

GRIZZLY BEAR JOURNALS 1963, 1964

GRIZZLY BEAR STUDY

Yellowstone National Park

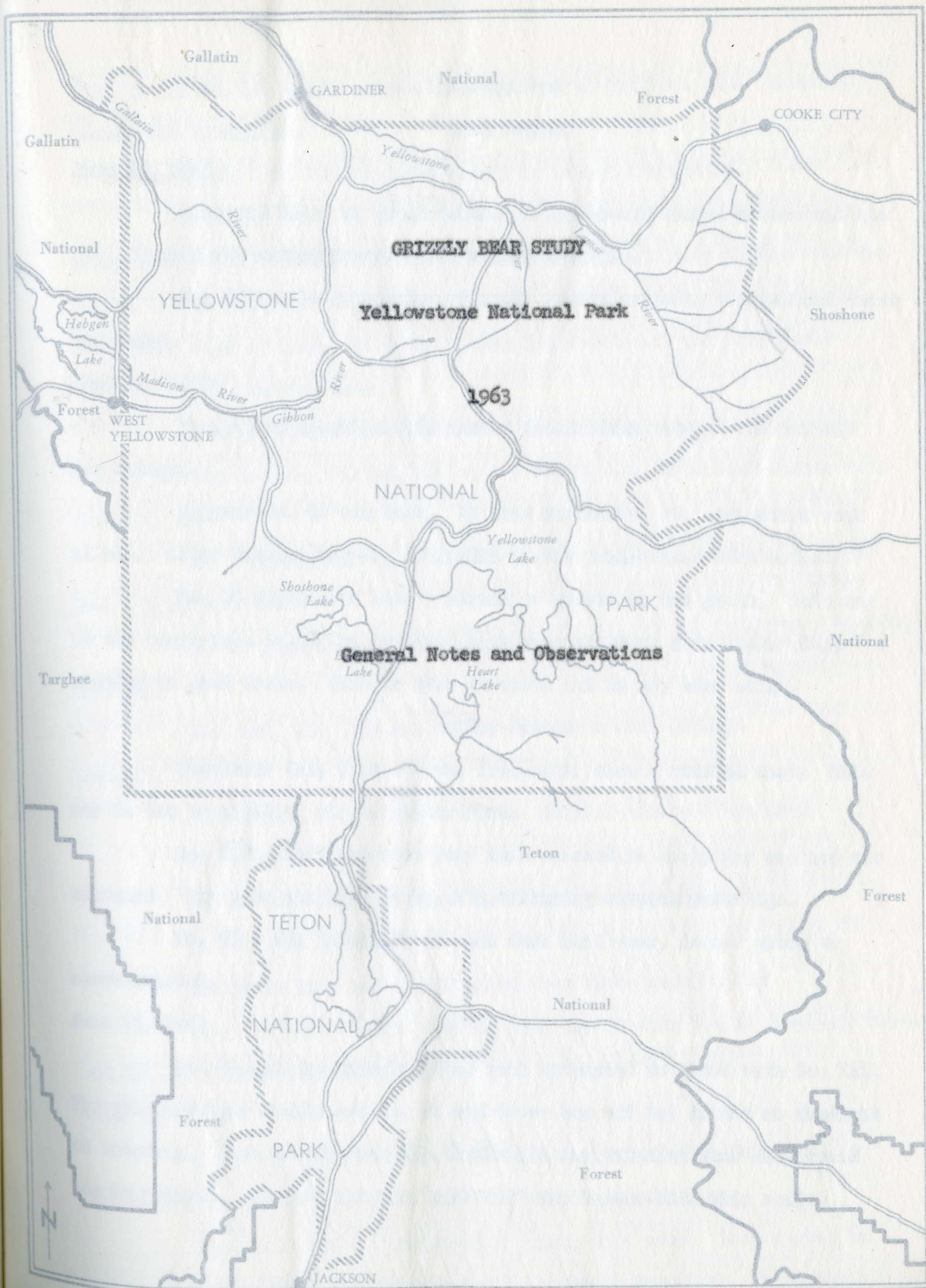
GRIZZLY BEAR STUDY

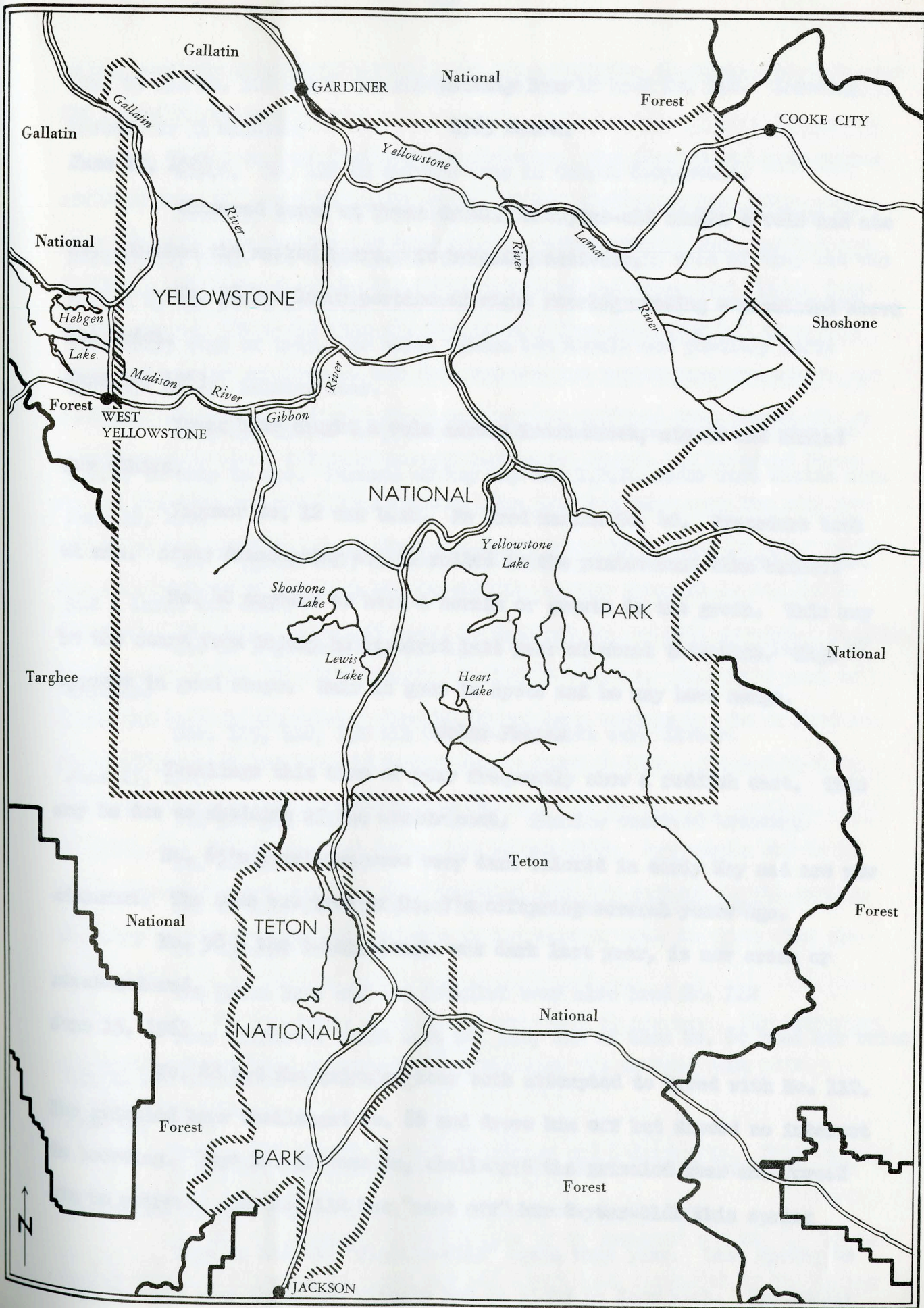
YELLOWSTONE NATIONAL PARK

Journal of John J. Craighead

Narration, Notes, Observations
and Remarks for the Years

1963, 1964





SCALE 5 4 3 2 1 0 5 10

(No. 99 and No. 100 and 1 unnamed Grizzly Bear 12 bred No. 112. Breeding lasted for 31 minutes.

1963 Season

June 13, 1963. No. 122 in silver trap in Canyon Campground.

Observed bears at Trout Creek. A 2-year-old caught a vole and ate it. Checked the marked bears. No breeding activity. In side of trap and was

No. 98 has lower portion of right foreleg missing - amputated above the wrist. No boxes broken but muscle and possibly nerve

June 14, 1963. Holding bear.

Young bear caught a vole across Trout Creek, ate it and hunted for others.

June 16, Ingomar No. 12 was back. He bred Marion No. 40. Procedure took 21 min. After dismounting No. 40 rolled in the pumice sand then bathed.

No. 40 appears to have a hernia or growth in the groin. This may be the scars from injury he received last year at about this time. Inge appears in good shape. Hair is gone in spots and he may have mange.

No. 109, 110, 130 all Color Phases from same litter.

June 17, Yearlings this time of year frequently show a reddish cast. This may be due to shedding of the winter coat. Maurice observed breeding.

No. 65's yearlings were very dark colored in early May and are now cinnamon. The same was true of No. 7's offspring several years ago.

No. 98 - the 3-legged-male was dark last year, is now cream or straw-colored.

June 15, 1963. Four different bears bred No. 112, one of them No. 88 bred her twice,

No. 88 and the grizzled bear both attempted to breed with No. 112.

The grizzled bear challenged No. 88 and drove him off but showed no interest in breeding. Inge No. 12 came in, challenged the grizzled bear and forced him to retreat. Sow No. 112 has "cast off" her 2-year-olds this spring

Inge is his old "fightin'-coll" again this year. Last spring he was in very poor shape and finally had to yield to Bear Back. Apparently

(No. 99 and No. 100 and 1 unmarked). Inge No. 12 bred No. 112. Breeding lasted for 31 minutes.

