ALASKA DEPARTMENT OF FISH AND GAME

JUNEAU, ALASKA

STATE OF ALASKA
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REPORT ON 1969 BROWN BEAR STUDIES

by

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Annual Project Segment Report
Federal Aid in Wildlife Restoration
Project W-17-2

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WORK PLAN SEGMENT REPORT

FEDERAL AID IN WILDLIFE RESTORATION

STATE:	Alaska		
PROJECT NO:	W-17-2	TITLE:	Big Game Investigations
WORK PLAN:	R	TITLE:	Bear Studies (Brown Bear)
JOB NO:	4.1R	TITLE:	Evaluation and Development of Brown Bear Census Techniques
	4.2R	TITLE:	Brown Bear Life History Study
	4.3R	TITLE:	Comparison of Harvest Data and Population Status
PERIOD COVERED:	January 1, 1969 through December 31, 1969		

ABSTRACT

No bear tagging was conducted at McNeil River during 1969. Seventy-two individual bears were identified, 13 of which had been tagged in previous years. Only 7 of the 13 tagged bears were positively identified. Bear abundance was high in relation to previous years when personnel were capturing and marking bears. Retention of the nylon rototags by bears was found superior to other ear marking equipment. A sow with three cubs observed in 1968 returned this year with only one yearling. Seven years of life history are available on four of the seven bears observed.

On the Alaska Peninsula, the Black-Chignik Lakes area was chosen as the most suitable region to conduct bear distribution and movement studies. Bear composition and trend counting techniques were evaluated in relation to management applicability.

The reported Alaska brown-grizzly bear legal sport harvest during the regulatory year 1968-69 was 607 bears (fall-1968 season, 359; spring-1969 season, 248). Fifty-seven percent of this harvest was from Game Management Units 4, 6, 8 and 9. Skull measurements were taken from 91 percent of the brown-grizzly bears sealed by the Department. Skull size plotted against age indicated little relationship in female bears, but did show a skull size increase with increasing age in male bears. The tooth cementum technique used to age brown-grizzly bears has been developed sufficiently for use as a bear management tool.

RECOMMENDATIONS FOR MANAGEMENT

A coordinated Department policy should be established regarding the McNeil River bear and salmon resources. The McNeil River State Game Sanctuary was established to maintain a high number of bears for the public to observe and photograph. To sustain this objective it is necessary to insure adequate salmon escapement into McNeil River and Mikfik Creek. Game Division personnel have recorded no red salmon escapement into Mikfik Creek during July 1968 or 1969. On 8 July 1967, game biologists reported as many as 1,000 red salmon entering Mikfik Creek on the evening high tide. Between 9 and 15 July 1969, I observed commercial fishing boats making legal purse seines in the only channel leading to Mikfik Creek and McNeil River. Sets were also common at the mouth of each of these waterways. Until policy regarding best use of these salmon can be established, I recommend McNeil River Cove be closed to commercial salmon fishing.

Continue to obtain and assess brown-grizzly bear harvest information. Statewide harvest data on sex and age composition, trends in hide and skull size, comparisons of harvest by year and season are presented in this publication under research auspices for the last time.

Collecting of bear teeth, processing and reading cementum ages should continue, especially in the heavier harvested game management units. Persons sealing bear should be made aware of the importance of age composition data and instructed in proper procedures for tooth selection and extraction.

An investigation should be conducted to determine the magnitude of illegal export of brown-grizzly bear hides. The sex, date and location of all such bears should be recorded to properly evaluate the bear sealing program. If possible, the circumstances relating to the illegal export of bear hides should be determined.

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OBJECTIVES

To record life history information on bears tagged at McNeil River.

To select one of three proposed brown bear study areas on the Alaska Peninsula.

To evaluate brown bear counting techniques in relation to practical management application.

To tag bear, test marking equipment and record movements of bear tagged on the Alaska Peninsula study area.

To summarize harvest data by year, comparing changes in the sex and age composition and skull and hide size.

METHODS

Bears were observed at McNeil River on lower Cook Inlet from 7 through 30 July 1969. No tagging was attempted this year to reduce disturbance of bears and to compare the number of bears available to past years when tagging crews were active. From 14 through 30 July, one biologist was present as compared to the preceding four seasons when four to six persons were working. Four to nine hours of observation were spent each day to record bear abundance, composition and to obtain life history information. Bears were separated on the basis of tag identification, size, color, number of young accompanying sows and individual physical characteristics. Identification of bears was made with the aid of binoculars and a 20X spotting scope. All sightings were made from a natural blind on the south side of McNeil River Falls. Jim Faro arrived on 13 July; Lee Miller and Lee Glenn left McNeil River Falls on 15 July.

Alaska Peninsula areas including Ugashik Lake, Black-Chignik Lakes and Moffit Bay were evaluated as possible locations on which to conduct brown bear population studies. Lentfer (1967) previously described the area boundaries. In addition to evaluation of each tract by aerial reconnaissance, past work by various investigators was reviewed. Criteria for area selection were based on bear abundance, the amount and success of bear hunting, the abundance of salmon streams and available salmon escapement data. Availability of cabins and transportation facilities was also considered. The Black-Chignik Lakes region was chosen as most suitable. Six replicate bear surveys were flown on the selected study area to evaluate bear counting techniques. All surveys were conducted using the method described by Erickson and Siniff (1963). Budget limitations restricted the number of replicate counts, therefore, the technique was not fully evaluated.

The bear sealing program provides information on bears harvested in Alaska. By regulation, brown and grizzly bear hides and skulls must be presented to a member of the Department for examination and sealing within 30 days after the date of kill. During the sealing operation, the date and location of kill, sex, skull and hide size are recorded on sealing forms. In the fall of 1969, a regulation was implemented allowing Department personnel to obtain a rudimentary lower premolar tooth (for age determination studies) when skulls were presented for sealing.

Questions arose this year regarding validity of data collected from the bear sealing program. Department personnel had cause to believe that bears were being transported outside Alaska without being sealed. During November of 1969, Department personnel, accompanied by representatives of the Bureau of Sport Fisheries and Wildlife, visited four taxidermy shops in the states of Washington and Colorado. This investigation was of a preliminary nature and, therefore, final conclusions are not made. Taxidermy records indicated that bear hides were being transported out of Alaska without being sealed but the magnitude of violations is unknown.

Brown-grizzly bear teeth were decalcified, sectioned, stained and mounted on slides, and ages were assigned during 1969. The techniques used are described by Lentfer (1968). The age determination study was retained under research classification for an additional year to refine technique, and to compare the assignment of ages when teeth are read by experienced and inexperienced persons.

ACKNOWLEDGMENTS

Credit for the 1969 McNeil River bear observations is given to James B. Faro.

Recognition is also given to Mrs. Mary Schneider and Mr. Nick Steen who prepared the brown-grizzly bear tooth collection for analysis.

Acknowledgment for expert aircraft piloting is given to Mr. John Swiss who flew all of the Black-Chignik Lake replicate bear surveys.

Sincere appreciation is extended to Robert A. Rausch who supervised this study and provided much assistance during manuscript preparation.

FINDINGS

Brown Bear Life History Study

Seventy-two individual bears were identified at McNeil River Falls during 14 through 30 July 1969. A maximum of 29 bears was observed at the falls at one time, but concentrations of over 20 bears were common. Fifteen sows were observed with 33 young (cubs and yearlings) giving an average litter size of 2.2 cubs per sow. The population composition is given in Table 1. Although findings are not conclusive, the counts show that the number of individual bears present at McNeil River this year was significantly greater than that observed in the preceding five years (30 to 35 bears each from 1963 through 1967, and 48 in 1968; in 1964 no work was done). No tagging was done and a minimum of personnel were present during July. The increase in bear numbers is believed to be a direct result of reduced human activities on the study area.

Bear tagging was initiated at McNeil River in 1963 as a means of obtaining life history information on individual brown bear. To date, 35 different bears have been tagged in the study. Results of the 1969 field work show that 13 different marked bears were observed and of these 7 were positively identified. Since the study began, a variety of marking devices has been attached to bears with varying degrees of success. The McNeil River bear marking history is summarized in Table 2. Until 1968, recapture of marked bears was the only means of positive identification. Disadvantages of this procedure were harassment of bears, increased chance of drug mortality and reduction in observing time. During the 1967 field season Lentfer (1968) attached color-coded neck collars and nylon rototags to bears in order to provide a visual means of identification without recapture. Of the seven bears positively identified in 1969, four were identified by collar and three were identified by numbered nylon ear tags. The nylon tags, however, were difficult to spot as they frequently were covered by fur and, when seen, the numbers were hard to read even with a spotting scope. In general, tags placed in the forward edge of the ear were easiest to spot.

Reproductive and growth history of female bears captured or observed more than one year at McNeil River are summarized in Tables 3 and 4.

Bear abundance and fishing success is presented in Table 5. The "Number of Bear Groups" column represents the actual single bears or families at the falls. A sow with three cubs would represent one group and a single bear would represent another. "Bear Hours" represents the sum of the time spent by all bear groups at the falls during the period of observation. If group "A" fished three hours, group "B" one hour, and group "C" six hours, this would total ten bear hours. The entire period a group spent at the falls was considered fishing effort even though the majority of its time may have been spent waiting for other bears to vacate a fishing spot. A group was not considered to have stopped fishing unless it was absent from the stream for more than 20 minutes; this allowance was necessary because bears frequently left to eat fish but returned and continued fishing within

15 minutes. When absent for more than 20 minutes, the group was "booked out" at the time it was observed to have left the area. The total number of fish taken each day was determined by the number of fish available rather than by the number of bears fishing at the falls. On days when few fish were available, bears tended to congregate at the falls. A few bears dominated the better fishing spots and the remaining bears either waited their turn or fished marginal areas. Lack of fish resulted in inefficient effort by bears either waiting or fishing in marginal areas. On days when fish were very abundant, the bears tended to catch their fill and move off, allowing other bears the opportunity to fish. The resulting "Average Number of Fish per Bear Hour" on the best days probably better illustrates the brown bear species' potential as fishermen. If fishing was very good, the bears became highly selective for salmon eggs. After catching a fish, a bear grasped it with its forepaws and compressed the sides of the fish with its teeth. If eggs spurted out from the pressure, the bear ripped open the belly and consumed the eggs; if the fish were a male or spawned female, it was dropped and the bear continued fishing. The discarded fish were frequently eaten by lower ranked bears, and in a few cases were the major source of fish for these bears.

