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Pinniped Investigations in Southern Alaska: 1983-84

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Investigations were conducted on Steller sea lions (Eumetopias jubatus) and harbor seals (Phoca vitulina) in south central and southeastern Alaska from March 1, 1983 through July 15, 1984. These investigations included an aerial survey of sea lion haul outs in Shelikof Strait in cooperation with NMFS National Marine Mammal laboratory; a vessel survey of sea lion haulouts in southeastern Alaska; observations of branded sea lions at Marmot Island; an aerial survey of sea lion haul outs near Sitka in September 1983 and February 1984; sea lion pup counts in Southeastern Alaska and the Gulf of Alaska in July 1984; and harbor seal trend counts in Prince William Sound, and southeastern Alaska in August and September, 1983.

The aerial survey in and adjacent to Shelikof Strait was conducted in cooperation with the NMFS National Marine Mammal Laboratory in order to assess the numbers of sea lions using these areas and determine if any substantial changes in abundance or distribution had occurred since the last surveys in 1976-79. This was considered particularly important because of the incidental take of sea lions which occurred in 1981 and 1982 during a winter/spring joint venture pollock fishery in Shelikof Strait. The pollock fishery occurred again in 1983 and 1984, however, the incidental take of sea lions was considerably reduced.

A vessel survey of southeastern Alaska was undertaken to investigate movements and distribution of sea lions from large rookeries in the northern Kodiak Archipelago to haul outs in southeastern Alaska. Observations of branded sea lions were continued on Marmot Island in order to assess female fidelity to rookeries and determine the age at which males are able to maintain territories. Aerial surveys of sea

lions in the Sitka area were performed as a continuation of the assessment of the population status of sea lions in southeastern Alaska. Pup counts of sea lions were performed also as population assessments in the Gulf of Alaska and in southeastern Alaska. Harbor seal trend counts were conducted to monitor population trends by using repetitive counts of seals on selected haulouts as population indicies which can be compared from year to year.

METHODS

Aerial surveys were flown in a "Grumman Widgeon or Cessna 185" aircraft with water landing capability. All known sea lion rookeries and haul outs in and adjacent to Shelikof Strait and in the general vicinity of Sitka were photographed with a hand held, motor driven 35 mm camera using high speed film. After developing, the slides were projected on a paper screen and the sea lions were marked off as they were counted individually. This technique has proven to be relatively reliable for determining the number of sea lions present at a given area at a given time, however, the total of these counts tends to underestimate the total population as it does not take into account those animals at sea at the time of the count.

Brand observations were made by visiting haulouts by skiff off a larger vessel in southeastern Alaska in March 1983 and by near daily observations on Marmot Island from June 3 through July 7, 1983.

Pup counts were conducted in the Gulf of Alaska and southeastern Alaska using the technique described by Calkins and Pitcher (1982) where adults are driven off rookeries and pups counted individually.

RESULTS AND DISCUSSION

Results of the aerial survey of sea lion haul outs in and adjacent to Shelikof Strait are shown in Table 1. As can be seen from Table 1 the overall total counts are very comparable between 1976 and 1984 although some shifts in distribution are evident. It must be remembered that this type of count only detects an instantaneous number of sea lions hauled out at the time of the survey and does not take into account animals which may be at sea or fluctuations due to weather, seasonal movements or concentrations because of a local food source. The estimated 15,000 sea lions seen at Paule Bay (noted in Table 1) may well have been just such a concentration. This concentration probably was attracted to the large school of spawning pollock which the joint venture fishery subsequently targeted on.

Sea lion surveys were flown in southeastern Alaska in September 1983 and February 1984. Table 2 shows the results of those surveys and includes counts at all locations in southeastern Alaska since 1975. Although the counts were not completed throughout southeastern Alaska, those counts which were completed are of interest as they represent use of areas during periods for which we have no previous information. The White Sisters appeared to increase in winter with a peak in the fall. Biali Rock appears to be used throughout the year with highest use in summer and fall and lowest in the spring. Use of Cape Cross appeared to be highest in th spring with no sea lions seen there in summer and low numbers in the fall.

Table 1. Steller sea lion photo survey counts April 1984 in and adjacent to Shelikof Strait compared to counts made in 1976.

