

## DEN SITE CHARACTERISTICS OF PRINCE WILLIAM SOUND BLACK BEARS.

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Black bear dens utilized in winter 1980/81 and 1981/82 by bears radio-collared in connection with population identity studies in Prince William Sound (Modafferi, in prep.) were located, marked and measured. The purpose of this work was to provide baseline data on characteristics of Prince William Sound black bear den sites. Such data are valuable in light of increased developmental activities anticipated in the area, especially logging. These observations also provide comparison data to that being collected on the Kenai Peninsula (Schwartz and Franzmann 1981) and along the upper Susitna River (Miller and McAllister 1982).

Mark Chihuly provided valuable assistance in this project in 1982 as did Chuck Schwartz in 1981. Julius Reynolds also assisted the project in various ways. Ron Modafferi provided historical data and his cooperation was essential and appreciated.

All radio-collared bears were in dens when bears were located by fixed-wing aircraft on 15 April 1981. However, 2 bears, both males, had left their dens by 23 April 1981 when dens were marked; only approximate locations and elevations are available for the dens of these 2 males. One 1981/82 den was also only approximately located because of radio failure. Nine bears, all

females, were still in dens on 23 April 1981 and these dens were marked with radio-collars, flagging and/or evident topographic features. In 1982, 6 new dens were located and marked on 9-13 April.

Marked dens were visited in the summers of 1981 and 1982 and their characteristics were noted and dens were measured. The measurements followed those outlined by Schwartz and Franzmann (1981) with the addition of a subjective characterization of relative quality on a scale from 1 (poor) to 5 (excellent). These data are presented in Table 1.

Of the 15 measured dens, 8 were in mature hemlock (*Tsuga spp.*) forests, a forest type likely to be heavily exploited by increased logging efforts. Hollow trees were used as dens by 3 bears denning in hemlock forests (Table 1).

Interestingly, 14 of the 15 dens examined were in natural cavities (3 in hollow trees, 4 in rock caves, 2 under hemlock roots and 5 under large boulders on talus slopes)(Table 1); only 1 den was completely excavated by a radio-collared black bear.

In 12 cases a determination or reasonable guess could be made on whether an examined den had been previously used by a black bear. In 9 of these previous use by black bears was evident or suspected (Table 1).

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Frequency of reuse of the same den by the same individual appeared low, although individual bears tended to den in the same general vicinity in successive years. One of the dens visited in 1981 was reused by a radio-collared bear in 1982 (den #5). Den #1 was occupied by a non-radio-collared bear in 1981/82, Den #6 was not occupied in 1981/82; the other dens found in the first year of the study were not revisited so occupancy in the second year was not determined for these dens (Table 2). The mean distance between the different dens used by 7 individuals in 1980/81 and 1981/82 was 1.1 miles (range = 0.4 - 1.9, SD = 0.6).

The time bears spent in 1980/81 dens could not be determined as the last flight in 1980 was on 29 September at which time all bears were still out. Emergence from dens seemed concentrated in the first 2 weeks of May for females and the last two weeks of April for the 2 males (Table 4). In 1982 data on time of entrance to and emergence from dens were not collected.

Aspects of known dens are illustrated in Figure 1. The mean slope of 15 dens was  $38^\circ$  (range =  $10 - 62^\circ$ , SD =  $13.6^\circ$ ) (Fig. 2). The high frequency of dens in natural cavities probably contributed to the apparent absence of trends in the slope and aspect data; perhaps the bears select for good cavities and these are independent of slope or aspect.

REFERENCES CITED

Miller, S. and D. McAllister. 1982. Brown and Black Bear. Vol. VI of Big Game Studies, Phase I Final Report, Susitna Hydroelectric Project, Ak. Dept. of Fish and Game. 233pp.

Schwartz, C. and A. Franzmann. 1981. Black Bear Predation on Moose. Project Progress Report, Federal Aid in Wildlife Restoration Project W-17-2, Job 17.3R. 43 pp.

Table 1. Characteristics of Black Bear Dens in Prince William Sound, 1980-1982.