The separation and subsequent reunion of a yearling and a sow was noted. On 18 July, a sow with two medium-sized yearlings was involved in fishing and failed to watch her young. When other bears approached the young, they became nervous and gradually worked their way up the bank and away from the stream and sow. A large bear was then observed approaching the yearlings and they reacted by running up the bank and out of sight. The sow continued fishing for an additional ten minutes and finally caught a fish before realizing that her yearlings were missing. She began searching the immediate vicinity of the falls for her young with no success. The sow was next seen on 20 July and had recovered her young. Separation and loss of young has been reported in previous years (Lentfer, 1967 and 1968), however, the frequency of permanent separation of cubs or yearlings is not known.

An instance of possible yearling separation was also noted. A lone yearling was sighted several times but was never observed to fish. It instead scavenged remains of partially eaten fish from other bears and was extremely nervous and ran when approached by other bears. The origin of the bear was never determined since none of the sows with yearlings were known to have lost yearlings or to have undergone family breakup.

Table 1. Composition of Brown Bear Observed at McNeil River, July 14-30, 1969.

Females with young	15 (21%)	
Young	33 (46%)	
Cubs		3 (4%)
Small		4 (6%)
Medium		18 (25%)
Large		8 (11%)
Single Bears	24 (33%)	
Small		8 (11%)
Medium		6 (8%)
Large		10 (14%)
Total	72 (100.0%)	

Table 2. Marking History of Brown Bear Captured or Observed More Than One Year at McNeil River.

Location and Status Code of Ear Tags

Rt = Right Ear
L = Left Ear
F = Front of Ear
B = Back of Ear
Miss = Missing Tag
Pres = Tag Present
Unk = Unknown

Ear Marker Color Code

Blk = Black
Y = Yellow
P = Pink
W = White
R = Red
G = Green
Blu = Blue
C = Chartreuse
O = Orange

Bear	Sex	Captured or Observed	Monel Ear Tag Right	Monel Ear Tag Left	Rototag Number Right	Rototag Number Left	Rototag Color	Colored Ear Marker	Collar	Tattoo Condition
No. 1818	F									
1963		Captured	1818	1819	----	----	----	Rope (Blk-Y) Rt	----	----
1967		Recaptured	Miss	Pres	9	----	F-Red, B-Green	Rope missing	OliveDrab	----
1968		Observed	Miss	Unk	Pres	----	Present	Rope missing	Present	----
1969		Observed	Miss	Unk	Pres	----	Present	Rope missing	Present	----
No. 19	F									
1967		Captured	4236	----	----	8	F-Red, B-Green	----	Red	No. 19
1968		Observed	Pres	----	----	Pres	Present	----	Present	Unk
1969		Observed	Pres	----	----	Pres	Present	----	Present	Unk
No. 22	F									
1967		Captured	4214	----	----	32	F&B-Green	----	OD w/blue	No. 22
1968		Observed	Unk	----	----	Pres	Present	----	Present	Unk
1969		Observed	Unk	----	----	Pres	Present	----	Present	Unk

Table 2 (cont.). Marking History of Brown Bear Captured or Observed More Than One Year at McNeil River.

Bear	Sex	Captured or Observed	Monel Ear Tag Right	Monel Ear Tag Left	Rototag Number Right	Rototag Number Left	Rototag Color	Colored Ear Marker	Collar	Tattoo Condition
No. 03	F									
1963		Captured	1806	1807	----	----	----	Rope(Y)Rt	----	----
1965		Recaptured	Pres	Pres	----	----	----	Rope missing	----	No. 03
			1855 1/					Rope (P)Rt 1/		
1967		Recaptured	All tags present		----	----	----	Present	Tan	Readable
1968		Recaptured	All tags present		----	----	----	Present	Present	Readable
1969		Observed	Tag in each ear		----	----	----	Present	Present	Unk
No. 13	F									
1963		Captured	1808	1809	----	----	----	Rope(Blk-W)Rt	----	----
1966		Recaptured	Pres	Miss	----	----	----	Rope missing	----	No. 13
			1884 1/	1883 1/				Rope(Y)Rt 1/		
1967		Observed	Unk	Unk	----	----	----	Present	----	Unk
1968		Recaptured	1808	Miss	----	51	F&B-Yellow	Missing	Green	Readable
1969		Observed	Unk	Miss	----	51 2/	Present	Missing	Missing	Unk
No. 17	F									
1967		Captured	4227	----	----	4	Red, Green	Flag(G)Rt	----	No. 17
1968		Recaptured	Miss	----	----	Pres	Present	Missing	----	Unreadable
					62 1/	Pres	F&B-Yellow	Flag(O)Rt 1/	----	Retattooed
No. 14	F									
1963		Captured	1824	1822	----	----	----	Rope(O)L	----	----
1966		Recaptured	Pres	Pres	----	----	----	Missing	----	No. 14
			1885 1/	Unk	----	----	----	Flag(C)L 1/	----	Unk
1968		Recaptured	All missing		----	----	----	Missing	----	Readable
			61 1/	Miss	----	61 1/	F&B-Yellow	Flag(W)Rt 1/	----	Readable

1/ New tag or marker attached. 2/ Observer identified tag number.

Table 2 (cont.). Marking History of Brown Bear Captured or Observed More Than One Year at McNeil River.

Bear	Sex	Captured or Observed	Monel Ear Tag Right	Monel Ear Tag Left	Rototag Number Right	Rototag Number Left	Rototag Color	Colored Ear Marker	Collar	Tattoo Condition
No. 05	F									
1965		Captured	1861	1859	----	----	----	Rope(W)Rt	----	No. 05
1966		Observed	Unk	Pres	----	----	----	Present	----	Unk
1967		Recaptured	Miss	Pres	----	----	----	Missing	----	Readable
No. 57	F									
1968		Captured	57	----	----	57	F&B-Yellow	Flag(O)Rt	----	No. 57
1969		Observed	Pres	----	----	57 2/	F&B-Yellow	Present	----	Unk
No. 23	M									
1967		Captured	4237	----	----	10	F&B-Green	----	Blue	No. 23
1968		Observed	Unk	----	----	Pres	Present	----	Present	Unk
No. 4231	M									
1967		Captured	4231	----	----	1	F-Green,B-Red	Flag(R)Rt	----	----
1968		Observed	Unk	----	----	Pres	Present	Present	----	----
1969		Observed	Unk	----	----	Pres	Present	Missing	----	----
No. 4226	M									
1967		Captured	----	4226	3	----	Red, Green	Flag(G)L	----	----
1968		Observed	----	Unk	Pres	----	Unk	Present	----	----
No. 21	M									
1967		Captured	----	4212	34	----	F&B-Green	Flag(Blu)L	----	No. 21
1968		Observed	----	Unk	Pres	----	Present	Present	----	Unk

1/ New tag or marker attached. 2/ Observer identified tag number.

Table 3. Reproductive Status, Age and Weights of Female Brown Bears Captured or Observed More Than One Year at McNeil River.

Bear	Captured or Observed	Est'd Age	Cementum Age	Number of Cubs	Number of Yearlings	Vulva Condition	Weight	Alizarin Red S Injected
No. 1818								
1963	Captured	3	---	None	None	Turgid	Measured-325	---
1967	Recaptured	---	9	None	None	Turgid	Est'd-350	Yes
1968	Observed	---	---	Two	None	---	---	---
1969	Observed	---	---	None	Two	---	---	---
No. 19								
1967	Captured	6-8	---	None	None	Turgid	Est'd-400	Yes
1968	Observed	---	---	Three	None	---	---	---
1969	Observed	---	---	None	One	---	---	---
No. 22								
1967	Captured	---	13	None	None	Turgid	Est'd-500	---
1968	Observed	---	---	None	None	---	---	---
1969	Observed	---	---	None	None	---	---	---
No. 03								
1963	Captured	3	---	None	None	Turgid	Measured-280	---
1965	Recaptured	5	---	Two	None	---	---	---
1967	Recaptured	7	10	None	None	Turgid	Est'd-400	Yes
1968	Recaptured	---	9	Three[1/]	None	---	---	---
1969	Observed	---	---	None	Two	---	---	---

1/ Loss of one cub observed.

Table 3 (cont.). Reproductive Status, Age and Weights of Female Brown Bears Captured or Observed.

Bear	Captured or Observed	Est'd Age	Cementum Age	Number of Cubs	Number of Yearlings	Vulva Condition	Weight	Alizarin Red S Injected
No. 13								
1963	Captured	2	---	None	None	Not turgid	Measured-275	---
1966	Recaptured	5	---	None	None	Turgid	---	---
1967	Observed	---	---	None	None	---	---	---
1968	Recaptured	7	9	One	None	---	Est'd-300	Yes
1969	Observed	---	---	None	One	---	---	---
No. 17								
1967	Captured	2	---	None	None	Not turgid	Est'd-200	Yes
1968	Recaptured	4	---	None	None	Turgid	Est'd-325	Yes
No. 14								
1963	Captured	7	---	None	None	Turgid	Measured-420	---
1966	Recaptured	10	---	None	None	Turgid	---	---
1968	Recaptured	---	10	None	None	Turgid	Est'd-500	---
1969	Observed	---	---	Three	None	---	---	---
No. 5								
1965	Captured	---	---	Two[2/]	None	---	---	---
1966	Observed	---	---	None	None	---	---	---
1967	Recaptured[3/]	---	6	Two	None	---	Measured-302	---
No. 57								
1968	Captured	---	4	None	None	Turgid	Est'd-300	Yes
1969	Observed	---	---	None	None	---	---	---

2/ One cub of each sex. 3/ Drug mortality.

Table 4. Growth History of Female Brown Bear Captured More Than One Year at McNeil River.

BODY MEASUREMENTS TAKEN (MEASUREMENTS GIVEN IN CENTIMETERS)

1. Total Length
2. Height at Shoulder
3. Hind Foot Length
4. Neck Circumference
5. Girth
6. Hind Paw Length
7. Hind Paw Width
8. Front Paw Length
9. Front Paw Width
10. Ear Length
11. Tail Length

Bear	Cem. Age	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	Weight Meas.	Weight Est.
No. 1818														
1963		156.2	90.2	30.2							13.0		325	
1967	9	195.6	101.6	30.5	71.1	137.2	22.9	16.5	17.8	16.5				350
No. 03														
1963	5	173.5	94.7	31.5							12.7	11.4	280	
1965	7	170.2	109.2	28.7		111.8								
1967	9	184.9	120.1	33.3	73.7	124.5	27.2	15.2	18.0	16.3				400
1968	10	200.7	109.2	34.3	72.4	133.4	24.9	15.2	18.5	15.2				375
No. 13														
1963	4	162.6	96.5	31.2							12.7		275	
1968	9	181.6	108.0	27.9	66.0	116.8	25.4	13.5	17.8	14.7				300
No. 17														
1967	3 1/	176.5	104.1	33.8	63.0	102.9	26.2	13.7	17.0	14.0				200
1968	4	188.0	105.4	30.5	71.9	109.2	25.4	14.7	17.8	14.0				325
No. 14														
1963	5	179.1	106.2	33.8							13.5	12.2	420	
1968	10	213.3	121.9	38.1	85.1	138.4	28.7	16.5	19.1	16.5				500
No. 5														
1965	4	177.8	101.6	29.2										
1967	6	194.3	95.3	31.2	68.6	108.0	23.6	14.0	17.3	16.0			302	

1/ Estimated age.