Location	March 1976	April 1984	Notes
Simidi Islands	(est) 2000	636	
Chirikof Island	3870	1285	
Nagai Island	1401	1250	
Ugaiushak Island	0	286	
Rock off Ugaiushak Is.	0	61	
Dry Bay	0	174	
Puale Bay	1014	4702	est 15,000 March, 1977
Takli Island	1877	1199	
Cape Kuliak	0	106	
Cape Ugat	222	356	
Latax Rocks	322	1188	
Sugarloaf Island	301	239	
Sea Otter Island	51	177	
Sea Lion Rocks	127	508	
Marmot Island	3655	2743	
Long Island	62	328	
Cape Chiniak	883	1138	
Ugak Island	0	202	
Gull Point	28	185	
Cape Barnabas	120	694	
Two Headed Island	1636	1870	
Cape Sitkinak	257	247	
Cape Ikolik	1913	239	
Steep Cape	0	25	
Tonki Cape	0	50	
TOTAL	19,739	19,888	

Table 2. Steller sea lion counts in Southeastern Alaska since 1975 including Sept 1983 and Feb. 1984. Dash indicates not counted.

Location	Apr/May 1975	July 1979	April 1982	July 1982	Sept 1983	Feb 1984	March 1983
Cape Bingham	–	0	0	0	–	–	–
Benjamin Island	–	–	227	2	–	–	–
White Sisters	700	761	353	934	1281	116	–
The Brothers Islands	50	–	102	119	–	–	19
Round Rock	0	–	7	1	–	–	–
Yasha Island	–	–	50	18	–	–	150
Cape Ommaney	–	–	212	415	49	–	175
Hazy Islands	–	893	481	1268	711	–	85
Timbered Island	–	–	326	114	1	–	280
Cape Addington	–	–	141	0	0	–	25
Grindle Island	–	–	154	0	–	–	–
Forrester Island	–	5308	153	3777	–	–	125
Biali Rock	500	810	75	722	744	585	–
Jacob Rock	150	0	30	1	1	0	–
Turnabout Island	8	–	8	3	–	–	–
Biorka Island	–	–	0	240	504	26	–
Tenake Cannery Point	–	–	124	0	–	–	–
Lull Point	–	–	202	0	11	–	100
Cape Cross	350	0	222	0	49	–	–
Sea Lion Island	200	–	0	0	–	0	–
Sunset Island	–	–	0	274	–	–	–
Corronation Island	0	–	0	74	0	–	0

All areas listed in Table 2 under the March 1983 survey were searched for branded sea lions. Three branded sea lions were sighted at Lull Point on March 6. One was not identifiable to location branded, however, it was a left shoulder (1976) branded animal. The other two were a right shoulder branded x (branded as a pup at Sugarloaf Island in 1976) and a right shoulder branded T (branded at Marmot Island as a pup in 1976). A right shoulder x branded male was collected on April 15, 1983 at Grindle Island for known age specimen material.

Observations of branded sea lions on Marmot Island are detailed in Tables 3 and 4. Apparently there were more females which were born on other areas that pupped on Marmot Island than in previous years. At least one representative of all branding locations was present on Marmot Island during the pupping period in 1983. No branded males held territories within the rookery proper. All branded males observed in 1983 appeared smaller than the large males which hold territories. Several branded males were observed attempting to enter the rookeries, however, they were consistently driven off by larger territorial males. Apparently males are not able to hold territories at ages 7 or 8.

Steller sea lion pup counts for the Gulf of Alaska and southeastern Alaska are shown in Table 5. Comparison of counts made in 1984 with those from 1979 shows that there were approximately 25% fewer pups in 1984. There are a number of possible reasons why the pup counts are lower, however, unless we can determine if the birth rate has changed, any reasons offered would be purely speculative at this point.

Table 3. Branded sea lions observed on Marmot Island June and July 1983.

