures in this column are estimated populations for the entire bay, devired by multiplying the total number of birds observed during the two surveys within Plot No. 113 by a factor of 4.81 (total area of Inshore Waters/area of Inshore Waters sampled, or 31.27/6.5).
[e]Combined total populations of Nearshore and Inshore Waters; this is a best estimate of the total waterbird population of Port Frederick.
[f]Asterisk indicates that the species was not observed during surveys of Nearshore and Inshore waters but was identified in the bay.
[g]Numbers in parentheses in this column summarize data for major species groups; these figures are not additive.
[h]Numbers in parentheses in this column provide density information for species; these figures are not additive.

Species/Species Group	Birds Observed by Date & Observer 2-19-82 (Trapp)	2-19-82 (Gould)	2-20-82 (Combined)	Total	Mean[a]	Standard Deviation	Coefficient of Variation	x mean[b] / x max
Arctic Loon	0	2	1	3	1			
Common Loon	1	0	4	5	2			
Unidentified Loons	5	3	7	15	5			
Total Loons	(6)[c]	(5)	(12)	(23)	(8)	(3.8)	(0.49)	(0.67)
Red-necked Grebe	6	4	14	24	8			
Horned Grebe	8	15	38	61	20			
Unidentified Grebes	2	4	0	6	2			
Total Grebes	(16)	(23)	(52)	(91)	(30)	(19.1)	(0.63)	(0.58)
Double-crested Cormorant	1	0	0	1	1			
Pelagic Cormorant	17	20	9	46	15			
Total Cormorants	(18)	(20)	(9)	(47)	(16)	(5.9)	(0.38)	(0.80)
Canada Goose	302	225	151	678	226			
Green-winged Teal	10	0	25	35	12			
Mallard	1146	427	1229	2802	934			
Pintail	389	0	275	664	221			
Unidentified Dabbling Ducks	370	257	0	627	209			
Total Dabbling Ducks	(1915)	(684)	(1529)	(4128)	(1376)	(629.6)	(0.46)	(0.72)
Greater Scaup	54	32	82	168	56			
Bufflehead	188	106	100	394	131			
Barrow's Goldeneye	18	144	4	166	55			
Common Goldeneye	0	0	1	1	1			
Unidentified Goldeneyes	747	676	997	2420	807			
Total Goldeneyes	(765)	(820)	(1002)	(2587)	(863)			(0.86)
Unidentified Diving Ducks	0	42	0	42	14			
Total Diving Ducks	(1007)	(1000)	(1184)	(3191)	(1064)	(104.3)	(0.10)	(0.90)
Harlequin Duck	356	244	352	952	317			
Oldsquaw	12	17	28	57	19			
Black Scoter	24	0	4	28	9			
Surf Scoter	665	704	1117	2486	829			
White-winged Scoter	175	222	317	714	238			
Unidentified Scoters	761	675	387	1823	608			
Total Scoters	(1625)	(1601)	(1825)	(5051)	(1684)	(123.0)	(0.07)	(0.93)

(Continued)

Species/Species Group	Birds Observed by Date & Observer 2-19-82 (Trapp)	2-19-82 (Gould)	2-20-82 (Combined)	Total	Mean[a]	Standard Deviation	Coefficient of Variation	x mean[b] / x max
Hooded Merganser	0	2	0	2	1			
Red-breasted Merganser	21	5	30	56	19			
Common Merganser	5	0	2	7	2			
Unidentified Mergansers	18	35	16	69	23			
Total Mergansers	(44)	(42)	(48)	(134)	(45)	(3.1)	(0.07)	(0.93)
Total Sea Ducks	(2037)	(1904)	(2253)	(6194)	(2065)	(176.1)	(0.09)	(0.92)
Total Ducks	(4959)	(3588)	(4966)	(13,513)	(4505)	(793.6)	(0.18)	(0.91)
Total Waterfowl	(5261)	(3813)	(5117)	(14,191)	(4731)	(797.7)	(0.17)	(0.90)
Surfbird	50	0	30	80	27			
Dunlin	50	0	0	50	17			
Unidentified Shorebirds	120	0	80	200	67			
Total Shorebirds	(220)	(0)	(110)	(330)	(111)	(110.0)	(1.00)	(0.50)
Mew Gull	6	1	13	20	7			
Glaucous-winged Gull	114	226	175	515	172			
Glaucous Gull	0	1	0	1	1			
Unidentified Gulls	60	0	5	65	22			
Total Gulls	(180)	(228)	(193)	(601)	(202)	(24.8)	(0.12)	(0.89)
Common Murre	46	0	0	46	15			
Unidentified Murres	0	7	38	45	15			
Pigeon Guillemot	13	11	13	37	12			
Marbled Murrelet	128	2	77	207	69			
Brachyramphus Murrelet	0	2	0	2	1			
Total Alcids	(187)	(22)	(128)	(337)	(112)	(83.6)	(0.74)	(0.60)
Total Waterbirds	(5888)	(4111)	(5621)	(15,620)	(5210)	(958.2)	(0.18)	(0.88)