Den No.	Bear No.	Repro. Status & Age at Exit	Winter of Known Use	Elevation (Ft.)	Scope (degree)	Aspect (True North)	Vegetation	% Canopy Tree Cover	Entrance		Chamber			Total Length (cm)	Prev. Use	Rela- tive Quality**	Location & Type
									Ht. (cm)	No. (cm)	Ln. (cm)	Wg. (cm)	Ht. (cm)				
NATURAL CAVITIES																	
1	101	F@9 w/3@1	'80-'81 '81-'82***	375	10	352	Alpine Tundra	0	38	47	216	160	96	800	yes*	3	Blackstone Bay Rock Talus
17	142	F@13 w/1@c	'81-'82	425	31	161	Hemlock	80	40	42	62	101	66	159	Yes	4	Cochrane Bay Hemlock Roots
2	106	F@19 w/0	'80-'81	450	25	27	Hemlock	30	65	55	71	80	90	94	No?	4	Blackstone Bay Hollow Tree
3	143	F@4 w/0	'80-'81	500	45	327	Hemlock	60	46	26	88	71	74	198	No?	2	Cochrane Bay Hollow Tree
5	144	F@7 w/0 F@8 w/2@c	'80-'81 '81-'82	600	31	123	Hemlock	30	37	48	67	62	--	89	Unk.	4	Cochrane Bay Hollow Tree
6	169	F@14 w/0	'80-'81 '81-'82****	300	26	330	Hemlock	20	55	104	175	126	67	308	Yes	3	Cochrane Bay Rock Cave
7	148	F@3 w/0	'80-'81	400	50	187	Alder/Salmon Berry	0	34	71	73	134	65	122	Unk.	3	Culross Pass. Rock Cave
8	147	F@17 w/0	'80-'81	900	55	122	Hemlock	80	178	42	128	114	118	980	Yes	3	Culross Pass. Rock Talus
10	149	F@11 w/0	'80-'81	1250	31	187	Alpine Tundra	0	43	59	86	86	53	268	Yes?	3	Cochrane Bay Rock Cave
13	101	F@10 w/unk.	'81-'82	575	34	317	Alder	10	48	270	94	203	69	335	Yes	2	Blackstone Bay Rock Talus
14	169	F@15 w/unk.	'81-'82	625	39	268	Salmon Berry	0	47	65	107	112	69	361	Yes	3	Cochrane Bay Rock Talus
15	148	F@4 w/unk.	'81-'82	950	35	236	Hemlock	95	46	68	73	89	71	124	Unk.	4	Culross Pass. Hemlock Roots
16	147	F@18 w/unk.	'81-'82	890	62	111	Hemlock	0	53	68	76	102	88	189	Yes	3	Culross Pass. Rock Cave
18	149	F@12 w/unk.	'81-'82	700	45	94	Alder	60	49	56	70	98	57	324	Yes	3	Cochrane Bay Rock Talus

(continued on next page)

Den No.	Bear No.	Repro. Status & Age at Exit	Winter of Known Use	Elevation (Ft.)	Scope (degree)	Aspect (True North)	Vegetation	% Canopy Tree Cover	Measurements			Length (cm)	Use	Relative Quality**	Location & Type		
									Ht. (cm)	No. (cm)	Ln. (cm)						
DUG CAVITIES																	
9	142	F@12 w/0	'80-'81	1300	52	185	Alder	0	36	52	70	129	92	80	No	3	Cochrane Bay Soil
UNKNOWN CAVITY TYPE (actual den not located on ground)																	
11	165	M @ 7	'80-'81	250 Approx.	--	--	Spruce	--	--	--	--	--	--	--	--	--	Cochrane Bay
12	146	M @ 9	'80-'81	350 Approx.	--	--	Alder (?)	-	--	--	--	--	--	--	--	--	Kings Bay
19	146	M @ 10	'81-'83	300 Approx.	--	--	Spruce (?)	-	--	--	--	--	--	--	--	--	Kings Bay

\* Same bear used the den in 77/78 (w/1@1), and probably in 78/80; not in same den in 76/77, unknown den located in 78/79.

\*\* Subjective characteristics of quality, 1 = Poor and 4 = Excellent.

\*\*\* Den #1 was reused in 81/82 by an unknown black bear.

\*\*\*\* Den #6 was not occupied in '81-'82.

Table 2. Denning History of Radio-collared Black Bears in Prince William Sound, Alaska (prioritized for dens by year, bear number and reproduction status given).

Den No.	Year				
	'77-'78	'78-'79	'79-'80	'80-'81	'81-'82
1	Bear #101 F@6 w/1@1		Bear #101 F@8 w/3@c (Prob.)	Bear #101 F@9 w/3@1	Unmarked Bear
2				Bear #106 F@19 w/0	Unk.
3				Bear #143 F@7 w/0	Unk.
5				Bear #144 F@7 w/0	Bear #144 F@8 w/2@c
6				Bear #169 F@14 w/0	Not occupied
7				Bear #148 F@3 w/0	Unk.
8				Bear #147 F@7 w/0	Unk.
9				Bear #142 F@12 w/0	Unk.
10				Bear #149 F@11 w/0	Unk.
11				Bear #165 M @ 7	Unk.
12				Bear #146 M @ 9	Unk.
13					Bear @101 F@10 w/unk.
14					Bear #169 F@15 w/unk.
15					Bear #148 F@4 w/unk.
16					Bear #147 F@18 w/unk.
17					Bear #142 F@13 w/1@c
18					Bear #149 F@12 w/unk.
19					Bear #146 M @ 10

Table 3. Denning History of Radio-collared Black Bears in Prince William Sound, Alaska (prioritized for dens by year, bear number and reproduction status given).