Table 5. Daily Brown Bear Fishing Effort and Success at McNeil River Falls, July 1969.

Data Recorded

1. Man Hours of Observation
2. Number of Bear Groups
3. Number of Bears
4. Number of Fish Taken
5. Average Number of Fish per Bear Hour
6. Total Bear Hours

July	(1)	(2)	(3)	(4)	(5)	(6)
14	5.6	10	22	32	1.7	19.3
15	6.5	10	20	28	1.0	27.4
16	8.0	16	26	66	1.6	40.7
17	4.5	18	35	78	4.0	16.7
18	6.5	15	27	57	1.2	46.2
19	3.7	9	19	37	2.4	15.6
20	6.5	16	28	30	0.6	46.6
21	5.0	16	30	82	2.8	28.8
22	7.0	19	38	65	1.0	67.2
23	8.5	28	55	215	4.3	49.5
24	5.5	22	43	42	0.7	61.3
25	7.5	25	47	172	3.4	50.2
26	6.5	29	50	133	2.0	65.2
27	7.0	25	46	229	4.7	49.2
28	6.0	24	46	112	1.8	60.8
29	7.1	20	36	113	2.2	50.5
30	6.0	24	42	107	2.5	42.5
Total	107.5	39	72	1,599	2.2	737.8

Population Status

During July and August 1969, aerial surveys of Ugashik Lake, Black-Chignik Lakes and Moffit Bay were flown to evaluate and select the most desirable location at which to conduct brown bear studies. The Black-Chignik Lake region was selected after review of available data. Erickson and Siniff (1963) described the study area. After selection of the study area, it was planned to tag bears by helicopter utilizing Cap-chur equipment. Tagging devices which were designed for aerial identification were to be tested; however, an inadequate budget made it impractical to initiate the tagging program. Available funds were spent conducting replicate bear surveys to determine the number of replicate flights needed to detect annual changes in bear composition.

Six replicate surveys were completed by three observers flying with the same pilot on the newly selected Black-Chignik Lake study area. Outcome of these six surveys is shown in Table 6, with previous data for years 1962 through 1969 presented in Table 7. It should be mentioned that the sample size, as given by Erickson and Siniff (1963), necessary to detect changes in the levels of abundance between years and areas is valid. His computations regarding the approximate number of replicate flights needed to estimate the "true time period means" within ten percent, with only a five percent chance of being wrong, was 15 morning, 65 mid-day, and 33 evening flights. Results of the 1969 field work support these findings.

Analysis of field work completed this year indicates that, when inadequate numbers of replicate surveys are made, only the average number of females with young can be classed as reliable information on which to base abundance trends from year to year and area to area. Interpretation of the 1969 Black-Chignik Lakes surveys also indicates that a minimum of six replicate counts, if conducted properly, are sufficient for management purposes to detect changes in the composition of females with young and cubs and yearlings combined. The third classification making up the composition is the single bear category. The accuracy of counts in the single bear category is less than desired and as such influences the percentages of sows with young, and young; in this respect, an increased number of replicate counts of the single bear group is needed to improve reliability. The number of replicate counts which are in fact needed for a higher degree of accuracy must be determined by additional field investigations and consultation with a qualified biometrician. Variations in the numbers of single bears observed on each of the six counts reflect the fact that these bears can escape and conceal themselves faster than sows with young when survey aircraft approach.

Table 6. Six Replicate Aerial Surveys of Brown Bear Conducted at Black-Chignick Lake, July-August, 1969.

Observer / Date / Time	Survey No. 1 Miller July 23 PM[1]		Survey No. 2 Miller July 26 AM[2]		Survey No. 3 Glenn July 26 PM	
	No.	%	No.	%	No.	%
Females w/young	23	20.9	29	23.8	22	20.6
Cubs	33	30.0	42	34.4	33	30.8
Yearlings	21	19.1	25	20.5	17	15.9
Cubs and yearlings	54	49.1	67	54.9	50	46.7
Single bears	33	30.0	26	21.3	35	32.7
Total bears	110		122		107	
Hours flown	2.6		2.8		2.6	
Bears per hour	43.0		44.4		41.2	

Observer / Date / Time	Survey No. 4 Rausch July 27 AM		Survey No. 5 Glenn August 3 AM		Survey No. 6 Miller August 3 PM	
	No.	%	No.	%	No.	%
Females w/young	27	23.7	21	22.8	26	22.6
Cubs	38	33.3	20	21.7	30	26.1
Yearlings	26	22.8	27	29.3	29	25.2
Cubs and yearlings	64	56.1	47	51.1	59	51.3
Single bears	23	20.2	24	26.1	30	26.1
Total bears	114		92		115	
Hours flown	2.8		2.6		2.4	
Bears per hour	40.7		36.1		47.9	

1/ Morning counts conducted between 6:00 and 9:00 AM.
2/ Evening counts conducted between 6:00 and 9:00 PM.

Table 6 (cont.). Cumulative Total of Surveys 1 through 6.

	Cumulative Totals		Observer and Range in %				
	Total No.	% Average	Observer	Low	Observer	High	% Diff.
Females w/young	148	22.3	Glenn	20.6	Miller	23.8	3.2
Cubs	196	29.6	Glenn	21.7	Miller	34.4	12.7
Yearlings	145	21.9	Glenn	15.9	Glenn	29.3	13.4
Cubs and yearlings	341	51.4	Glenn	46.7	Rausch	56.1	9.4
Single bears	174	26.2	Rausch	20.2	Glenn	32.7	12.5
Total bears	663						
Hours flown	15.8						
Bears per hour	42.3						

Table 6 (cont.). Cumulative Total of Survey Nos. 1, 5 and 6.

	Cumulative Totals		Observer and Range in %				
	Total No.	% Average	Observer	Low	Observer	High	% Diff.
Females w/young	70	22.1	Miller	20.9	Miller	22.8	1.9
Cubs	83	26.2	Miller	21.7	Glenn	30.0	8.3
Yearlings	77	24.3	Glenn	19.1	Miller	29.3	10.2
Cubs and yearlings	160	50.5	Glenn	49.1	Miller	51.3	2.2
Single bears	87	27.4	Miller	26.1	Glenn	30.0	3.9
Total bears	317						
Hours flown	7.6						
Bears per hour	41.7						

ıe 7. Aerial Survey Brown Bear Composition Data, Alaska Peninsula Trend Count Areas. 1/

Study Area and Year	PERCENT OF POPULATION					Total Sample Size	Number of Replicate Counts
	F W/Young	Cubs	Yearlings	Cubs and Yearlings	Single Bears		
Ugashik Lakes							
1965	22	22	28	49	29	65	1
1966	22	24	27	51	27	55	1
1967	21	29	19	48	31	58	1
1969	24	21	36	56	20	117	2
Black-Chignik Lakes							
1962	26	30	22	52	23	1718	27
1965	28	32	25	57	15	236	2
1966	22	34	13	47	31	108	1
1967	27	45	10	55	17	157	2
1968	23	43	14	57	19	129	3
1969	22	30	22	51	26	663	6
dy Lake							
1965	26	31	19	50	24	42	1
1966	22	51	8	59	19	37	1
1967	25	39	21	61	14	28	1
Moffet Bay							
1966	23	33	12	45	32	60	1
1967	22	31	13	44	35	55	1
1968	25	30	21	51	24	128	2
1969	16	19	14	33	51	92	1
Canoe Bay							
1966	21	16	32	47	32	19	1
1967	24	27	24	51	24	37	1
1968	22	32	14	46	32	63	2

1/ Figures based upon cumulative total of all replicate counts.

Comparison of Harvest Data and Population Status

The effects of regulation changes on the harvest of brown-grizzly bear can be interpreted best by presenting harvest information by regulatory year, (Table 8). The total reported harvest during the 1969 regulatory season was 607 bears (fall-1968 season, 359; spring-1969 season, 248). This is a significant difference when compared to a total of 505 bears presented for sealing during the calendar year 1969 (spring season, 248; fall season, 257). The statewide reported bear harvest shows a continuing decline from a high of 875 during the 1966-67 season and is believed partly to be a reflection of increasing bear regulation restrictions. Fifty-seven percent of the 1968-69 harvest was from Game Management Units 4, 6, 8 and 9. Harvest data by season for the calendar year 1969 is presented in Tables 9 through 11.

Skull measurements were taken from 91 percent of the brown-grizzly bear sealed by Department personnel. It should be recognized that an undetermined degree of error exists in these measurements by nature of the experience of persons measuring bear skulls. In addition to possible skull measurement errors, some personnel have misidentified the sex of bears being sealed and thus influenced averages, especially in units with low bear harvests. Skull size data by unit and residency of hunters for years 1968 and 1969 are shown in Table 12. The average skull size from the heavier harvested units such as 4, 6, 8 and 9 shows little variation between years. Inferences drawn regarding changes in skull size (and cementum ages) from low harvest units are questionable since a few nonrepresentative samples can significantly alter averages.

A tooth, usually a PM_1, was obtained, sectioned, and age assigned from 77 percent of the 1969 reported brown-grizzly bear harvest. The technique described by Lentfer (1968) was used to prepare the teeth for reading. Modifications of the technique were tested but no major changes in technique were devised. The spring and fall tooth collections were prepared for age determination by different laboratory technicians with no detectable difference in the quality of processed specimens. Eighty-eight percent of the teeth were read from the first slide; six percent required additional tooth sectioning and slide preparation before age determination could be made. The remaining six percent were classed as unreadable. Age data by unit and season are presented in Tables 13 through 15. Three persons read the Units 8 and 9 tooth collection for comparative purposes with satisfactory results. The Unit 8 collection was read by Mr. Vernon Berns (Bureau of Sport Fisheries and Wildlife, Kodiak) and myself. Agreement was found in the assignment of cementum ages on 81 percent of the teeth; 18 percent differed by one year and 1 percent differed by more than one year. Divergent reading seems to be a result of individual interpretation of the first cementum layer; for this reason effort will continue to obtain teeth of known age bears. No differences were found in the mean age after calculating assigned ages by season and by reader. Results of the Unit 8 comparison were similar to that found in Unit 9. In the latter instance, teeth were read by James Faro (Area Biologist, Alaska Department of Fish and Game), who had little previous experience in examination of cementum layering of bear teeth.

Skull sizes of males and females plotted against age for bears harvested in Unit 8 and 9 during the calendar years 1968 and 1969 are presented in Figs. 1 through 4. The comparison indicated little relationship between skull size and age of female bears, but did indicate a positive correlation between skull size and age in males.

