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HABITAT USE BY THE PRIBILOF SHREW IN SUMMER

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The Pribilof shrew (Sorex pribilofensis) is known to occur only on St. Paul Island, Pribilof Islands, Alaska (Preble and McAtee 1923. A biological survey of the Pribilof Islands, Alaska. N. Am. Fauna No. 46). During a review of the status of small mammals inhabiting Alaska's coastal islands, Fay and Sease (1985 . Preliminary status survey of selected small mammals. Report for Endangered Species Office, U.S. Fish and Wildlife Service, Anchorage, Alaska) considered this shrew to be one of several "so little known...that their status and future are open to question". They state further "the Pribilof shrew ... may be threatened and require some protective action in the near future, but more information about them will be needed before any action can be taken."

Most specimens of the Pribilof shrew taken previously from St. Paul came from near the village. There was concern that cats, kept as pets by many villagers, may have adversely affected shrew populations in this area. In addition, a new housing development now occupies an area where shrews were previously found. If shrews were confined to habitats near the village the two factors listed above would constitute severe threats to the continued well-being of this animal.

As a preliminary step in evaluating the status of shrew populations on St. Paul, an effort was made in 1986 to determine whether shrews still exist near the village and if they occur elsewhere on the island. Maps were then made of the areas of habitats used by the animals. This report summarizes the findings.

Study Area and Methods

Shrew trapping had to be done on an incidental basis by biologists involved in an ongoing seabird monitoring project at St. Paul, so traps were always placed near the main road system for convenient access. Within these limits, sites were selected to sample different vegetation types and different geographic areas. For purposes of this evaluation, habitats sampled were assigned to one of four vegetation types: crowberry, grass-umbel, wet sedge meadow, or forb meadow (Table 1). An effort was made to select at least two geographic areas containing each major vegetation type. Figure 1 shows the location of the five trap lines that were established. Most lines covered more than one vegetation type.

Galvanized cones 150 mm in diameter by 260 mm deep were used as pit-fall traps. No effort was made to locate traps at precise intervals, but traps were usually placed about 4m to 7m apart, and in more-or-less straight lines. Starting points and directions were determined subjectively to encompass different habitats. Since up to 39 traps were used per line, a distance of 200 m to 250 m was spanned by each trap line (see Table 2 for description of trapping areas).

Traps were driven into the soil so that the lip of each trap was at or just below the surface of the ground litter. Surveyor's flags were used to mark trap locations. Initial checks of each trap line were at about two-hour intervals, but in areas where

trapping success was low, subsequent checks were less frequent. The duration of trapping in each location was determined primarily by the demands of other work; if a particularly time-consuming commitment was scheduled, traps were usually removed because it would have been impossible to check them regularly. When live shrews were discovered in traps they were weighed (with a 50 g Pescola scale) and released. Dead shrews were measured, weighed, and preserved in alcohol. All specimens were sent to the University of Alaska Museum, Fairbanks.

Results

A total of 37 shrews was captured (see Appendix 1 for measurements of specimens) in over 20 days (17,832 trap-hours) of trapping in July and August (Table 3). Shrews were found in four of the five areas sampled. No animals were caught near Lake Hill, an inland area with little tall cover. An examination of capture rates of traps in various habitats (Table 4) reveals that shrews were caught almost exclusively in the grass-umbel habitat. Two animals were caught in the forb meadow habitat, but both these captures were in spots near, but not in, grass-umbel habitat.

Capture rates varied among areas from 0 to 9.1 shrews per 1000 trap-hours (Table 3). By far the highest rate was recorded at Zapadni Reef. In fact, the trapping effort there had to be terminated after only 34 hours because we could not check traps

as frequently as would have been required given the high capture rate. Zapadni Reef had a higher percentage of grass-umbel habitat than other sites (Table 2). Nevertheless the rate of capture there was over twice as high as the average for the grass-umbel habitat in all areas combined (Table 4).

Apparently not every day was equally as good for shrew trapping. For example, the village trap line was established at 18:00 h on July 8. Single shrews were caught on July 9, 11, and 12, but on July 13 seven animals were captured! Unfortunately, traps had to be removed on August 14 so it was not possible to determine if the capture rate would have decreased again. An effort was made to correlate trapping success with weather, which varied from cool and rainy to cool and sunny. No conclusive evidence was obtained, probably because the trapping period was short.

Discussion

Although areas and habitats were sampled with unequal intensity, it seems apparent that shrews are found primarily in plant communities characterized by relatively tall overstory plants with fairly high stem density. The grass-umbel association, apparently the most highly favored habitat, has a well-developed layer of dead stems on the surface of the ground. This may provide excellent cover, and it may also be the preferred habitat of beetles and other insects which shrews presumably depend on for food. The crowberry lacks a well-developed overstory, and this feature is only moderately developed in the forb meadow.

Although the overstory was relatively short in the wet sedge meadow that we sampled, nevertheless it was substantial. The litter layer was also well-developed. Perhaps this habitat is too wet for shrews.