[a] I chose to use the mean for Plot No. 113 because it makes the data more comparable to the other shoreline surveys of Port Frederick.

[b] This is an attempt to determine what proportion of the birds actually present will be detected and recorded on any given survey, on the average, by small boat.

[c] Numbers in parentheses summarize data for major species groups; these figures are not additive.

Appendix A. Absolute numbers of major groups and species of waterbirds observed during shoreline skiff counts of Port Frederick, Chichagof Island, Alaska, 19-22 February 1982.

Species/Species Group	Plot Number 96	97	112	113[a]	114	128	129	TOTAL
Arctic Loon	0	0	1	1	0	0	0	2
Common Loon	0	1	0	2	0	0	0	3
Unidentified Loons	0	2	0	5	2	12	20	41
Total Loons	(0)[b]	(3)	(1)	(8)	(2)	(12)	(20)	(46)
Red-necked Grebe	3	10	0	8	2	2	12	37
Horned Grebe	6	2	1	20	14	5	0	48
Unidentified Grebes	0	0	1	2	0	0	0	3
Total Grebes	(9)	(12)	(2)	(30)	(16)	(7)	(12)	(88)
Double-crested Cormorant	0	0	0	1	0	0	0	1
Pelagic Cormorant	2	13	7	15	7	14	4	62
Total Cormorants	(2)	(13)	(7)	(16)	(7)	(14)	(4)	(63)
Great Blue Heron	0	0	0	0	2	0	0	2
Canada Goose	0	0	424	226	306	4	37	997
Green-winged Teal	0	0	0	12	0	0	0	12
Mallard	35	0	607	934	1167	113	69	2925
Pintail	0	0	0	221	0	0	0	221
Unidentified Dabbling Ducks	0	0	0	209	0	0	0	209
Total Dabbling Ducks	(35)	(0)	(607)	(1376)	(1167)	(113)	(69)	(3367)
Greater Scaup	0	1	121	56	194	0	1	373
Bufflehead	16	6	165	131	253	7	62	640
Barrow's Goldeneye	0	0	0	55	0	0	0	55
Common Goldeneye	0	0	0	1	0	0	0	1
Unidentified Goldeneyes	48	5	432	807	127	247	255	1921
Total Goldeneyes	(48)	(5)	(432)	(863)	(127)	(247)	(255)	(1977)
Unidentified Diving Ducks	0	0	0	14	0	0	0	14
Total Diving Ducks	(64)	(12)	(718)	(1064)	(574)	(254)	(318)	(3004)
Harlequin Duck	20	50	47	317	81	63	58	636
Oldsquaw	9	7	23	19	40	0	9	107
Black Scoter	0	2	14	9	0	0	0	25
Surf Scoter	28	203	206	829	270	191	379	2106
White-winged Scoter	9	61	115	238	162	9	51	645
Unidentified Scoters	131	70	84	608	105	71	68	1137
Total Scoters	(168)	(336)	(419)	(1684)	(537)	(271)	(498)	(3913)
Hooded Merganser	0	0	0	1	0	0	0	1
Red-breasted Merganser	3	3	3	19	11	2	0	41
Common Merganser	3	0	10	2	7	15	25	62
Unidentified Mergansers	0	3	3	23	32	0	0	61
Total Mergansers	(6)	(6)	(16)	(45)	(50)	(17)	(25)	(165)
Total Sea Ducks	(203)	(399)	(505)	(2065)	(708)	(351)	(590)	(4821)

(Continued)

Appendix A. Con't.