Table 16 lists the brown-grizzly bear sport harvest for calendar years 1961 through 1969. Trends of nonresident participation in the bear harvest are given along with the number of male bears harvested. Also listed are the average hide size, skull size and cementum age.

Table 8. Alaska Brown-Grizzly Bear Sport Harvest by Game Management Unit, Season and Regulatory Year.[1/]

	SPRING									FALL									FALL* & SPRING**							
UNIT	61	62	63	64	65	66	67	68	69	61	62	63	64	65	66	67	68	69	61* 62**	62* 63**	63* 64**	64* 65**	65* 66**	66* 67**	67* 68**	68* 69**
1	6	7	4	8	7	6	18	6	3	7	5	5	12	1	7	9	12	18	14	9	13	19	7	25	15	15
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	28	32	18	40	41	49	41	36	44	11	12	9	15	23	26	21	14	22	43	30	49	56	72	67	57	58
5	4	1	4	2	6	4	4	6	10	5	6	2	9	9	18	11	12	10	6	10	4	15	13	22	17	22
6	6	9	11	19	23	24	32	37	14	7	15	21	13	11	14	24	26	9	16	26	40	36	35	46	61	40
7			No	Open	Season					1	1	1	-	-	-	1	-	2	1	1	1	-	-	-	1	-
8	82	96	80	90	119	137	141	77	77	36	35	32	28	67	62	43	27	20	132	115	122	147	204	203	120	104
9	69	95	75	64	98	101	111	68	53	51	60	89	91	110	120	100	90	38	146	135	153	189	211	231	168	143
10	1	3	-	10	6	5	3	-	2	-	-	-	5	4	1	5	4	2	3	-	10	11	9	4	5	6
11	-	-	-	-	2	-	3	3	2	5	14	9	22	16	12	17	12	7	5	14	9	24	16	15	20	14
12	3	3	5	1	2	3	-	4	1	11	16	18	14	17	9	16	12	12	14	21	19	16	20	9	20	13
13			No	Open	Season					42	34	42	35	44	63	29	38	17	42	34	42	35	44	63	29	38
14			No	Open	Season					16	9	13	12	15	5	12	11	3	16	9	13	12	15	5	12	11
15			No	Open	Season					4	5	4	2	3	4	4	11	6	4	5	4	2	3	4	4	11
16	8	3	3	4	6	5	4	10	7	20	15	24	16	31	22	24	13	30	23	18	28	22	36	26	24	20
17	-	-	-	-	-	2	1	3	1	2	3	3	5	6	7	10	7	4	2	3	3	5	8	8	13	8
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	1	1	1	2	1	13	11	11	19	17	17	16	13	9	13	11	11	20	18	18	18	14
20	6	4	10	5	17	12	4	5	7	11	22	34	41	15	45	11	18	19	15	32	39	58	27	49	16	25
21	-	1	-	-	-	-	1	-	-	4	6	3	-	-	1	-	1	2	5	6	3	-	-	2	-	1
22	-	1	-	-	1	2	2	3	2	1	-	-	-	-	.	1	3	-	2	-	-	1	2	2	4	5
23	-	2	5	10	20	8	6	18	9	6	4	6	4	7	4	6	11	5	8	9	16	24	15	10	24	20
24	-	3	3	2	3	1	5	-	2	3	3	6	7	8	14	8	5	7	6	6	8	10	9	19	8	7
25	1	-	1	2	5	5	7	3	4	3	4	6	9	6	20	10	7	8	3	5	8	14	11	27	13	11
26	1	-	4	11	2	1	1	2	9	-	2	6	5	3	8	3	12	7	-	6	11	7	4	9	5	21
TOTAL	215	260	223	268	359	366	385	283	248	259	282	344	364	413	490	381	359	257	519	505	612	723	779	875	664	607

1/ Regulatory year represents the fiscal year bear seasons (July 1 through June 30).

Table 9. Brown-Grizzly Bear Harvest, Spring Kill - 1969.

UNIT	RESIDENT			NONRESIDENT			TOTAL						
	M	F	Unk	M	F	Unk	M	F	Unk	Total	% of Total	% Male	% Nonres.
1	3						3			3	1.2	100	0
4	21	2		17	4		38	6		44	17.7	86	48
5	1	1		6	2		7	3		10	4.0	70	80
6	5	3	1	3	2		8	5	1	14	5.6	62	36
7						No Season							
8	24	13		27	13		51	26		77	31.0	66	52
9	10	1		36	6		46	7		53	21.4	87	79
10	2						2			2	.8	100	0
11	1	1					1	1		2	.8	50	0
12					1			1		1	.4	0	100
13						No Season							
14						No Season							
15						No Season							
16	1	1		5			6	1		7	2.8	86	71
17	1						1			1	.4	100	0
18													
19	1						1			1	.4	100	0
20	3	2		1	1		4	3		7	2.8	57	29
21													
22	1	1					1	1		2	.8	50	0
23	2			5	2		7	2		9	3.6	78	78
24	2						2			2	.8	100	0
25	1			3			4			4	1.6	100	75
26	3		1	4	1		7	1	1	9	3.6	88	56
TOTAL	82	25	2	107	32		189	57	2	248	100	77	56
%	77	23		77	23		77	23					

Table 10. Brown-Grizzly Bear Harvest, Fall Kill - 1969.

UNIT	RESIDENT			NONRESIDENT			TOTAL						
	M	F	Unk	M	F	Unk	M	F	Unk	Total	% of Total	% Male	% Nonres.
1	9	7	1	1			10	7	1	18	7.0	59	56
4	3	6		10	3		13	9		22	8.6	59	59
5	2	7		1			3	7		10	3.9	30	10
6	2	4		2	1		4	5		9	3.5	44	33
7	1			1			2			2	.8	100	50
8	5	2		6	7		11	9		20	7.8	55	65
9	5	8		16	7	2	21	15	2	38	14.8	58	66
10	1	1					1	1		2	.8	50	0
11	4	1		1	1		5	2		7	2.7	71	29
12	4	1		4	3		8	4		12	4.7	67	58
13	6	2		9			15	2		17	6.6	88	53
14	3						3			3	1.2	100	0
15	4	2					4	2		6	2.3	67	0
16	11	7		6	6		17	13		30	11.7	57	40
17		1		1	2		1	3		4	1.6	25	75
18													
19	1			4	3	1	5	3	1	9	3.5	63	89
20	8	6		3	2		11	8		19	7.4	58	26
21		2						2		2	.8	0	0
22													
23	3			2			5			5	1.9	100	40
24	2	1		3	1		5	2		7	2.7	71	57
25	2	1		3	2		5	3		8	3.1	63	63
26	4	1	1		1		4	2	1	7	2.7	67	14
TOTAL	80	60	2	73	39	3	153	99	5	257	100	61	45
%	57	43		65	35		61	39					

Table 11. Brown-Grizzly Bear Harvest, Total Kill - 1969.

UNIT	RESIDENT			NONRESIDENT			TOTAL						
	M	F	Unk	M	F	Unk	M	F	Unk	Total	% of Total	% Male	% Nonres.
1	12	7	1	1			13	7	1	21	4.2	65	5
4	24	8		27	7		51	15		66	13.1	77	52
5	3	8		7	2		10	10		20	4.0	50	45
6	7	7	1	5	3		12	10	1	23	4.6	55	35
7	1			1			2			2	.4	100	50
8	29	15		33	20		62	35		97	19.2	64	55
9	15	9		52	13	2	67	22	2	91	18.0	75	74
10	3	1					3	1		4	.8	75	0
11	5	2		1	1		6	3		9	1.8	67	22
12	4	1		4	4		8	5		13	2.6	62	62
13	6	2		9			15	2		17	3.4	88	53
14	3						3			3	.6	100	0
15	4	2					4	2		6	1.2	67	0
16	12	8		11	6		23	14		37	7.3	62	46
17	1	1		1	2		2	3		5	1.0	40	60
18													
19	2			4	3	1	6	3	1	10	2.0	67	80
20	11	8		4	3		15	11		26	5.1	58	27
21		2						2		2	.4	0	0
22	1	1					1	1		2	.4	50	0
23	5			7	2		12	2		14	2.8	86	64
24	4	1		3	1		7	2		9	1.8	78	44
25	3	1		6	2		9	3		12	2.4	75	67
26	7	1	2	4	2		11	3	2	16	3.2	79	38
TOTAL	162	85	4	180	71	3	342	156	7	505	100	69	50
%	66	34		72	28								

Table 12. Alaska Game Management Units 1 - 26 Average Male Brown-Grizzly Skull Size Recorded in Inches and by Year, Season, and Residency of Hunter.

UNIT 1

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	1	18.5	-	-	1	18.5	50
68	5	21.1	-	-	3	20.9	2	20.4	10	20.9	91
69	3	24.7	-	-	8	21.7	1	19.0	12	22.2	92

UNIT 4

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	5	22.5	3	23.0	8	22.7	62
68	16	21.8	6	24.1	4	22.8	3	21.0	29	22.3	76
69	19	23.3	16	22.9	3	21.2	9	21.9	47	22.7	92

UNIT 5

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	-	-	4	23.7	4	23.7	80
68	2	23.6	3	25.8	4	22.5	2	21.5	11	23.4	85
69	1	25.1	6	22.1	2	20.1	1	20.5	10	21.8	100

UNIT 6

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	5	23.8	8	21.5	13	22.4	100
68	8	23.8	13	25.5	7	21.8	6	20.6	34	23.5	87
69	5	24.4	3	25.2	2	23.2	2	18.5	12	23.4	100

Table 12 (cont.). Alaska Game Management Units 1 - 26 Average Male Brown-Grizzly Skull Size Recorded in Inches and by Year, Season, and Residency of Hunter.

UNIT 7

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	-	-	1	24.2	1	24.2	100
68	-	-	-	-	-	-	-	-	-	-	-
69	-	-	-	-	1	27.2	1	21.4	2	24.3	100

UNIT 8

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	8	23.0	19	23.9	27	23.6	93
68	23	23.7	21	24.3	1	27.7	13	23.4	58	23.9	95
69	24	23.9	25	24.5	5	24.6	5	23.9	59	24.2	95

UNIT 9

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	6	23.9	44	23.5	50	23.5	93
68	5	23.5	49	25.5	9	23.3	40	23.0	103	24.3	93
69	10	23.9	36	25.5	5	22.5	15	23.2	66	24.5	99

UNIT 10

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	2	23.5	-	-	2	23.5	100
68	-	-	-	-	-	-	2	23.2	2	23.2	100
69	2	27.3	-	-	1	27.3	-	-	3	27.3	100

Table 12 (cont.). Alaska Game Management Units 1 - 26 Average Male Brown-Grizzly Skull Size Recorded in Inches and by Year, Season, and Residency of Hunter.