Brand	Location Branded	Shoulder	Number Males	Sighted Females
O	Marmot I.	Left	41	73
X	Sugarloaf I	Left	8	9
unid.		Left	21	22
T	Marmot I.	Right	94	238
X	Sugarloaf I.	Right	24	76
unid.		Right	84	242
J	Seal Rocks	Right	12	17
E	Lewis I.	Right	1	0
V	Outer I.	Right	0	4
L	Cape St. Elias	Right	1	0

Table 4. Branded female sea lions with pups observed on Marmot Island June and July 1983.

Brand	Shoulder	No. Sighted
X	Right	33
O	Left	10
T	Right	0
J	Right	4
V	Right	1
Unid.	Right	06

Table 5. Steller sea lion pup counts in the Gulf of Alaska 1978, 1979 and 1984.

Location	Counts			Difference 1979/1984		
	1978	1979	1984	Total	direction	Percent change
Seal Rocks	545	491	799	308	up	63
Outer Island	431	888	1034	146	up	16
Sugarloaf I.	5021	5123	3114	2009	down	39
Marmot I.	6140	6741	5751	990	down	15
Chirikof I.	1573	1649	1913	264	up	16
Chowiet I.	4670	5485	3207	2278	down	42
Atkins I.	2750	4538	2093	2445	down	54
Churnabura I.	545	646	200	446	down	69
Clubbing Rks.	(est) 725	1419	1394	25	down	2
Pinnacle Rk.	(est) 615	2748	2013	735	down	27
Forrester I.	no count	2187	2568	381	up	17
TOTALS	23015	31915	24086	7829	down	25

Harbor Seals

METHODS

Three regions of southern Alaska were selected to establish harbor seal trend count survey routes, two in southeastern Alaska and one in Prince William Sound (Figs. 1-3). The survey routes were based out of Ketchikan, Sitka and Cordova. Each route was composed of 16 to 25 haulout sites. The routes were surveyed in single engine, float equipped aircraft (Cessna-185). As each haulout site was flown over the seals were photographed with a 35mm motor driven camera with a 200mm lens using high speed film, ASA 200. Seals were photographed from an altitude of 600-1000 feet. Slides were commercially developed and the seals counted form images projected on a paper screen.

Surveys were flown daily, as weather permitted, during a 10 to 12 day period on each survey route. Availability of most hauling sites in southern Alaska is limited by tidal stage, therefore, more animals are usually hauled out at the lower stages of tide. Counts were therefore timed to coincide with low tides, starting within two hours before low tide and finishing no later than 2 hours after low tide. The counts were conducted during August and early September when harbor seals molt in southern Alaska. It appears that maximum numbers of animals generally haulout during this period.

Data from each survey route were tabulated by individual haulout site. Mean numbers of seals hauled out and associated variances were calculated for each site in a survey routes. Means and variances were summed for all sites on each route to provide pooled totals. Frequency of use (FOU) of each haulout site was calculated by dividing the number of times a haulout site was occupied by seals by the total number of times a haulout was surveyed.

RESULTS AND DISCUSSION

Data from the three survey routes are summarized in Tables 6-8. As this was the first year of data collection no comparisons can be made, therefore, no information on population trends can be derived. It does seem that the surveys have potential as population indicies. Based on the variance estimates obtained from the initial survey data it appears that differences of about 10% can be detected with 80% probability of certainty at the 0.10 significance level. Harbor seals are long-lived with a low productivity rate therefore, it is unlikely that yearly differences in population levels, in the absence of unusually high mortality, would be detected. Biennial surveys should be adequate to detect population changes which average more than 5% per year.

Table 6. Data summary for Ketchikan area harbor seal trend count surveys, August 1983.

Map # [1]	Site	$\bar{x}$ No. seals	s^2	N	Range	FOU [2]
1	Whale R.	30.7	185.0	9	9-56	1.00
2	White R.	141.0	1332.3	9	92-213	1.00
3	Carp I.	9.4	59.8	9	0-23	0.78
4	New Eddy.	103.7	3158.4	9	24-213	1.00
5	Channel I.	188.7	4998.5	9	103-341	1.00
6	Eagle I	107.1	2052.1	9	57-188	1.00
7	Tolstoi I.	15.1	100.6	9	0-35	0.89
8	Daisy I.	85.9	1267.4	9	45-148	1.00
9	McKenzie I.	118.9	1459.2	9	71-194	1.00
10	Clover B	40.6	324.0	9	16-72	1.00
11	Skin I.	15.3	239.8	9	0-52	0.89
12	Lancaster C.	4.4	8.0	9	0-8	0.78
13	E. Dora B.	46.6	1256.0	9	0-121	0.89
14	Wedge I.	75.1	2391.2	9	18-158	1.00
15	Moria S.	39.9	718.2	9	11-90	1.00
16	W. Rock I.	36.2	655.4	9	5-86	1.00
	Pooled Totals	1058.6	20205.9			

[1] Site locations shown in Figure 1.