No.	Year					
	'76-'77	'77-'78	'78-'79	'79-'80	'80-'81	'81-'82
101	Den unk. F@5 w/1@c	Den #1 F@6 W/1@1	Den unk. F@7 w/unk.	Den #1 (Prob) F@8 w/3@c	Den #1 F@9 w/3@1	Den #13 F@10 w/unk.
106	Den unk. F@15 w/2@c	Den Not Meas. F@16 w/unk.	Den unk. F@17 w/unk.	Den not Meas. F@18 w/unk.	Den #2 F@19 w/unk.	
143		Den Not Meas. F@4 w/unk	Den unk. F@5 2/unk	Den unk. F@6 w/unk	Den #3 F@7 w/0	
144					Den #5 F@7 w/unk.	Den #5 F@8 w/2@c
169					Den #6 F@14 w/0	Den #14 F@15 w/unk.
148					Den #7 F@3 w/0	Den #15 F@4 w/unk.
147					Den #8 F@17 w/0	Den #16 F@18 w/unk.
142					Den #9 F@12 w/0	Den #17 F@13 w/1@c
149					Den #10 F@11 w/0	Den #18 F@12 w/unk.
165					Den #11 M @ 7	Den unk.
146					Den #12 M @ 9	Den #19 M @ 10



Table 4. Den entrance and emergence dates of radio-collared Black Bears in Prince William Sound, winter of 1980/81.

Bear ID	Sex	Age @ exit	1980 Entrance *	1981 Emergence *
101	F	9	29 Sept.- ?	29 April - 14 May
106	F	19	29 Sept.- ?	29 April - 14 May
143	F	7	29 Sept.- ?	27 April - 29 April
144	F	7	29 Sept.- ?	29 April - 14 May
169	F	14	29 Sept.- ?	14 May - 22 May
148	F	3	29 Sept.- ?	29 April - 14 May
147	F	17	29 Sept.- ?	29 April - 14 May
149	F	11	29 Sept.- ?	29 April - 14 May
142	F	12	29 Sept.- ?	23 April - ?
165	M	7	29 Sept.- ?	15 April - 23 April
146	M	9	29 Sept.- ?	15 April - 23 April

\* Last flight in fall was on 29 September when all bears were out of dens.

\*\* Range represents last observation in den & first observation outside den.