UNIT 11

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	2	21.6	4	23.9	6	23.2	75
68	3	21.5	-	-	1	17.1	4	21.5	8	20.9	100
69	1	22.6	-	-	3	22.4	1	24.5	5	22.8	83

UNIT 12

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	3	20.1	4	20.9	7	20.5	100
68	-	-	-	-	2	19.9	5	20.6	7	20.4	100
69	-	-	-	-	4	19.8	4	20.1	8	19.9	100

UNIT 13

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	6	20.7	5	22.5	11	21.5	69
68	-	-	-	-	9	21.8	6	22.2	15	22.0	83
69	-	-	-	-	5	22.4	9	22.5	14	22.5	93

UNIT 14

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	1	19.3	3	21.8	4	21.2	67
68	-	-	-	-	2	20.6	1	24.8	3	22.0	100
69	-	-	-	-	3	18.7	-	-	3	18.7	100

Table 12 (cont.). Alaska Game Management Units 1 - 26 Average Male Brown-Grizzly Skull Size Recorded in Inches and by Year, Season, and Residency of Hunter.

UNIT 15

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	1	24.9	1	24	2	24.5	100
68	-	-	-	-	5	25.1	-	-	5	25.1	71
69	-	-	-	-	3	24.8	-	-	3	24.8	75

UNIT 16

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	2	23.1	7	23.1	9	23.1	82
68	2	23.5	3	25.5	2	21.5	6	22.7	13	23.3	81
69	1	26.7	5	23.2	10	22.5	6	21.9	22	22.7	96

UNIT 17

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	-	-	2	22.5	2	22.5	100
68	2	23.5	-	-	1	20.8	2	24.6	5	23.4	71
69	1	23.5	-	-	-	-	1	22.8	2	23.2	100

UNIT 19

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	2	22.5	4	22.7	6	22.6	100
68	1	24.0	-	-	2	21.4	3	20.0	6	21.1	100
69	1	23.8	-	-	1	21.9	3	18.6	5	20.3	83

Table 12 (cont.). Alaska Game Management Units 1 - 26 Average Male Brown-Grizzly Skull Size Recorded in Inches and by Year, Season, and Residency of Hunter.

UNIT 20

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	3	21.2	1	21.3	4	21.3	67
68	1	23.8	2	25.4	7	21.9	3	20.0	13	22.2	76
69	3	21.2	1	19.9	6	22.0	3	18.7	13	20.9	87

UNIT 22

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	1	23.0	-	-	1	23.0	100
68	1	20.1	-	-	1	22.4	-	-	2	21.3	67
69	1	22.7	-	-	-	-	-	-	1	22.7	100

UNIT 23

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	2	21.7	4	23.5	6	22.9	100
68	7	21.6	11	23.7	2	23.1	4	21.3	24	22.6	100
69	1	18.7	5	22.3	2	24.0	2	20.9	10	22.0	83

UNIT 24

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	-	-	6	22.1	6	22.1	100
68	-	-	-	-	1	21.7	2	22.4	3	22.1	75
69	2	22.3	-	-	2	22.6	3	20.7	7	21.7	100

Table 12 (cont.). Alaska Game Management Units 1 - 26 Average Male Brown-Grizzly Skull Size Recorded in Inches and by Year, Season, and Residency of Hunter.

UNIT 25

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	2	22.7	4	21.3	6	21.8	100
68	1	20.8	2	20.1	2	21.9	2	20.4	7	20.8	88
69	1	23.6	3	21.0	1	18.9	2	18.4	7	20.3	78

UNIT 26

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				Sample
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Size %
67	-	-	-	-	-	-	1	20.0	1	20.0	100
68	1	19.9	-	-	1	21.4	6	21.3	8	21.1	62
69	3	21.2	4	22.5	2	22.0	-	-	9	22.0	82

Table 13. Age Composition of Brown Bears Harvested in Alaska during the 1969 Spring Season based on Tooth Cementum Layering.

Unit	Sex	Number of Bears by Age Class											Mean Age	Range	Sample Size	% of Total Harvested
		1	2	3	4	5	6	7	8	9	10	11+				
4	M				3	6	3	2		1	2	6	7.6	4-14	23	
	F				1	1		1				1	7.2	4-13	4	61%
5	M					1	1					1	10.0	5-19	3	
	F						1	1	1				7.0	6- 8	3	60%
6	M				1		1				2	3	10.1	4-15	7	
	F		1		1								3.0	2- 4	2	64%
8	M			5	2	9	7	9	1	1	3	4	6.5	3-14	42	
	F		1	2	8	2	2	2	2	3			5.4	2- 9	22	83%
9	M			1	5	7	4	4	4	2	5	9	8.4	3-20	41	
	F					4	1					1	6.5	5-13	6	89%
11	M						1						6.0	6	1	
	F						1						6.0	6	1	100%
12	M										1		10.0	10	1	
	F															100%
16	M				1				1			4	11.5	4-15	6	
	F					1							5.0	5	1	100%
17	M											1	13.0	13	1	
	F															100%
19	M					1						1	10.1	5-15	2	
	F															100%
20	M			1		1						1	6.3	3-11	3	
	F					1			1				6.5	5- 8	2	71%
23	M				1	1		1				2	8.2	4-15	5	
	F					1						1	8.0	5-11	2	78%
24	M										1	1	10.5	10-11	2	
	F															100%
25	M										1		10.0	10	1	
	F															25%
26	M			1				1				1	8.3	3-15	3	
	F															66%

e 14. Age Composition of Brown Bears Harvested in Alaska during the 1969 Fall Season based on Tooth Cementum Layering.

Unit	Sex	Number of Bears by Age Class											Mean Age	Range	Sample Size	% of Total Harvested
		1	2	3	4	5	6	7	8	9	10	11+				
1	M		1	1		1							3.3	2- 5	3	
	F			1			1	1				1	3.0	3-12	4	39%
4	M			3	1		2	3					6.1	3-11	11	
	F				2	1	2				1	1	5.0	4- 6	5	73%
5	M			1	1	1							4.0	3- 5	3	
	F			4		1		1	1				4.6	3- 8	7	100%
6	M			1		1						1	7.3	3-14	3	
	F			1	1	1						1	6.5	3-14	4	78%
7	M			1								1	7.5	3-11	2	
	F															100%
8	M		1	2	3	2	1			1		1	5.1	2-11	11	
	F		2		1	1		1	1			2	6.4	2-12	8	95%
	M		1	3	2	2	3		1			4	7.1	2-18	16	
	F	1	2	1	3	2	1			1	1	2	5.6	1-12	14	79%
10	M											1	15.0	15	1	
	F					1							5.0	5	1	100%
11	M		1			1				1		1	7.5	2-14	4	
	F			1				1					5.0	3- 7	2	86%
12	M	1	2							1		2	7.2	1-17	6	
	F					1			1			1	8.3	5-12	3	75%
13	M		1		3	2	1	1		2		2	6.9	2-17	12	
	F			1			1						4.5	3- 6	2	82%
14	M		3										2.0	2	3	
	F															100%
15	M			1								1	7.0	3-11	2	
	F		1									1	8.5	2-14	2	67%
16	M		3	2	3	1	1	1			1	3	5.2	2-15	15	
	F		1	2		2		1		1		1	5.8	2-12	8	73%
17	M				1								4.0	4	1	
	F				1	1							4.5	4- 5	2	75%

Table 14 (cont.). Age Composition of Brown Bears Harvested in Alaska during the 1969 Fall Season based on Tooth Cementum Layering.

Unit	Sex	Number of Bears by Age Class											Mean Age	Range	Sample Size	% of Total Harvested
		1	2	3	4	5	6	7	8	9	10	11+				
19	M		1	2	1	1							3.4	2- 5	5	
	F						1			1		1	10.7	1-17	3	89%
20	M		2	1		1		1	1			5	10.1	2-25	11	
	F		2		2	1		1		1		1	5.9	2-14	8	100%
21	M															
	F						1	1					7.5	6- 7	2	100%
23	M					1		1	1				6.7	5- 8	3	
	F															60%
24	M					1	2	1	1				6.6	5- 8	5	
	F						1	1					6.5	6- 7	2	100%
25	M				1	1		1					5.3	4- 7	3	
	F						1	1			1		7.7	6-10	3	75%
26	M			1	2							1	6.8	3-16	4	
	F		1				1						4.0	2- 6	2	86%

...le 15. Age Composition of Brown Bears Harvested in Alaska during the 1969 Season based on Tooth Cementum Layering.

Unit	Sex	Number of Bears by Age Class											Mean Age	Range	Sample Size	% of Total Harvested
		1	2	3	4	5	6	7	8	9	10	11+				
1	M		1	1		2							3.8	2- 5	4	
	F			1			1	1				1	3.0	3-12	4	38%
4	M			3	4	6	5	5		1	2	6	7.1	3-14	32	
	F				3	2	2	2			1	1	6.0	4-13	11	65%
5	M			1	1	2	1					1	7.0	3-19	6	
	F			4		1	1	2	2				5.3	3- 8	10	80%
6	M			1		2	1				2	4	9.3	3-15	10	
	F		1	1	2	1						1	5.3	3-14	6	70%
7	M			1								1	7.5	3-11	2	
	F															100%
8	M		1	7	5	11	8	9	2	2	3	5	6.2	2-14	53	
	F		3	2	9	3	2	3	3	3		2	5.6	2-12	30	86%
	M		1	4	7	9	7	4	5	2	5	13	8.0	2-20	57	
	F	1	2	1	3	6	2			1	1	3	5.9	1-13	20	85%
10	M											1	15.0	15	1	
	F					1							5.0	5	1	50%
11	M		1			1	1			1		1	7.2	2-14	5	
	F			1			1	1					5.3	3-17	3	89%
12	M	1	2							1	1	2	7.6	1-17	7	
	F					1			1			1	8.3	5-12	3	77%
13	M		1		3	2	1	1		2		2	6.9	2-17	12	
	F			1			1						4.5	3- 6	2	82%
14	M		3										2.0	2	3	
	F															100%
15	M			1								1	7.0	3-11	2	
	F		1									1	8.5	2-14	2	67%
16	M		3	2	4	1	1	1	1		1	7	7.0	2-15	21	
	F		1	2		3		1		1		1	5.7	2-12	9	81%
17	M				1							1	8.5	4-13	2	
	F				1	1							4.5	4- 5	2	80%

Table 15 (cont.). Age Composition of Brown Bears Harvested in Alaska during the 1969 Season based on Tooth Cementum Layering.