N.P.S. No. 122 in culvert trap in Canyon Campground.

June 15, 1963. A three-year-old boy and son of Mr. Morrison of Northfield, Minn. was unattended. With his arm in hole in side of trap and was seized by the young grizzly. Boy's arm was severely bitten and lacerated from sharp edge of trap. No bones broken but muscle and possibly nerve damage. N.P.S. holding bear.

June 19, 1963. We processed No. 122 and then turned it over to N.P.S. to ship to zoo. Parents of boy may sue N.P.S. under Tort Claims Act.

June 16, 1963

No. 7 (green sow) arrived with her 2 yearlings - 1 light colored and 1 large and dark.

No. 12 Inge bred No. 112 again this evening. Breeding lasted 47 minutes.

Nos. 109, 110, 130 all 2-year-olds from same litter.

June 17, 1963

Did not get out to Trout Creek. Maurice observed breeding.

No. 12 bred No. 65

No. 88 bred No. 112 (bred her twice the same afternoon)

No. 41 also bred No. 112

The Brown Bear and the Grizzled bear also bred No. 112

Four different bears bred No. 112, one of them No. 88 bred her twice, all in one afternoon and evening.

June 18, 1963

A cow elk was hit by an auto 6 miles east of West Entrance. We picked her up and dropped her 1 mile above Trout Creek dump.

Inge is his old "fightin'-self" again this year. Last spring he was in very poor shape and finally had to yield to Scar Neck. Apparently

he was severely injured in a fight. He returned later in season and took over the dominant position.

This year Scar Neck has not appeared. The Short-eared boar paired off with sow 112. Inge was with sow No. 65 but challenged him. They ran over 1/4 mile, the Short-eared boar finally made a stand. Inge parried and finally grabbed Short-ear by the throat; twisted and threw the 750-lb. boar to the ground. We could hear the two roaring from well over 1/3 of a mile away. Short-ear got back on his feet and the two locked jaws and cuffed one another. Inge finally forced Short-ear to turn tail and then chased him at a fast pace for about 1/2 mile through the sage. Sow No. 65 remained where No. 12 had left her until he returned. The two then went over the hill and out of sight together. Inge chasing a large Brown Boar ahead of him. Short-ear circled back to the dump and immediately showed interest in sow No. 40 (Marion). The other boars had shown no interest in her this evening. However, Short-ear bred No. 40. The breeding lasted 19 minutes. Boar then went to creek and laid in the water. Sow No. 40 had been bred by No. 12 on June 14. Apparently No. 40 has been in estrus for at least 8 days. She was bred by Short-ear today and by No. 88 on June 11.

No. 120 chased and cuffed her 2-year-olds. Apparently she is in the process of weaning them. They traveled with her earlier in the spring. Now they remain clear of her and lie in the sage at some distance when she is feeding.

No. 7's yearlings suckled her for about 10 minutes. Her mammaries are still enlarged and apparently the yearlings are getting some milk. Suckled like cubs.

Sow No. 123 chased several yearlings and 2-year-olds. Behaves like a sow weaning offspring.

Sow No. 40 (Marion) chased 3 cubs of an unmarked sow No. 1. It appeared that she intended to catch one and might have succeeded if the mother

of the cub had not rushed to the defense of the cub and chased No. 40. This is the first observed attempt of a grizzly either male or female to capture and harm a cub. Females with cubs are alert and suspicious and generally do not let other bears take liberties with their cubs. However, there have been ample opportunities over the past 5 years for adult bears to chase and harm cubs but no other instance of this has been observed.

Sow No. 10 is probably 6 years old but during the 5 years we have been observing she has never shown up with cubs. It is quite possible that some sows in the population never conceive until 5 or 6 years old, perhaps older.

A new sow arrived with 2 cubs. There are now a total of 3 sows with 7 cubs. We suspect the latest arrival is Mae West with 2 cubs.

Old Blue - Boar No. 30 probably arrived. He is a huge boar but quite timid and seldom comes into the dump until nightfall.

June 19, 1963

Set two traps last evening and captured 2 yearlings.

Processed 3 bears today. The 2 yearlings we captured and a 4-year-old caught by the Park. This is the one that bit the boy and the bear will be shipped to a zoo.

No. 12 was with No. 65 - The Brown Boar was paired with Sow No. 112. He was also with her last evening.

Order of male hierarchy now appears to be:

No. 12

Short-ear

Ivan

Grizzled Bear

No. 88

Brown Boar and Old Blue?

Peg Leg No. 76 arrived for first time.

No breeding occurred during evening. Inge No. 12 herded No. 65 around all evening. Would not let her approach dump or mingle with other

bears. Sow 12 was receptive to No. 88 but not bred. Fighting and chasing interrupted.