Species/Species Group	Plot Number 96	97	112	113[a]	114	128	129	TOTAL
Total Ducks	(302)	(411)	(1830)	(4505)	(2449)	(718)	(977)	(11,192)
Total Waterfowl	(302)	(411)	(2254)	(4731)	(2755)	(722)	(1014)	(12,189)
Surfbird	0	0	0	27	0	0	0	27
Dunlin	0	0	0	17	0	0	0	17
Unidentified Shorebirds	0	0	0	67	0	0	0	67
Total Shorebirds	(0)	(0)	(0)	(111)	(0)	(0)	(0)	(111)
Mew Gull	2	0	226	7	33	38	42	348
Herring Gull	0	0	0	0	0	0	1	1
Glaucous winged Gull	5	29	39	172	116	35	29	425
Glaucous Gull	0	0	0	1	0	0	0	1
Unidentified Gulls	0	0	2	22	0	3	0	27
Total Gulls	(7)	(29)	(267)	(202)	(149)	(76)	(72)	(802)
Common Murre	1	0	2	15	1	6	4	29
Unidentified Murres	0	0	0	15	0	0	0	15
Pigeon Guillemot	0	12	1	12	5	1	2	33
Marbled Murrelet	1	10	6	69	1	52	30	169
Brachyramphus Murrelets	0	0	0	1	0	0	0	1
Total Alcids	(2)	(22)	(9)	(112)	(7)	(59)	(36)	(247)
Total Waterbirds	322	490	2540	5210	2938	890	1158	13,548

[a]Figures in this column represent the average of 3 counts (See Table 3).
[b]Numbers in parentheses summarize data for major species groups; these figures are not additive.

Appendix B. Absolute numbers of major groups and species of waterbirds observed during offshore boat transects of Plot No. 113, Port Frederick, Chichagof Island, Alaska, 20 and 23 February 1982.

Species/Species Group	20 February								23 February								Grand Total
	1	2	3	4	5	6	7	Subtotal	1	2	3	4	5	6	7	Subtotal	
Common Loon	0	0	0	0	1	0	0	1	0	0	1	0	1	0	0	2	3
Unidentified Loon	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	3	3
Total Loons	(0)[a]	(0)	(0)	(0)	(1)	(0)	(0)	(1)	(0)	(1)	(1)	(0)	(1)	(2)	(0)	(5)	(6)
Red-necked Grebe	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	2
Pelagic Cormorant	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1
Oldsquaw	0	0	2	10	0	0	0	12	0	0	0	2	0	0	0	2	14
Unidentified Scoters	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4
Common Merganser	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
Total Sea Ducks	(0)	(0)	(2)	(10)	(0)	(0)	(0)	(12)	(0)	(0)	(2)	(2)	(0)	(0)	(4)	(8)	(20)
Mew Gull	0	0	0	0	1	1	0	2	0	0	1	0	0	0	0	1	3
Glaucous-winged Gull	0	0	0	2	0	0	2	4	2	1	4	12	1	2	2	24	28
Total Gulls	(0)	(0)	(0)	(2)	(1)	(1)	(2)	(6)	(2)	(1)	(5)	(12)	(1)	(2)	(2)	(25)	(31)
Common Murre	0	0	0	0	0	0	0	0	1	1	1	2	9	5	2	21	21
Unidentified Murres	3	2	2	8	21	22	3	61	0	0	0	0	0	0	0	0	61
Pigeon Guillemot	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
Marbled Murrelet	1	3	2	4	2	7	1	20	0	1	0	1	0	0	0	2	22
Total Alcids	(4)	(5)	(4)	(12)	(23)	(30)	(4)	(82)	(1)	(2)	(1)	(3)	(9)	(6)	(2)	(24)	(106)
TOTAL WATERBIRDS	4	5	6	24	26	31	6	102	4	4	9	17	11	10	8	63	165

[a]Figures in parentheses summarize data for major species groups; these figures are not additive.