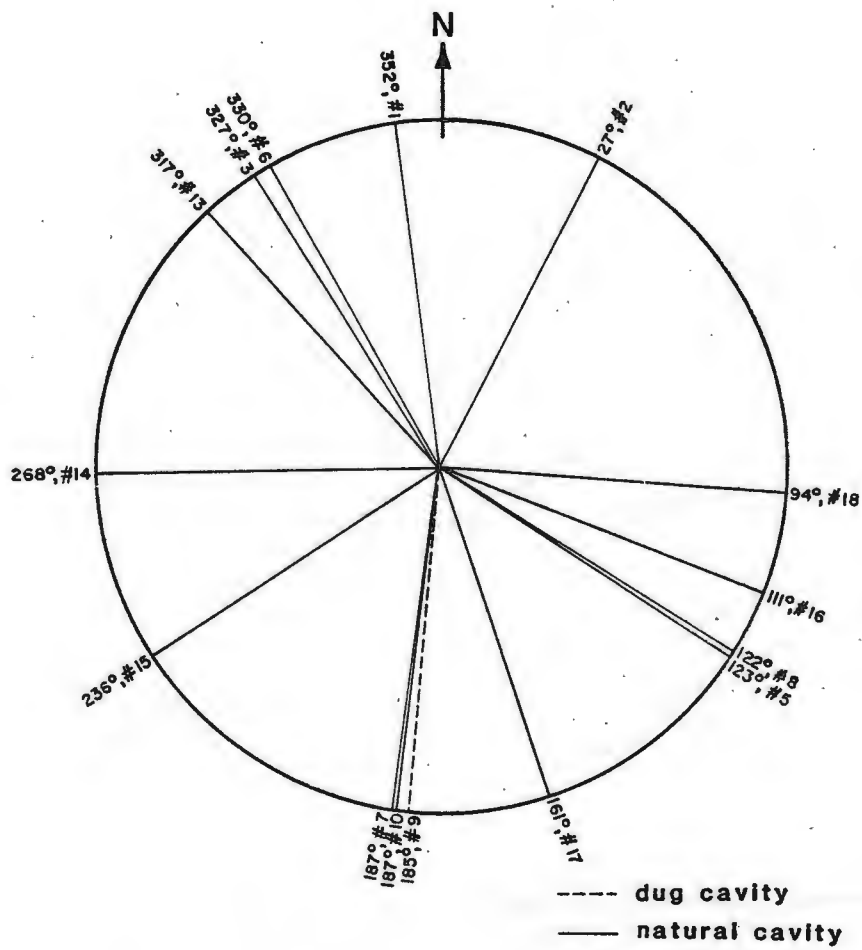


Figure 1. Aspect of all black bear study dens in northwestern Prince William Sound, Alaska. (1980-1981, 1981-1982)

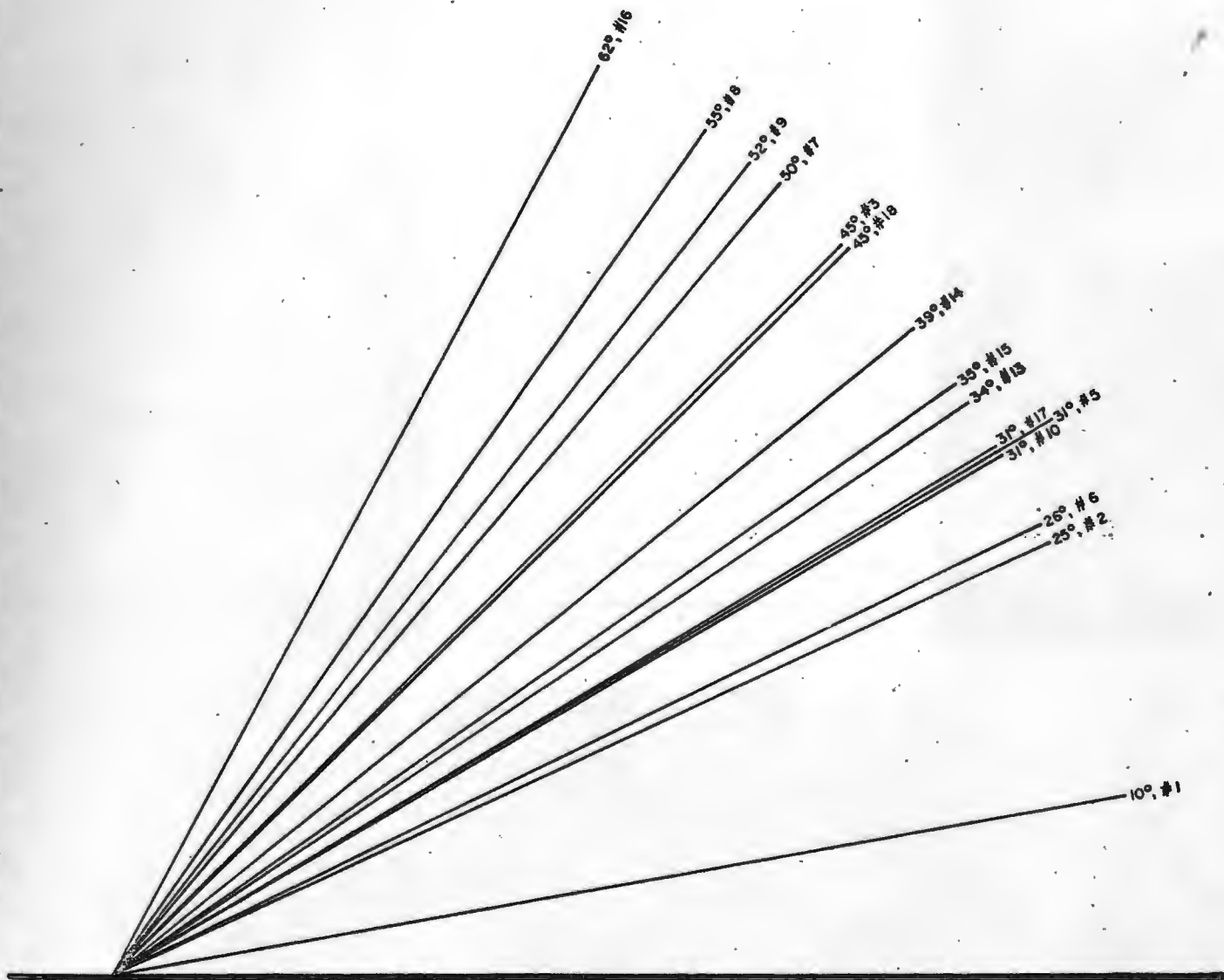


Figure 2. Slope of all black bear study dens in northwestern Prince William Sound, Alaska. (1980-1981, 1981-1982)