[2] FOU (Frequency of Use) = number of times a haulout is occupied by seals divided by total number of times haulout checked for seals.

Table 7. Data summary for Sitka area harbor seal trend count surveys, September 1983.

Map# [1]	Site	$\bar{x}$ No. seals	s^2	N	Range	FOU [2]
1	Hoggatt I.	169.3	6955.6	8	31-291	1.00
2	Vixen I.	70.0	841.0	9	31-109	1.00
3	Moser I.	27.2	521.9	9	0-77	0.89
4	Southarm R.	48.3	210.3	7	24-68	1.00
5	Northarm R.	36.9	121.0	7	14-49	1.00
6	Long Bay R.	121.8	110.3	8	103-134	1.00
7	H. of. Inlet	76.3	388.1	6	49-100	1.00
8	Grassy R.	44.7	2263.0	9	0-119	0.78
9	Mid I.S.	25.6	295.8	9	2-64	1.00
10	Saltery B.	11.7	101.3	9	0-26	0.67
11	Crab B.	100.0	538.2	6	59-124	1.00
12	Strawberry I.	43.4	449.4	9	1-69	1.00
13	Tenakee R.	42.8	1106.8	8	0-78	0.75
14	Apple Tree R.	151.0	1640.3	7	104-208	1.00
15	Point Hayes	41.6	466.6	9	7-71	1.00
16	Traders I.	12.4	159.0	9	0-29	0.56
17	Midway R.	11.9	188.1	9	0-42	0.67
18	Plover R.	91.1	3102.5	9	23-166	1.00
19	Pt. Moses	29.9	130.0	8	14-47	1.00
20	Krugloi I.	25.1	1488.6	9	0-96	0.67
	Pooled Totals	1181.0	21077.8			

[1] Site locations shown in Figure 2.

[2] FOU (Frequency of Use) = number of times a haulout is occupied by seals divided by total number of times haulout checked for seals.

Table 8. Data summary for Prince William Sound harbor seal trend count surveys, August - September 1983.

Map# [1]	Site	$\bar{x}$ No. seals	s^2	N	Range	FOU [2]
1	Sheep B.	18.5	182.5	10	0-47	0.90
2	Gravina I.	22.6	363.6	10	0-52	0.70
3	Gravina R.	57.7	228.0	10	31-86	1.00
4	Olson B	81.0	1183.4	9	31-149	1.00
5	Porcupine P.	19.2	272.6	10	0-49	0.70
6	Fairmount I.	84.6	2735.3	10	12-170	1.00
7	Payday P.	22.0	182.8	9	0-39	0.89
8	Olson I.	23.5	72.3	8	12-37	1.00
9	Point Pellew	23.0	478.3	9	0-73	0.78
10	L. Axel Lind	21.1	665.5	7	0-67	0.57
11	Storey I.	18.8	108.2	10	6-39	1.00
12	Agnes I.	66.4	882.1	8	11-114	1.00
13	Little Smith I.	95.6	1346.9	10	55-171	1.00
14	Big Smith I.	130.5	3564.1	8	31-240	1.00
15	Seal I.	116.0	3540.3	9	45-216	1.00
16	Applegate R.	251.9	11449.0	8	113-398	1.00
17	Green I.N.	25.9	494.7	8	0-58	0.75
18	Channel I.	143.0	16978.1	6	28-327	1.00
19	L. Green I.	85.6	3364.0	7	26-199	1.00
20	P. Chalmers	36.8	968.2	6	0-68	0.83
21	Stockdale H.	32.3	474.6	7	0-65	0.86
22	Montague P.	35.1	266.1	8	0-58	0.88
23	Rocky B.	35.8	461.1	8	0-61	0.88
24	Schooner R.	86.4	1049.8	10	19-117	1.00
25	Canoe P.	51.3	1135.7	8	10-86	1.00
	Pooled Totals	1584.6	52447.2			

[1] Site locations shown in Figure 3.