Quite a fight between Inge and No. 88. Inge chased No. 88 and grabbed him by the butt, climbed over him breaking him down. Inge grabbed No. 88 in the loins as he lay sprawled on his back and bit and shook the approximately 400-lb. bear like a terrier shakes a rat. No. 88 finally broke loose and his huge jaws clamped on Inge's jowls. Inge reared back and fought free then the two stood face to face jaws wide apart. They reared and parried looking and disengaging jaws, each trying to twist the other to the ground. Each maneuvered first to the left then to the right trying to get the advantage of the high sloping ground. Inge slapped No. 88 across the shoulder with a terrific swipe of his right paw then lunged for his throat. No. 88 staggered back and to one side from the blow but rose on his hind legs before Inge could get his throat and the two stood together swiping and biting and exchanging growls and roars that could be heard for 1/2 mile away. No. 88 did not retreat but showed no enthusiasm to press the encounter so Inge turned his back on him and moved over to claim sow No. 65. She in the meantime was receiving the attention of the large Brown Boar. This boar had mounted the sow but quickly retreated as Inge approached. No. 88 remained where he had fought for several minutes then climbed the embankment and mixed with some of the other bears. Neither Inge or 88 appeared to be seriously injured though both showed signs of the conflict. No. 88 slowly gave ground and moved off.

The yearling No. 141 marked today joined her mother, the blue sow No. 125 and tried to suckle. Apparently she located her mother less than 6 hours after coming out of the anesthesia.

No. 65 was receptive to all boars but No. 12 chased off all comers.

No. 120 again chased 2-year-olds.

June 20, 1963

Received word that a grizzly had been shot at Shoshone Lake.

Maurice, When we arrived at Trout Creek the Brown Boar was breeding No. 65. Breeding lasted 17 minutes; animals were across the sage flats. Inge and Boar No. 88 were at the dump feeding.

Sow No. 125 is now together with both her yearlings No. 141 and No. 142 which we marked yesterday.

The Grizzled Boar chased the Brown Boar away, returned and mounted sow No. 65 for $1\frac{1}{2}$ min. The Brown Boar had been breeding No. 65 when we arrived. He did not contest the Grizzled Boar. This boar was on the sow 10 minutes (probably did get her bred) then was driven off by Short-ear. Short-ear did not mount the sow. She moved steadily south for about a mile with Short-ear keeping pace about 25 yds. behind.

The sow caught up with No. 12 and immediately Short-ear stopped and did not pursue her further. Inge and No. 65 moved on up the valley together.

Bob Wood observed No. 37 at Thumb during Spring. Not seen since.

June 21, 1962

Took Dr. Frazer Darling and Noel Eickhorn for a walk into Sulphur Mt. and up Alum Creek. We saw several grizzlies but I could not determine markers. We then visited Trout Creek with Maurice.

Inge circled the Trout Creek dump apparently looking for a sow - perhaps No. 65.

Several young boars (76 and 51) tried to breed sow 112. She had been bred a number of times earlier in week. The large boars showed no interest in her so suspect she is no longer in estrus.

A new sow with 3 cubs arrived. Sow is marked but did not come in close enough to identify her.

No. 112 apparently no longer in estrus.

June 21, Received word that a grizzly had been shot at Shoshone Lake. Maurice, Derek, and Charlie hiked in. Bear had torn up Dr. Pulling's camp and finally the seasonal ranger shot it. They buried it and Maurice and boys dug it up. Found that it was No. 80, a boar that we marked here at the Lab in 1961. He was never seen in 1962. The bear apparently showed no fear of the campers at Shoshone and had to be killed. Had Darling and Eickhorn for supper. Enjoyed talking with Frank Darling. He is making a study of impact of humans on National Parks.

June 22, 1963 Could not get out to Trout Creek. See Maurice's notes.

June 23, 1963 No. 88 bred sow No. 65. Could not get to Trout Creek. See Maurice's notes.

June 24, 1963 Eleven large boars at Trout Creek. No breeding occurred. Set 2 traps. No. 80 is a good example. Fidal, an unmarked bear that challenged No. 12 pursued sow No. 84 all evening but she was not receptive. She attracted other boars as well but receptive to none.

June 25, 1963 Captured yearling number 133 in trap. Had a difficult time immobilizing it. Held it over until afternoon. Shot the Grizzled Sow's (No. 65) 3 unmarked yearlings on the dump at about noon. Used 3 darts, hit two in by neck and 1 in leg. Dragged the third one out of the creek. Put all three in trap. Did not get out to Trout Creek Dump. See Maurice's notes.

Processed 3 in the afternoon and held one over night. Did not get to Trout Creek. See Maurice's notes. Learned that John Wat killed a marked grizzly. According to report she scratched boy severely. H.P.S. will now try to catch sow and 3 cubs and ship to zoo.