Unit	Sex	Number of Bears by Age Class											Mean Age	Range	Sample Size	% of Total Harvested
		1	2	3	4	5	6	7	8	9	10	11+				
19	M		1	2	1	2						1	5.3	2-15	7	
	F						1			1		1	10.7	1-17	3	91%
20	M		2	2		2	1	1				6	9.2	2-25	14	
	F		2		2	2	1	1	1			1	6.0	2-14	10	92%
21	M															
	F						1	1					7.5	6- 7	2	100%
23	M				1	2		2	1			2	7.6	4-15	8	
	F					1						1	8.0	5-11	2	71%
24	M						1	2	1	1	1	1	7.7	5-11	7	
	F							1	1				6.5	6- 7	2	100%
25	M				1	1		1			1		6.5	4-10	4	
	F						1	1			1		7.7	6-10	3	58%
26	M			2	2			1				2	7.4	3-16	7	
	F		1				1						4.0	2- 6	2	56%

Figure 1. Skull Size Plotted Against Age for Male Brown Bears Killed in Unit 9, 1968-69.

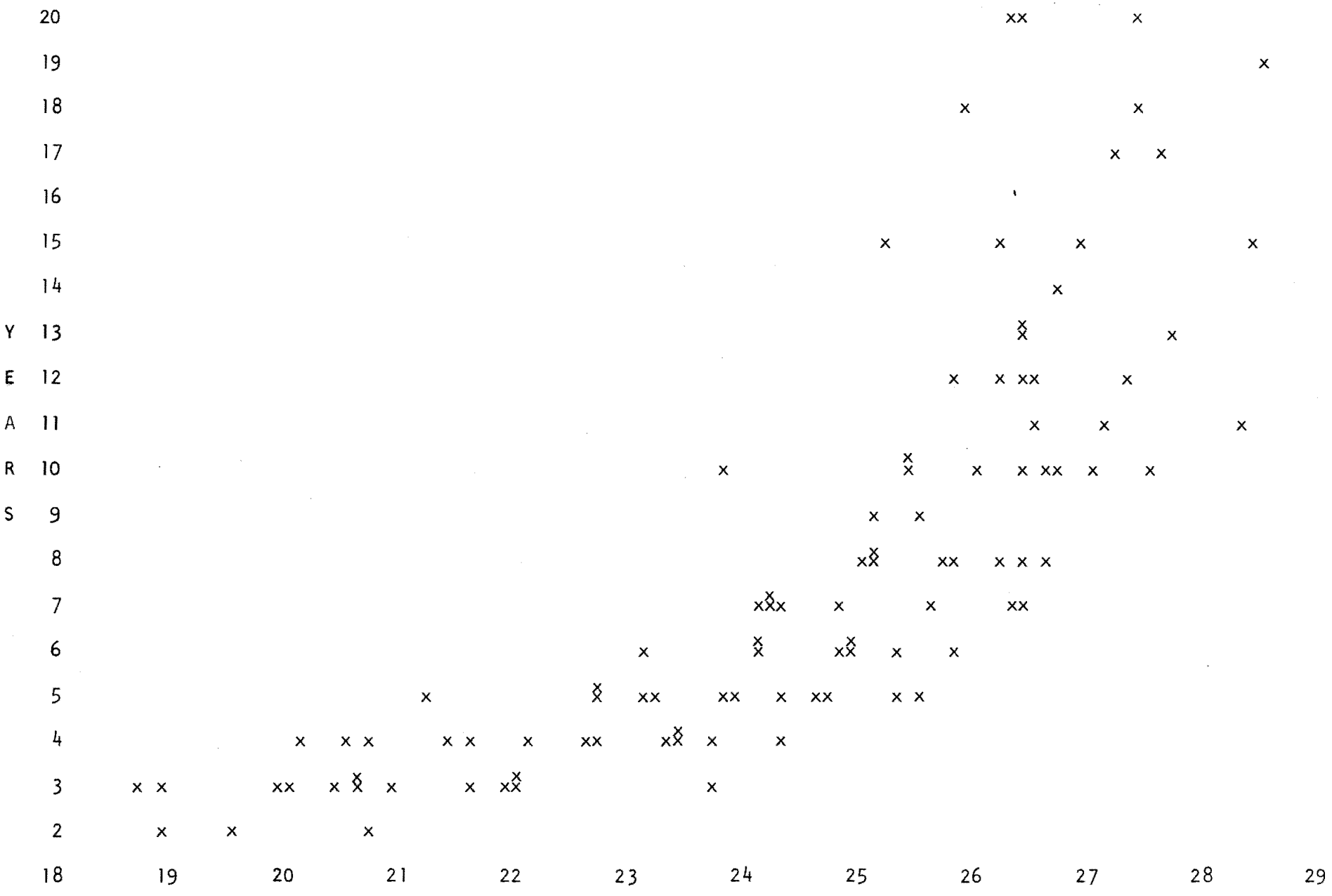

Figure 2. Skull Size Plotted Against Age for Female Brown Bears Killed in Unit 9, 1968-69.

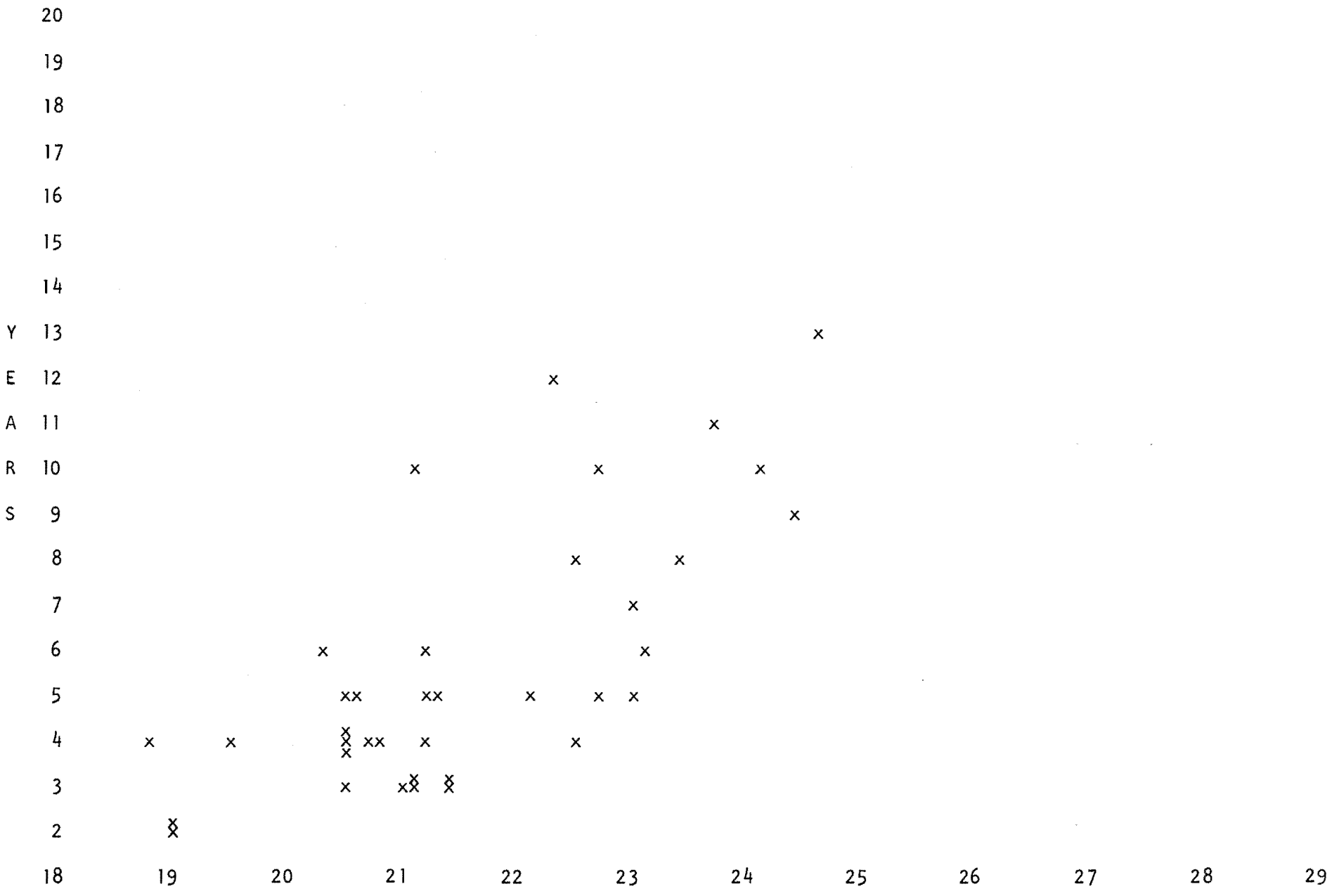

Figure 3. Skull Size Plotted Against Age for Male Brown Bears Killed in Unit 8, 1968-69.