Since capture rates varied over time at the same area, it is not possible to draw strong conclusions about the relative densities of shrews in different areas. Still the data demonstrate that shrews still occur near the village in spite of the cats, and that they also occur in areas away from the village. The favored grass-umbel habitat occurs in a fairly narrow (usually less than 1500 m) strip along the eastern and southern coasts of St. Paul. This habitat probably also occurs along the northern coast, but it is not found along the western coast.

Shrew population levels probably fluctuate between years on St. Paul, but it is not known if these fluctuations are cyclic. Furthermore, we do not know whether populations were particularly "high" in the areas we sampled in 1986. It is possible that in years when populations are higher than they were in 1986 shrews make more extensive use of habitats other than grass-umbel.

Recommendations

A rigorous sampling scheme should be implemented at St. Paul to determine the relative density of shrews in different areas of "preferred" habitat. This would involve determining the extent of the grass-umbel habitat on St. Paul, and randomly selecting

line transects to sample by live trapping. Trapping should occur for a relatively extensive period (e.g. 7-10 days) at each site. Ideally, trapping should occur simultaneously at several sites with similar habitats. Detailed notes on vegetation around each trap should be made so that particular plant communities within the grass-umbel association may be identified. Correlations between capture rates and communities could then be examined. Detailed weather records at trapping sites should be kept to determine if weather influences capture rates.

Traps should be set in wet sedge meadow, crowberry, and forb meadow habitats to further evaluate the use of these habitats by shrews. The distribution of these habitats on St. Paul should also be delineated.

Table 1. Characteristics of potential shrew habitats at St. Paul I., Alaska.

Habitat Type	Height (cm) of Tallest Plants	Dominant Species of Plants in Habitats	Extent of Habitat on St. Paul
Crowberry	<10	<u>Empetrum nigrum</u> , <u>Salix</u> spp., moss	Extensive in uplands
Grass-umbel	50-90	<u>Elymus arenarius</u> , <u>Poa eminens</u> , <u>Angelica lucida</u> , <u>Conioselinum chinense</u> , <u>Artemisia arctica</u>	Fairly narrow coastal strips
Wet Sedge Meadow	20-30	<u>Carex lyngbyaei</u> , <u>Carex</u> spp.	Marsh and lake edges
Forb Meadow	15-25	<u>Lupinus nootkatensis</u> , <u>Pedicularis</u> spp., <u>Carex</u> spp., <u>Angelica lucida</u> , numerous other forbs	Extensive on upland plateaus

Table 2. Characteristics of shrew trapping areas at St. Paul I., Alaska in 1986.

Location	Physiography of General Area	Primary Habitat	No. of Traps in Habitats
1. Village	a. relatively flat, < 10m elevation, scattered low sand dunes	grass-umbel	19 (61) ^a
	b. broad moist edge of marsh	wet sedge meadow	12 (39)
2. Zapadni	a. 10-15 south-facing slope, 15-20 m elevation, scattered boulders on surface	grass-umbel	39 (100)
3. Ridge Wall	a. 20-25 east-facing side of weathered lava flow	crowberry	18 (46)
	b. plateau at foot of the slope described above (a.)	grass-umbel forb meadow	13 (33) 8 (21)
4. Lake Hill	a. 25-30 slope on northeast-facing hill about 40 m tall	crowberry	19 (49)
	b. base of hill and gently sloping plateau at foot of slope, about 25m elevation	forb meadow	20 (51)
5. Weather Station Lake	a. rolling dunes by lake, <15 m elevation	grass-umbel	32 (74)
	b. relatively flat meadow inland from dunes	forb meadow	7 (26)

^a percentage of traps at the site in parentheses

Table 3. Trapping effort and success for shrews at St. Paul I.,
Alaska in 1986.

Location	Set Out Date Time	Retrieved Date Time	Elapsed Time	No. Traps	Trap- Hours	Shrews Caught	Shrews/ 1000 T.H.
Village	07/08 1800	07/14 1000	146	31	4526	11	2.4
Zapadni Reef	08/02 1200	08/04 2300	74	30	1326	12	9.1
Ridge Wall	08/27 1700	09/02 1500	142	30	5538	5	0.9
Lake Hill	08/06 1100	08/07 1800	31	39	1209	0	0
Weather Sta. Lk.	08/21 1230	08/26 1830	134	39	5226	9	1.7

Table 4. Capture rates of shrews in different habitats at St. Paul I., Alaska in 1986.