June 25, 1963

Processed No. 65's third yearling. The entire family of 4 are now marked. Gave it No. 145. ~~the information and we received letters from Bob Cooney~~ Began setting up the Field Radio Station. ~~letters in file).~~

Maurice observed the Short-eared boar and the Brown boar playing together. This seems rather unusual as they will fight viciously over a sow. Several days ago we observed the same type of behavior between two adult boars (not members of the upper strata). ~~another party at about the same time~~ No boars have been showing any interest in the Grizzled sow No. 65. She is probably out of estrus, but we suspect she may come in estrus again within a few days. Also true of No. 112. ~~in previous years. In general adults~~ The number of bears at Trout Creek is gradually increasing. The population is nearing a peak. Have seen some bears that were not recorded in 1962. It would appear that a small percentage of the Trout Creek population do not come into Trout Creek each year or to the other dump areas. ~~including other~~ No. 80 is a good example. Fidel, an unmarked bear that challenged Ing No. 12, in 1961, did not reappear in 1962. There is now a bear at Trout Creek that fits his description and temperament. It could be Fidel but we cannot be certain. ~~interrupting the breeding but did not attempt to breed No. 84.~~ ~~The Brown~~ The Green Sow No. 7 and her two yearlings tried to swim the Yellowstone River at Sulphur Mt. ~~is still in estrus. Has been bred by Brown~~ Sow No. 84 mounted by Grizzled Boar probably bred. Bear chased by No. 12. ~~No. 12 chased No. 14 but did not attempt to breed sow No. 40.~~

Did not get out to Trout Creek Dump. See Maurice's notes. ~~interest,~~ Sow with 3 cubs has been reported causing trouble in the Old Faithful Campground since early June. The evening of June 25 sow and cubs were wandering among campers sleeping on ground in open. Sleepers awakened, startled the cubs and the sow attacked a boy in his sleeping bag. According to report she scratched boy severely. N.P.S. will now try to catch sow and 3 cubs and ship to zoo.

June 27, 1963

Received confirmation on the bear shot by John Wat.

Grant Hagen sent us the information and we received letters from Bob Cooney and the Wyoming Fish and Game Dept. (See letters in file).

No. 37 the Dump Kid was shot by John Wort on June 21, 1963, approximately $1\frac{1}{2}$ miles south of the South Gate on Pole Cat Creek - 1 mile west of the mouth of Pole Cat Creek and the Snake River, Teton County.

Another grizzly (a sow) was killed by another party at about the same time and place.

A lot of chasing of 2-year-olds occurred at Trout Creek. There appears to be more of this this year than in previous years. In general adults appear to be quite tolerant of yearlings both the weaned and unweaned ones, but quite intolerant of the 2-year-olds.

Sow Now 84 weaned 2-year-olds this spring. Bruno attempted to breed her without success. No. 12 has been following her closely (pursuing other male bears) for the last few days. Maurice reported that the Grizzled Boar bred her on June 26 copulating for 16 minutes. The Brown Boar chased Bruno away and attempted to breed No. 84. No. 12 chased the Brown Boar off after 10 minutes disrupting the breeding but did not attempt to breed No. 84. The Brown Boar may or may not have consummated a successful breeding.

Marion, Sow No. 40 is still in estrus. Was being bred by Bruno. No. 14 then No. 12 interfered. No. 14 broke off after breeding for 7 minutes. No. 12 chased No. 14 but did not attempt to breed sow No. 40.

Sow No. 84 came in with Inge No. 12. No. 12 showed no sexual interest, however No. 14 and the Brown Boar both showed immediate interest. No. 14 copulated for about 7 minutes, was chased by No. 12. The Brown Boar during the furor mounted and bred for 10 minutes before No. 12 chased him off in turn. No. 12 probably breeding sow No. 84 away from Dump area as he has been with her constantly the past few days and defends her against other boars.

June 28, 1963

Drove to Mammoth and Gardiner for equipment and consultations.

Observed antelope selectively eating flower heads of Thlaspi pratensis. The pair and interrupted the breeding activity. There is little

doubt but N.P.S. captured the sow that had been giving trouble in the Old Faithful campground. Used sucostrin and Cap-Chur gun. Will ship sow to zoo. Have not yet captured cubs. showed any interest in sow No. 10.

See Maurice's notes for Trout Creek. the sow , she has

June 29, 1963 the right ear. From her behavior it appeared that she was

arriving See Maurice's notes. Went to Missoula ear. She stood up and

June 30 thru July 3, 1963 times as she approached. At the dump she was

rushed by See Maurice's notes, and then a number of the bears present came over

July 4 thru 7th, 1963 touched noses and then she proceeded to feed.

At Moose, Wyoming 3 yearlings.

July 2, 1963 7 and her two yearlings arrived. She has not yet weaned them.

July 9, 1963 Maurice made the following observation:

"Marked sow appeared with 3 collared cubs. Believe this sow is No. 48. She had one cub (No. 124) in 1962, abandoned the cub in early July of that year. Also abandoned a single cub (No. 49) in 1960. On July 30 of 1960 this sow displayed definite breeding activity with an unidentified boar. Was mounted by the boar, started copulation, then boar dismounted. Sow was definitely receptive. If this is sow No. 48, it will be the first record of cubs in successive years for an individual female. Has single tag, square aluminum in left ear, upper outside. did not pursue.

No. 34 appeared with 2 cubs. This sow weaned yearlings (Nos. 92 and 93) in 1962. Has single marker, red aluminum in right ear, upper outside.

we instrumented her and lost her after tracking for only 1 day.