[2] FOU (Frequency of Use) = number of times a haulout is occupied by seals divided by total number of times haulout checked for seals.

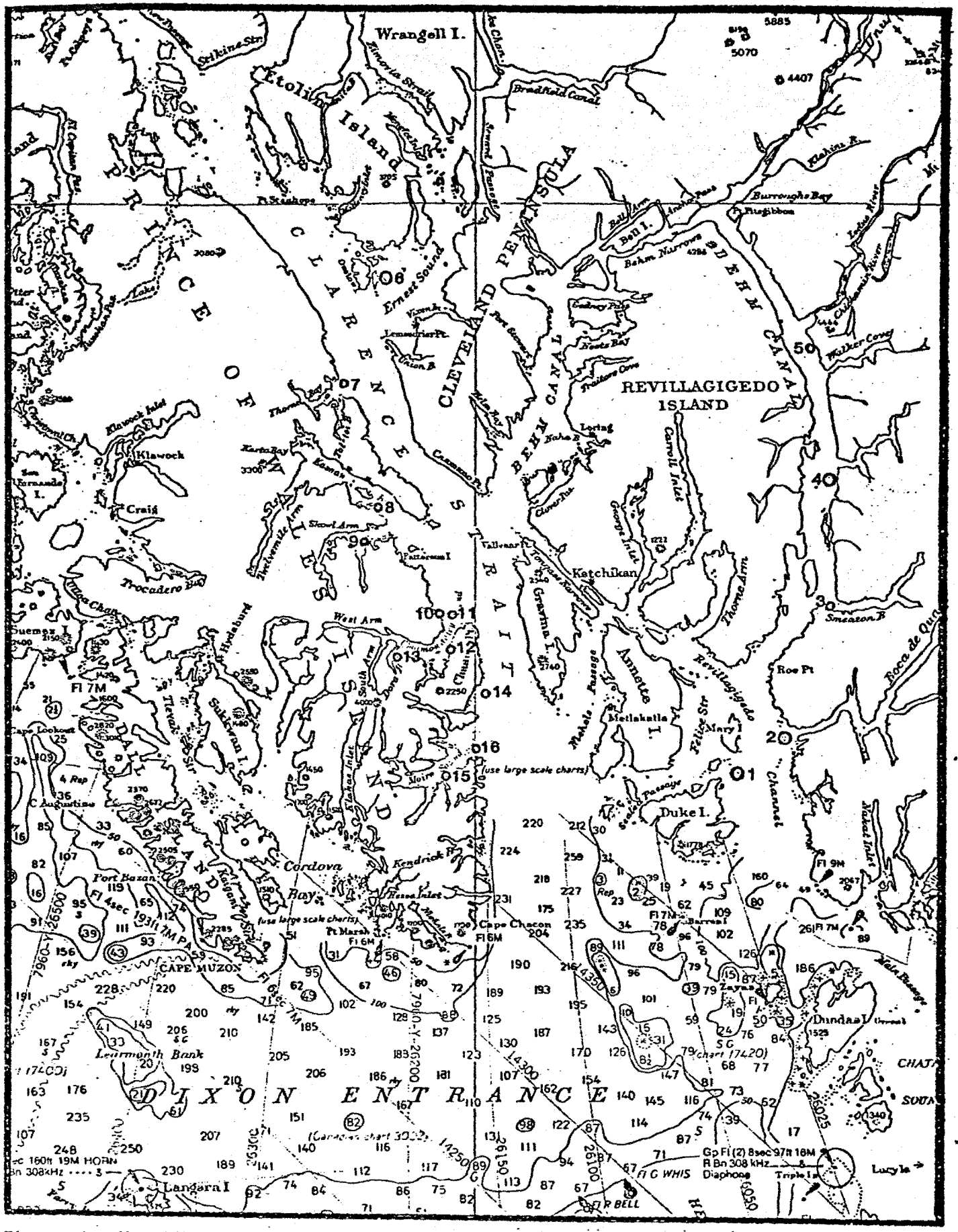

Figure 1. Ketchikan area harbor seal trend count route. Haulout site names and count data summary are presented in Table 1.