Habitat	Total Trap-Hours	Shrews/1000 T.H.
Grass-umbel	10234	3.4
Forb Meadow	2694	0.7
Wet Sedge Meadow	1752	0
Crowberry	3145	0

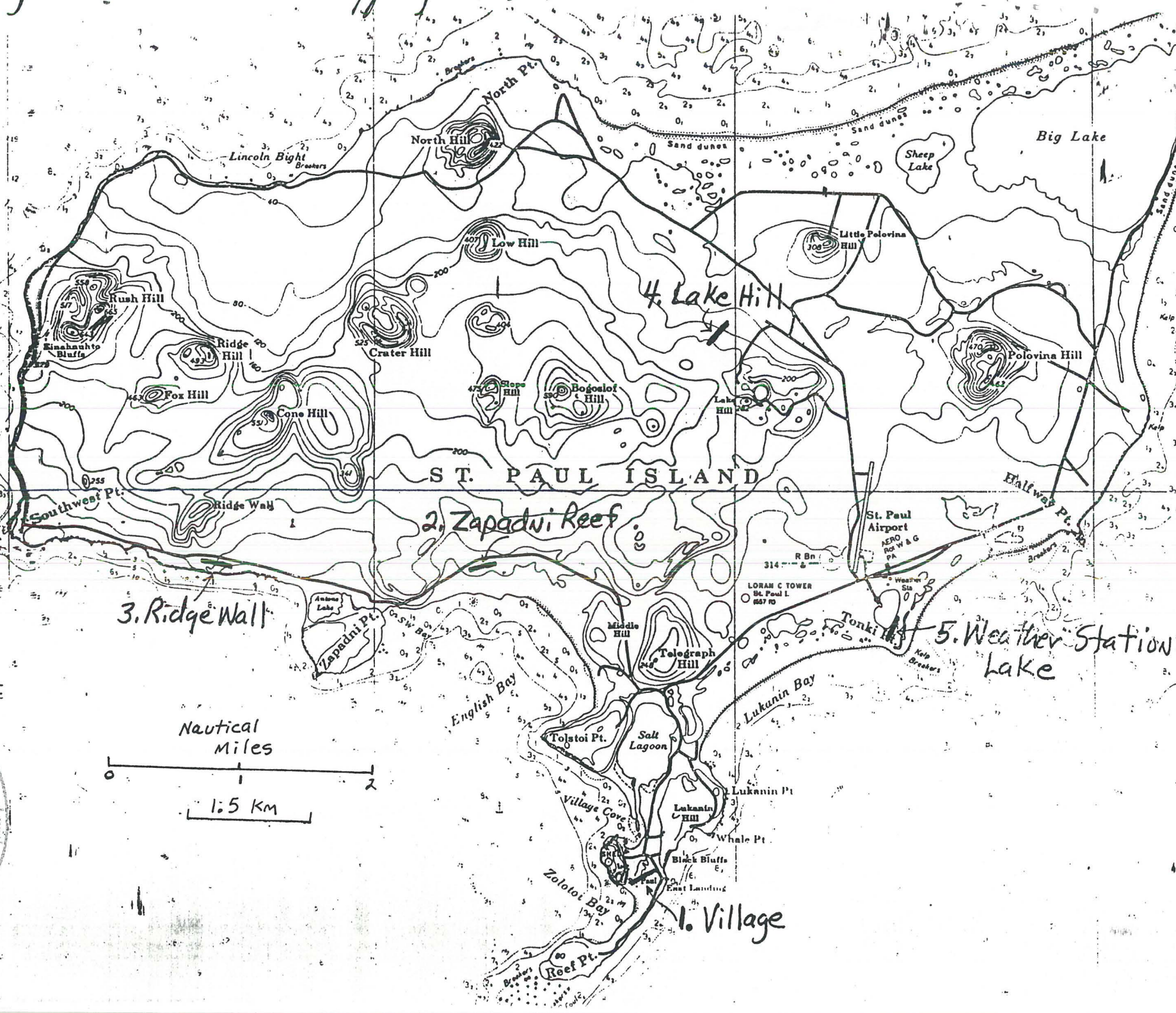
a

Appendix 1 Measurements of shrews captured at St. Paul I., Alaska in 1986.

b						
Number	Weight	Length	Tail	Leg	Ear	Comments
01	5.3	85	33	8	8	Intest. & liver parasites
02	4.7	92	35	9	7	Severe mite load
03	5.2	85	36	9	7	
04	6.0	90	34	9	6.5	Lactating female
05	5.6	82	33	9	7	
07	3.6	86	32	9	8	
08	5.5	81	32	9	7	
09	4.1	85	34	9	7	
10	5.8	88	32	9	9	
11	4.3	85	30	8	8	
12	5.0	88	32	8	7.5	
13	5.5	94	34	8	7.5	
14	6.0	90	34	8	8	
15	5.5	87	32	8.5	7.5	
16	5.0	88	32	8	8	
17	5.6	82	33	9	8	
18	7.2	--	--	-	-	Lactating female
19	6.3	--	--	-	-	
20	5.2	--	--	-	-	
21	5.5	--	--	-	-	
22	6.0	--	--	-	-	
23	5.0	--	--	-	-	
24	6.0	--	--	-	-	
25	5.5	--	--	-	-	
26	6.0	--	--	-	-	
27	4.5	--	--	-	-	
28	5.0	--	--	-	-	
29	5.5	--	--	-	-	
30	6.5	--	--	-	-	
31	6.0	--	--	-	-	
32	4.5	--	--	-	-	

a
weight in grams, other measurements in mm (a few specimens not weighed or measured).

b
numbers lower than 17, when preceded by "VMM-86-", are actual field collection numbers on specimen labels. Number "06" was not used. Numbers higher than 16 were usually assigned to live animals that were released.



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