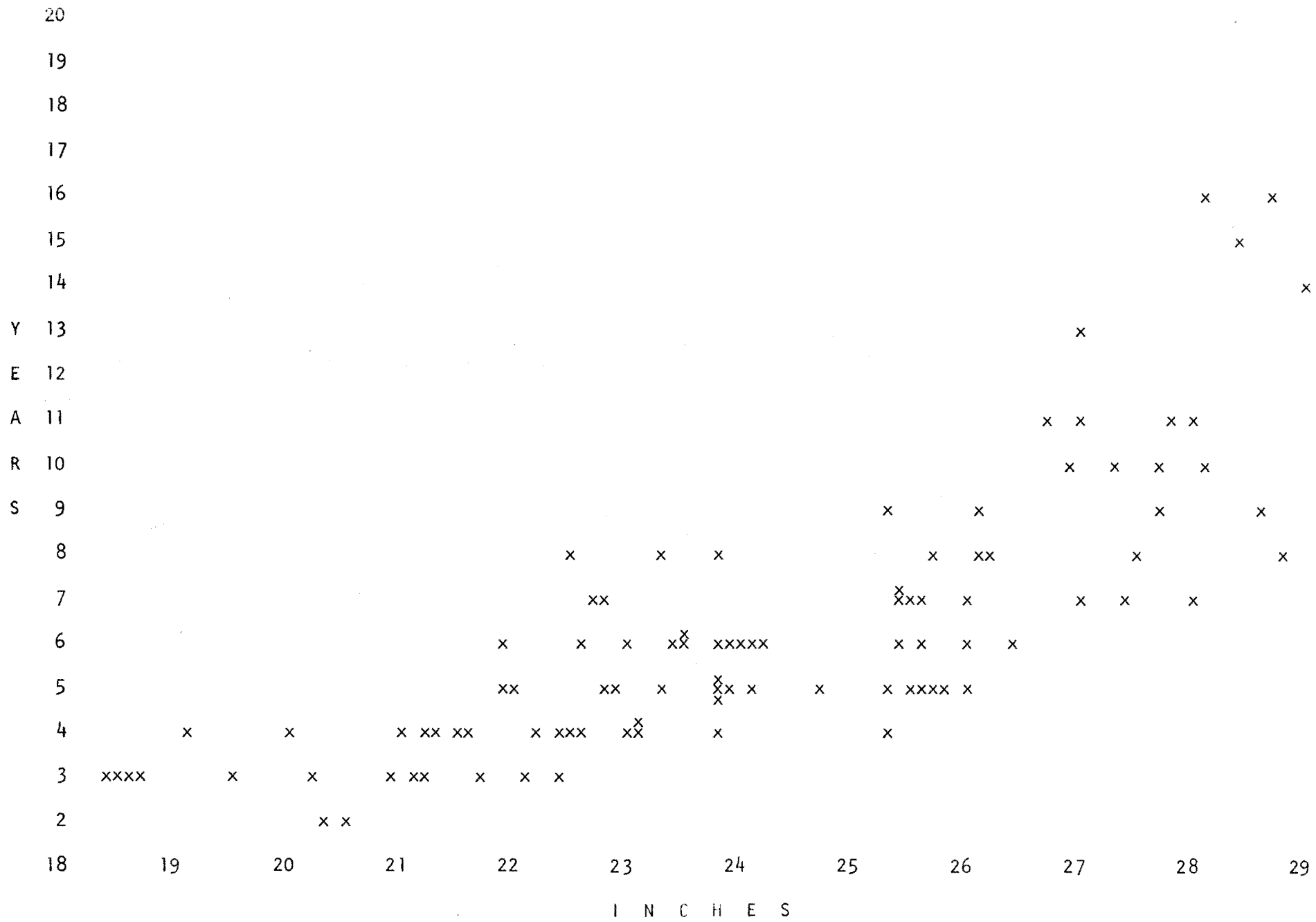

Figure 4. Skull Size Plotted Against Age for Female Brown Bears Killed in Unit 8, 1968-69.

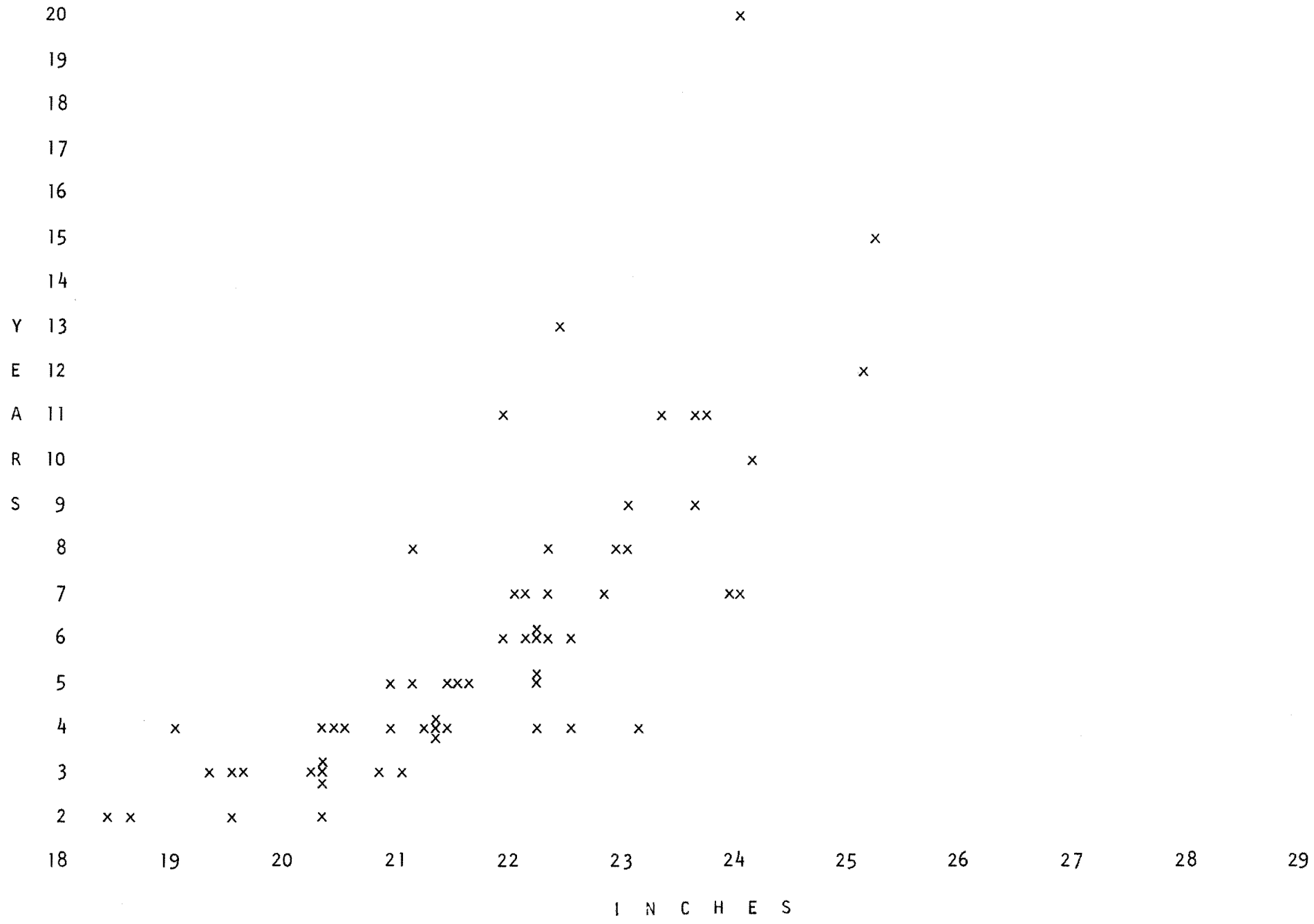

Table 16. Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 1

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	13	9	69	1	8	11.1			9/1-6/30
1962	14	9	64	4	29	14.0			Same
1963	7	4	57	2	29	13.9			Same
1964	20	16	84	2	10	13.9			Same
1965	8	6	75	1	13	13.8			Same
1966	13	9	69	4	31	13.3			9/1-6/20
1967	27	12	44	8	30	13.8	18.5		9/1-6/10
1968	18	11	61	4	22	12.9	20.9		Same
1969	21	13	65	1	5	14.0	22.2	3.8(4)	9/1-11/30

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 4

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1]	Mean Skull Size Male[2]	Mean Cem. Age Male[3]	Regulatory Year Seasons
1961	39	31	80	23	59	15.1			9/1-6/30
1962	44	29	67	29	66	14.6			Same
1963	27	20	74	15	56	14.4			Same
1964	55	37	69	24	44	14.2			Same
1965	64	43	68	33	52	13.7			Same
1966	75	47	67	50	67	13.1			9/1-6/20
1967	62	43	72	30	48	13.2	22.7		9/1-6/10
1968	50	38	78	18	35	12.7	22.3	8.0(10)	Same
1969	66	51	77	34	52	13.7	22.7	7.1(32)	9/1-11/30

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 5

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	8	6	75	5	63	13.6			9/1-6/30
1962	7	4	57	0	0	15.5			Same
1963	4	4	100	0	0	15.5			Same
1964	11	4	36	5	45	14.5			Same
1965	15	12	80	4	27	14.5			Same
1966	22	11	55	16	73	15.2			9/1-6/20
1967	15	8	53	10	67	14.5	23.7		9/1-6/10
1968	18	13	72	7	39	14.0	23.4	7.8(5)	Same
1969	20	10	50	9	45	13.8	21.8	7.0(6)	9/15-11/30

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 6

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	13	8	62	3	23	13.2			9/1-6/30
1962	24	17	71	9	38	13.3			Same
1963	34	16	50	5	15	14.0			Same
1964	32	22	76	9	28	14.6			Same
1965	34	18	53	8	24	15.4			Same
1966	38	20	53	7	18	14.6			9/1-6/20
1967	56	35	70	26	46	14.2	22.4		9/1-6/10
1968	63	39	67	33	52	14.4	23.5	7.1(26)	Same
1969	23	12	55	8	35	14.7	23.4	9.3(10)	9/15-11/30

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 7

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	1	0	0	0	0	0			9/1-9/30
1962	1	0	0	0	0	0			Same
1963	0	0	0	0	0	0			Same
1964	0	0	0	0	0	0			Same
1965	0	0	0	0	0	0			10/15-11/15
1966	0	0	0	0	0	0			9/1-9/30
1967	1	1	100	1	100	-	24.2		10/15-11/15
1968	0	0	0	0	0	0	0		Same
1969	2	2	100	1	50	15.2	24.3	7.5(2)	Same

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 8

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1]	Mean Skull Size Male[2]	Mean Cem. Age Male[3]	Regulatory Year Seasons
1961	118	78	66	72	61	16.9			10/1-5/31
1962	131	91	78	84	64	16.5			Same
1963	112	77	69	55	49	16.2			Same
1964	118	72	63	62	53	15.2			Same
1965	186	111	60	90	48	15.7			Same
1966	199	106	54	96	48	15.7			Same
1967	184	107	58	91	49	15.3	23.6	5.0(14) Fall	10/1-5/20
1968	104	61	59	62	60	15.6	23.9	6.2(52)	KNWR 10/1-5/20 Kod. Is. Ex. KNWR 9/1-6/30 Rem. 10/1-5/31
1969	97	62	64	53	55	15.9	24.2	6.2(53)	KNWR 11/1-12/31 Kod. 6/30 Rem. 10/1-12/31

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 9

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	120	85	73	71	59	16.4			9/10-5/31 N. of Becharof S. -10/1-5/31
1962	155	109	70	97	63	16.4			9/10-5/31 N. of Dog Salmon & Wide Bay S. -10/1-5/31
1963	164	100	65	114	70	16.1			9/1-5/31
1964	155	103	70	108	70	16.1			Same
1965	208	136	67	137	66	15.7			9/1-5/31 N. of Meshik S. -9/15-5/31
1966	230	157	71	173	75	15.7			9/1-5/20 N. of Meshik S. -9/15-5/20
1967	211	143	68	163	77	15.8	23.5	6.6(30) Fall	9/15-5/10 Preregistered camp
1968	158	111	73	134	85	15.5	24.3	7.6(48)	9/15-5/10 Preregistered camp by 9/1 & 4/1
1969	91	67	75	67	74	15.8	24.5	8.0(57)	9/15-10/30 N. of Katmai S. -10/1-11/30

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 10

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1]	Mean Skull Size Male[2]	Mean Cem. Age Male[3]	Regulatory Year Seasons
1961	1	1	100	0	0	18.1			10/1-5/31
1962	3	2	67	0	0	16.6			Same
1963	0	0	0	0	0	0			9/1-5/31
1964	15	9	60	5	33	16.4			Same
1965	10	7	70	1	10	15.9			9/15-5/31
1966	6	4	67	1	17	16.1			9/15-5/20
1967	8	3	38	0	0	13.4	23.5		Same
1968	4	2	50	4	100	14.9	23.2	5.0(2)	Same
1969	4	3	75	0	0	19.4	27.3	15.0(1)	10/1-11/30