July 10, 1963

July 7, 1963

Observed No. 83 breed sow No. 10 across the flats from the dump.

The breeding continued for at least 16 minutes. No. 12 came over the bank,

approached the pair and interrupted the breeding activity. There is little

doubt but that sow No. 10 got bred.

Sow No. 10 and Boar No. 88 came into dump. There were 4 or 5 other large males present but none showed any interest in sow No. 10.

The Brown Boar arrived about dark with sow , she has tape in the right ear. From her behavior it appeared that she was

arriving at Trout Creek for the first time this year. She stood up and

July 11, 1963

looked things over several times as she approached. At the dump she was rushed by several young bears and then a number of the bears present came over and sniffed her briefly or touched noses and then she proceeded to feed.

No. 65 chased her 3 yearlings.

No. 7 and her two yearlings arrived. She has not yet weaned them. This should be examined carefully. See autopsy notes.

July 9, 1963

(Took photo of the silver-colored hide.)

Maurice and Frank went to Trout Creek. Scarneck arrived for first

time. Scarneck and Inge (No. 12) were aware of each other but appeared to consciously ignore one another like two fighters who know they must fight but would prefer not to if there is a way out. They circled and eyed one another from a distance each keeping his distance. Finally they came face to face as was inevitable when both sought food at the same place. When there was no alternative but to make a stand Inge rushed. Scarneck backed slowly away with dignity and No. 12 did not pursue.

The sow No. 96 with radio and collar was in at dump with one cub. She was earlier seen at Cash Creek on July 1, 1963 with 2 cubs. Last year

we instrumented her and lost her after tracking for only 1 day.

Shot No. 96 at the dump. She came in with one cub and other cub joined her later. Missed with first shot. Hit her in shoulder with second.

July 10, 1963

One yearling No. 143 in trap. Had captured her two weeks earlier so weighed and released. Eric Bauer went with us and took photos.

Sow No. 96 with radio collar arrived with no cubs.

Shot sow No. 121 in Canyon Campground with lethal dose of sucostrin. Received only partial injection and got up. Lance and Maurice had a few anxious moments until they could shoot the bear again. Got her about midnight. She is a 3-year-old and probably is the bear that has been biting people in the campground. We have captured her several times before, all in the Canyon Campground.

July 11, 1963

Captured the Owl-faced Sow. Her two collared cubs were at the trap. I shot 2 rolls of film of them playing and crawling over trap.

Skinned, autopsied and boned No. 121. We now have 3 blood samples and 3 dental casts of this bear. Too bad we had to sacrifice it. Took reproductive tract. This should be examined carefully. See autopsy notes. (Took photo of the straw-colored hide.)

Tried to instrument the Owl-faced Sow No. 148. Could not get the transmitter to operate properly. Was about to give her another injection of penta when she suddenly got up. We all scattered to the cars. I got in the back of the truck. She gave chase, falling on her face and then getting up. We had a few exciting moments. Lance ran over some equipment with a car when the bear charged his way. We fortunately had taken the transmitter off for testing and had taken all data we needed as well as marking her and getting a blood sample. She is an old bear perhaps 15 years. (See dental chart) This will be an interesting blood sample.

Took photo of mammaries which were full.

Shot No. 96 at the dump. She came in with one cub and other cub joined her later. Missed with first dart. Hit her in shoulder with second.

syringe loaded with 55 mg. of sucostrin. She ran south over 1/4 mile before collapsing in marsh. Located her with 2 cubs standing by. We hauled her to trap and will hold her over night. Transmitter assembly appeared to be in excellent condition. Will try to get cubs in morning. ²Pete Bixler, Jim Wiley, Maurice, Frank and I all participated in this first recovery of one of our transmitters.

The bears appear to be generally fatter and in better condition this summer than in previous years. May be due to the white-bark pine crop last fall and to the generally lush condition of the vegetation last year and this spring. Cannot yet correlate this with specific food items in the diet other than perhaps the white-bark pine nuts.

June 12, 1963

Left No. 96 in trap at Trout Creek. Two cubs were present when we returned in morning. Processed sow No. 96. Removed old collar and transmitter and placed a new one on her. Checked transmitter at about 3 miles while on bear. Photographed collared cubs.

Picked up signal from No. 96 at 7:00 P.M. at field station. Bear was S.E. at a distance of 3 or 4 miles.

July 13, 1963

Picked up signal from No. 96 at 6:35 A.M. in same direction as last evening.

8:00 : 8:45 P.M. - no signal

Drove to Gardiner. Took photos of antelope. Antelope are fond of yellow sweet clover. Ate leaves, stems and blossoms.

Behavior:

When I arrived at Trout Creek there was one lone cub. An unmarked sow (No. 4) with 3 cubs arrived. The lone cub tried to join her but one of her cubs chased him continually and the others joined in from time to time. The sow and her litter finally accepted the lone cub after about 30 minutes.