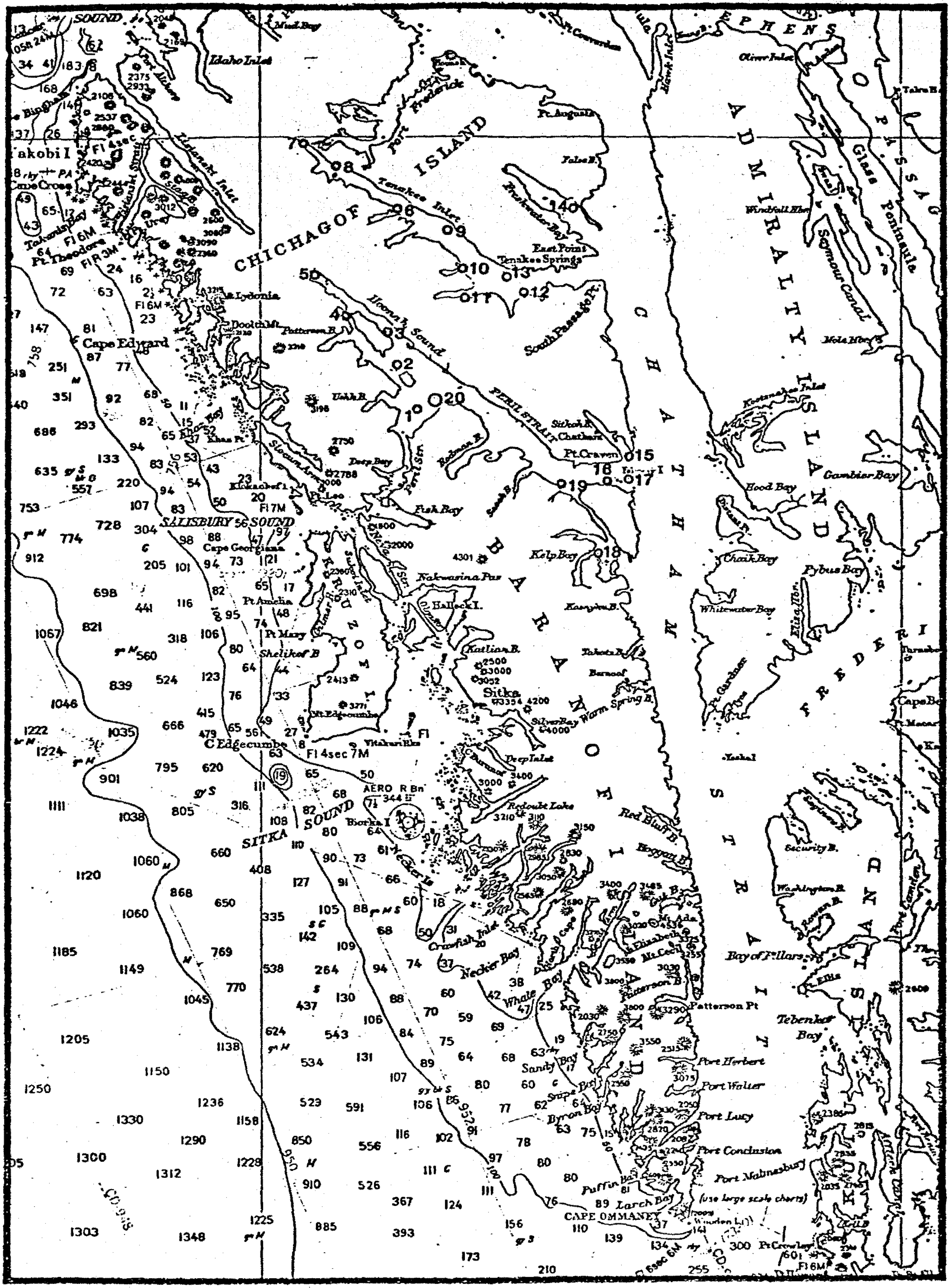

Figure 2. Sitka area harbor seal trend count route. Haulout site names and count data summary are presented in Table 2.