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 11

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	4	3	75	1	25	11.8			9/1-12/31 5/15-6/15
1962	14	6	43	11	79	12.4			Same
1963	9	6	67	7	78	12.6			Same
1964	22	13	65	16	73	13.2			Same
1965	18	8	47	14	78	13.3			Same
1966	12	10	91	9	75	12.4			Same
1967	20	10	50	15	75	12.4	23.2		Same
1968	15	8	53	7	47	12.0	20.9	6.8(4)	Same
1969	9	6	67	2	22	15.3	22.8	7.2(5)	9/1-9/30 5/15-6/15

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 12

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1]	Mean Skull Size Male[2]	Mean Cem. Age Male[3]	Regulatory Year Seasons
1961	15	11	73	9	60	11.8			9/1-12/31 5/15-6/15
1962	19	9	47	6	32	11.8			Same
1963	23	13	59	17	74	12.0			Same
1964	15	9	60	4	27	13.1			Same
1965	19	8	44	4	21	12.5			Same
1966	12	6	50	5	42	12.7			Same
1967	16	7	50	10	63	11.4	20.5		Same
1968	16	7	47	9	56	11.8	20.4	5.0(1)	Same
1969	13	8	62	8	62	11.6	19.9	7.6(7)	9/1-9/30 5/15-6/15

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 13

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	42	20	50	26	62	13.0			9/1-9/30
1962	34	22	65	19	56	13.8			Same
1963	42	22	54	27	64	12.6			Same
1964	35	14	41	22	63	12.8			Same
1965	44	25	58	21	48	12.9			Same
1966	63	33	56	41	65	13.2			Same
1967	29	16	57	13	45	12.8	21.5	6.5(15) Fall	9/15-10/5
1968	38	18	49	19	50	12.9	22.0	5.9(9)	Same
1969	17	15	88	9	53	13.4	22.5	6.9(12)	9/20-10/20

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 14

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1]	Mean Skull Size Male[2]	Mean Cem. Age Male[3]	Regulatory Year Seasons
1961	15	7	47	7	47	12.6			9/1-9/30
1962	8	4	50	0	0	13.1			Same
1963	13	8	67	5	38.4	12.9			Same
1964	12	9	75	1	8	12.9			Same
1965	15	7	47	7	47	12.7			9/1-10/15
1966	5	2	40	2	40	13.5			9/1-9/30
1967	12	6	55	6	50	12.0	21.2		Same
1968	11	3	30	6	55	14.5	22.0	5.7(3)	Same
1969	3	3	100	0	0	11.7	18.7	2.0(3)	9/20-10/20

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 15

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	4	2	50	0	0	18.6			9/1-9/30
1962	5	2	40	3	60	11.5			Same
1963	4	2	50	0	0	12.8			Same
1964	2	2	100	2	100	12.9			Same
1965	3	1	33	1	33	13.2			Same
1966	4	1	25	1	25	17.3			Same
1967	4	2	50	1	25	15.5	24.5		Same
1968	11	7	64	1	9	14.5	25.1	2.0(2)	Same
1969	6	4	67	0	0	14.3	24.8	7.0(2)	Same

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 16

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1]	Mean Skull Size Male[2]	Mean Cem. Age Male[3]	Regulatory Year Seasons
1961	28	12	43	18	64	13.0			9/1-12/31 5/15-6/15
1962	18	9	50	10	83	12.1			Same
1963	27	18	69	11	41	13.0			Same
1964	20	13	65	9	45	12.7			Same
1965	37	22	73	19	51	13.5			Same
1966	27	11	42	14	52	13.3			Same
1967	28	13	50	19	68	14.4	23.1	8.1(10) Fall	Same
1968	23	16	70	16	70	14.5	23.3	8.1(14)	Same
1969	37	23	62	17	46	14.2	22.7	7.0(21)	9/1-10/15 5/15-6/15

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 17

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1]	Mean Skull Size Male[2]	Mean Cem. Age Male[3]	Regulatory Year Seasons
1961	2	1	50	0	0	13.7			9/1-12/31 5/15-6/15
1962	2	2	100	0	0	15.5			Same
1963	3	1	100	0	0	16.3			Same
1964	5	2	40	4	80	11.5			Same
1965	6	2	33	5	83	13.3			Same
1966	9	4	50	4	44	14.1			Same
1967	11	3	27	10	91	14.8	22.5		Same
1968	10	7	70	6	60	13.6	23.4	7.3(3)	Same
1969	5	2	40	3	60	15.3	23.2	8.5(2)	9/1-10/15 5/15-6/15

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 18

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961									9/1-12/31 5/15-6/15
1962									Same
1963									Same
1964									Same
1965	N O R E P O R T E D K I L L								Same
1966									Same
1967									Same
1968									Same
1969									9/1-11/30 5/15-6/15

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 19

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1]	Mean Skull Size Male[2]	Mean Cem. Age Male[3]	Regulatory Year Seasons
1961	12	6	50	8	67	11.4			9/1-12/31 5/15-6/15
1962	11	7	64	3	27	13.3			Same
1963	11	5	56	8	73	13.2			Same
1964	19	12	63	13	68	12.3			Same
1965	18	6	35	15	83	12.4			Same
1966	18	5	29	14	78	12.7			Same
1967	17	7	44	13	76	13.5	22.6		Same
1968	15	6	50	10	67	12.1	21.1	4.7(3)	Same
1969	10	6	67	8	80	11.5	20.3	5.3(7)	9/1-10/15 5/15-6/15

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 20

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	17	12	71	4	24	13.0			9/1-12/31 5/15-6/15
1962	26	16	62	5	19	12.6			Same
1963	44	25	57	7	16	12.4			Same
1964	46	28	64	15	33	13.0			Same
1965	32	18	56	11	34	13.7			Same
1966	57	28	50	22	39	13.2			A 9/1-12/31 B&C 9/1-12/31 5/15-6/15
1967	15	6	40	2	13	13.3	21.3		A 9/15-12/31 B&C 9/15-12/31 5/15-6/15
1968	23	17	74	5	22	13.4	22.2	15.2(5)	A 9/15-10/15 B&C 9/15-12/31 5/15-6/15
1969	26	15	58	7	27	13.0	20.9	9.2(14)	A 9/20-10/20 B&C 9/1-30 5/15-6/15

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 21

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	3	1	33	0	0	12.9			9/1-12/31 5/15-6/15
1962	7	4	57	2	29	13.9			Same
1963	3	2	67	0	0	12.1			Same
1964	-	-	-	-	-	-			Same
1965	-	-	-	-	-	-			Same
1966	1	1	100	0	0	12.4			Same
1967	1	1	100	0	0	14.8			Same
1968	1	0	0	0	0	0			Same
1969	2	0	0	0	0	0			9/1-11/30 5/15-6/15

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 22

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	1	1	100	0	0	14.0			9/1-12/31 5/15-6/15
1962	1	1	100	0	0	11.8			Same
1963	-	-	-	-	-	-			Same
1964	-	-	-	-	-	-			Same
1965	1	1	100	1	100	13.5			Same
1966	2	1	50	1	50	16.2			Same
1967	3	2	67	0	0	14.5	23.0		Same
1968	6	3	50	0	0	13.2	21.3	5.0(2)	Same
1969	2	1	50	0	0	11.7	22.6	0	9/1-11/30 5/15-6/15

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 23

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	6	4	67	2	33	13.9			9/1-12/31 5/1-6/15
1962	5	4	80	3	60	12.9			9/1-12/31 5/15-6/15
1963	11	8	73	8	73	13.7			8/20-12/31 5/1-6/15
1964	14	12	86	5	36	13.7			9/1-12/31 5/1-6/15
1965	27	24	89	18	67	13.5			9/1-12/31 5/15-6/15
1966	12	11	92	8	67	13.7			Same
1967	12	10	83	7	58	13.9	22.9		Same
1968	29	24	83	17	59	13.5	22.6	11.4(18)	Same
1969	14	12	86	9	64	13.2	22.0	7.6(8)	9/1-11/30 5/15-6/15

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 24

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	1	1	100	0	0	14.2			9/1-12/31 5/15-6/15
1962	5	3	60	0	0	12.5			Same
1963	8	5	71	1	13	13.0			8/20-12/31 5/1-6/15
1964	9	7	78	3	33	13.7			Same
1965	11	7	64	4	36	12.8			8/20-12/31 5/15-6/15
1966	17	7	44	10	58	12.9			Same
1967	13	9	75	9	69	13.8	22.1		9/1-12/31 5/15-6/15
1968	5	4	80	3	60	13.3	22.1		Same
1969	9	7	78	4	44	12.5	21.7	7.7(7)	9/1-11/30 5/15-6/15

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 25

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male[1/]	Mean Skull Size Male[2/]	Mean Cem. Age Male[3/]	Regulatory Year Seasons
1961	4	4	100	2	50	12.1		9/1-12/31	5/15-6/15
1962	5	3	60	3	60	13.4			Same
1963	6	1	33	6	100	13.8			8/20-12/31 5/1-6/15
1964	11	7	64	4	36	12.6			Same
1965	11	5	45	6	55	12.9			Same
1966	25	18	72	14	56	13.1			Same
1967	17	11	65	13	76	13.3	21.8		9/1-12/31 5/15-6/15
1968	10	8	80	4	40	12.5	20.8	4.0(2)	Same
1969	12	9	75	8	67	12.5	20.3	6.5(4)	9/1-11/30 5/15-6/15

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

Table 16 (cont.). Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1969: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 26

Year	Total Kill	No. Males	% Males	No. Nonres.	% Nonres.	Mean Hide Size Male 1/	Mean Skull Size Male 2/	Mean Cem. Age Male 3/	Regulatory Year Seasons
1961	1	1	100	0	0	10.2			9/1-12/31 5/1-6/15
1962	2	1	50	1	50	15.0			9/1-12/31 5/15-6/15
1963	13	8	73	4	31	12.8			8/20-12/31 5/1-6/15
1964	16	12	80	5	31	13.9			9/1-12/31 5/1-6/15
1965	5	3	60	1	20	13.4			9/1-12/31 5/15-6/15
1966	9	5	63	4	44	13.0			Same
1967	4	2	67	2	50	10.4	20.0		Same
1968	14	13	93	8	57	12.0	21.1	5.7(7)	Same
1969	16	11	79	6	38	12.8	22.0	7.4(7)	9/1-11/30 5/15-6/15

1/ Length plus width given in feet.
2/ Length plus width given in inches.
3/ Tooth sample size in parenthesis.

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