Another unmarked sow (No. 2) arrived with one cub. She immediately recognized the lone cub as hers and tried to call it away from sow No. 4. She approached closely woofing. Sow No. 4 bristled up and the lone cub appeared uncertain. First he ran to sow No. 2 then back to sow No. 4. Sow No. 4 then challenged sow No. 4, they slapped at one another and the cubs scattered in all directions. June) and Sow No. 2 withdrew toward the lone cub which had run off some distance. She called him as before, he joined her (cowed like a beaten dog not beneath her muzzle) then ran back to sow No. 4. She in the meantime had called her 3 cubs back. The lone cub was accepted by the 3 cubs but a woof from sow No. 2 urgently repeated and with considerable authority brought the lone cub scampering back. He approached cautiously then moved in under her upraised forearm and began to suckle - only then was he certain of his allegiance and were we certain of which sow he belonged to. He miraculously lost his uncertainty and caution and remained with his mother. She allowed him to suckle for 1/2 minute then moved away and let him feed for a longer period. He remained with her the rest of the evening and left with her and his littermate traveling northward across the sage.

July 14, 1963 used the radio tower using a block and tackle and guide ropes.

All went Met with Mr. Garrison and staff to have supper with Senator Massey Barrett, Kefauver, McGee and 2 other senators at Lake Hotel. took a blood

sample. Took them out to see the bears. All seemed to enjoy it. Mr. and Mrs. Trevor S. Povah were present and asked to return some time to see us work on a grizzly. past. Now has 2 cubs with distinct white collars. Maurice

July 15, 1963 in of the identity of No. 48 but we have now confirmed this and

re-marked Made a count with Maurice at Rabbit Creek car.

The blood sample should Large boars 5 or 6 interesting as this is one of the older sows in the population. Sows 3 2-year-olds 3 one from which we have 3 or 4-year-olds 3 obtained blood. Yearlings 2 Young adult 1 Sow with 3 cubs

In addition there is the sow that was immobilized at Old Faithful and sent to a zoo. Her 3 cubs are still at large.

Movement and Behavior:

July 9

No. 96 was in and the collar intact but it is not functioning as we get no signal. Scarneck was present. Earlier she had been at Trout Creek (from late June) and fought with No. 12. Last year he remained at Trout Creek in the dominant role after injuring Inge No. 12. This year he apparently could not cope with No. 12 and moved on to Rabbit Creek where we expect him to remain. He is not the dominant bear here.

July 13, 1963 The dominant bear here appears to be "White-fang". He is an ugly fearsome looking bear with the lip torn away so that his teeth (left canine) show in a continual snarl. He is aggressive and made several bluffing charges toward the car. He has been the dominant bear or at least one of the more dominant ones at Rabbit Creek for several years.

Saw a marked bear which we could not identify and 2 collared 2-year-olds - beautiful bears. 1 collared yearling.

July 16, 1963

Erected the radio tower using a block and tackle and guide ropes. All went well.

Shot No. 48 (Abandon) at dump marked her again and took a blood sample. She had one ear tag but had lost markers. This is a very old bear with an interesting breeding history (see Family history). She has orphaned cubs twice in the past. Now has 2 cubs with distinct white collars. Maurice was not certain of the identity of No. 48 but we have now confirmed this and re-marked her with white and green rope in the left ear.

The blood sample should be particularly interesting as this is one of the older sows in the population and the oldest one from which we have obtained blood.

Shot an unmarked sow that had 3 cubs. This is bear No. 150. She was a small bear and 55 mg. of sucostrin put her out nicely. Placed red and white rope in the right ear.

No. 96 was in and the collar intact but it is not functioning as we get no signal.

July 17, 1963

Had 2 traps set and captured one bear, a yearling at Trout Creek.

No. 151. Processed and released at T.C.

Worked at Lab.

July 18, 1963

Set 2 traps, captured one bear.

A cub killed at Trout Creek. Apparently was killed by a large bear. Was dead 4 or 5 days before we located it. This is the first record of cub mortality from natural causes and the only record of a cub being killed by an adult. Will know more when we can inspect the skeleton and skull. Skull appears crushed.

Took Mr. and Mrs. Frank Goodyear out to Trout Creek. We had recaptured No. 149. We immobilized and released only.

July 19, 1963

Two cubs in trap. One had broken jaw and trap door had crushed 2 claws but foot was uninjured.

Located a cub at T.C. dump about 10 A.M. Appeared to be lost or orphaned. Shot cub with CO₂ gun, weighed, marked and released.

Met Bapa at Jackson Airport.

For details see notes

Front Creek - 1963
Trap Success - 1963

Date	No. Traps	No. Successful
6/18	2	2
6/19	2	0
6/24	2	1
6/25	1	0
6/26	1	0
6/27	2	0
6/30	2	2
7/1	2	(1 and Grizzled bear both attempted)
7/2	2	0
7/3	2	0
7/10	2	1
7/11	2	1
7/12	1	0
7/15	2	Brown Bear (unmarked) bred
7/16	2	Grizzled Bear bred
7/17	6	88 Sow receptive but not bred
7/18	2	1
7/19	2	1
7/21	2	1
7/22	2	1
7/23	2	1
7/24	0	0
7/25	1	0
7/29	2	2 cubs
7/30	2	1 sow No. 42
7/31	1	0
8/1	2	0
8/2	1	0
8/4	2	0
8/5	2	0
8/6	1	1
6/19		Defended by No. 12. Mounted by No. 88 and Brown Bear but chased each time by No. 12. Sow very receptive.
6/20		Brown Bear bred
6/26		Grizzled Bear bred
6/23		88 bred
6/26		Grizzled Bear bred, chased by No. 12
6/27		Brown bear ? Probably not successful.
7/7		88 bred

All breeding over by July 10-15.