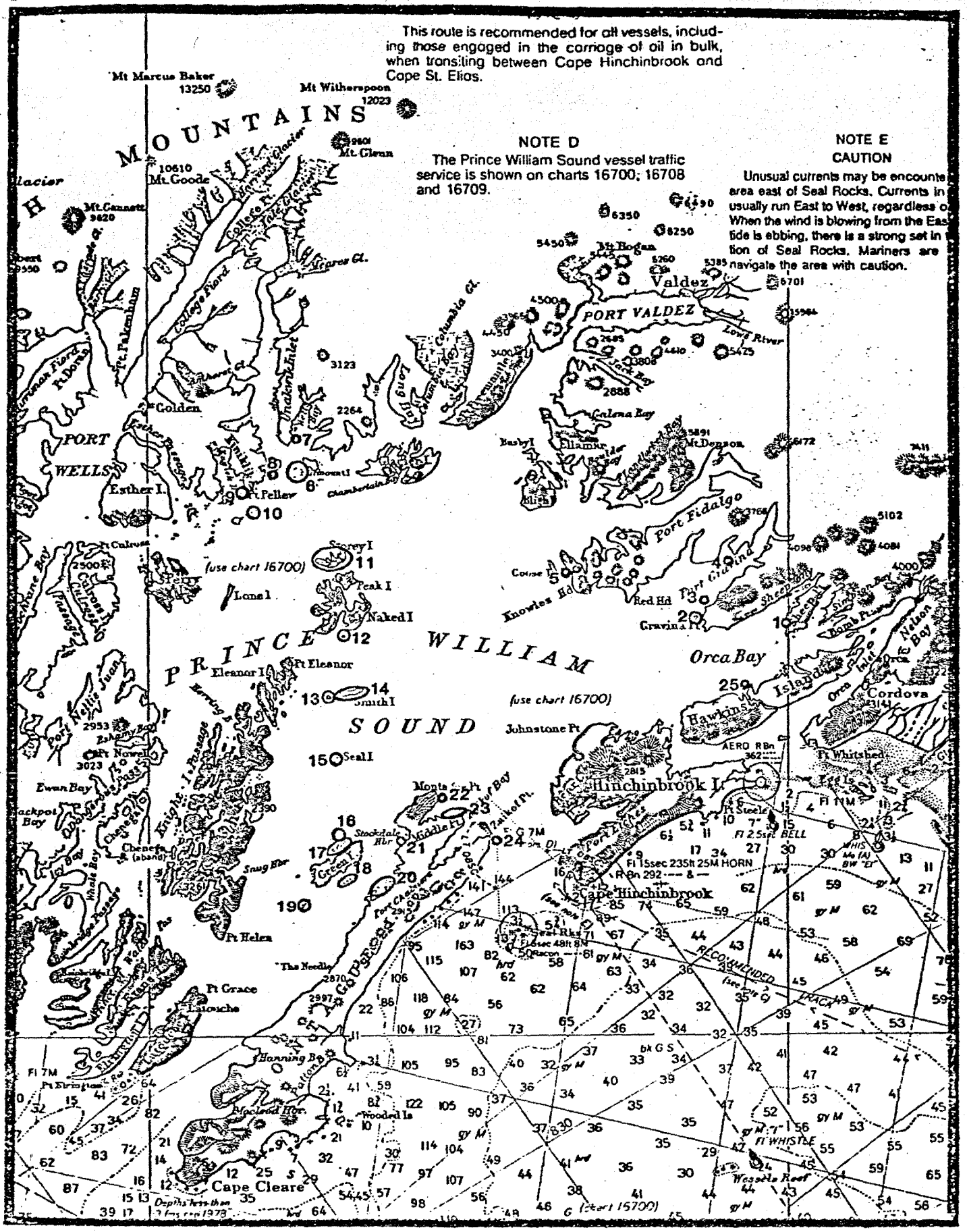

Figure 3. Prince William Sound harbor seal trend count route. Haulout site names and count data summary are presented in Table 3.