For details see notes

Trout Creek - 1963
Breeding Notes - Summary

Sows Breeding

Sow No. 40 was bred by 4 different boars between 6/11 and 6/27.

Sow	Date	Boar
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Sow No. 41 was bred by 3 different boars between 6/11 and 6/19.

Ld. round Al,	6/11	88 bred
On 6/21 two upper outside R ear	6/14	12 bred
40	6/18	Short-ear
On June 17 boar No. 88 bred	6/27	14 bred
3 other boars that same evening for a total of 5 apparently successful copulations.	6/15	12 bred (88 and Grizzled boar both attempted)
	6/16	12 bred
Sow No. 65 weaned her yearling this spring	6/17	88 " as bred by 3 and
probably 4 different boars between 6/11 and 6/23.	6/17	88 "
	6/17	41 "
Apparently all the large males capable	6/17	Brown Boar (unmarked) bred
several sows at Trout Creek during the course of the breeding season.	6/17	Grizzled Boar bred
appears that the boars are limited in breeding the	6/19	88 Sow receptive but not bred - boars interrupted.
a sow apparently in estrus will be ignored by 1 or more large males including	6/21	76 and 51 mounted but no breeding occurred
the dominant boar, No. 12. However, another boar will show decided interest	6/17	?
in a female so ignored and will breed her and she will be very successful mating	6/17	12 ♀ receptive, however no successful mating was observed. May have occurred after we left.
It appears reasonable that a boar that has bred 1	6/18	Brown Boar (allowed to mount but boar chased by No. 12 so
before arriving at T.C. on a particular morning or one	6/19	Defended by No. 12. Mounted by No. 88 and Brown Boar but chased each time by No. 12. Sow very receptive.
quently over a period of days will be "bred out" temporarily	6/20	Brown Boar bred
interest in a sow in estrus that will attract other males	6/20	Grizzled Boar bred
opportunity to breed and even attract the younger males.	6/23	88 bred
Competition for sows in estrus appears to be greatest at the beginning of the breeding season.	6/26	Grizzled Boar bred, chased by No. 12 this
Sows in estrus apparently will tolerate only so many copulations	6/27	Brown boar ?. Probably not successful.
84 running from aggressive males and fighting them off.		
a number of times.		
10	7/7	88 bred

All breeding over by July 10-15.

Breeding Notes - Summary

Sow No. 40 was bred by 4 different boars between 6/11 and 6/27.

Sow No. 112 was bred by 5 different boars between 6/15 and 6/19.

On 6/21 two young boars mounted No. 112 but did not succeed in breeding her.

On June 17 boar No. 88 bred sow No. 112 twice and she was bred by 3 other boars that same evening for a total of 5 apparently successful copulations.

Sow No. 65 weaned her yearlings this spring and was bred by 3 and probably 4 different boars between 6/17 and 6/23.

Apparently all the large males are capable breeders and do breed several sows at Trout Creek during the course of the breeding season. It appears that the boars are limited in the breeding they can do. Some evenings a sow apparently in estrus will be ignored by 1 or more large males including the dominant boar, No. 12. However, another boar will show decided interest in a female so ignored and will breed her and she will be very receptive.

It appears reasonable that a boar that has bred 1 or more times before arriving at T.C. on a particular evening or one that has bred frequently over a period of days will be "bred out" temporarily and show no interest in a sow in estrus that will attract other males that have had less opportunity to breed and even attract the younger males.

Competition for sows in estrus appears to be greatest at the beginning of the breeding season.

Sows in estrus apparently will tolerate only so many copulations running from aggressive males and fighting them off. We have observed this a number of times.

1963

Bear Count - Trout Creek

Date First Observed	Sow No.	No. Cubs	Description
Date		No.	
6/18	Cubs	7/2 20	Dark cubs. One has white chest and throat.
	Yearlings	6/16 19	Small dark sow.
	2 years	7/1 8	
6/18	3 years	7/1 3	
	4 years	6/21 3	
	Young adults	6/23 8	
6/18	Adults - Males	7/2 16	
	Females	7/2 22	

1963

Date	Unmarked but Recognizable Bears	Description
6/21	Grizzled Boar (2)	One with white collar.
6/21	Short-eared Boar	One with white throat.
	Brown Boar	Took photos
7/2	Mae West	
	Owl-faced Sow	
7/2	Raoul	Sow is probably No. 48. May have only 2 cubs.
	Fidel - ?	
	Old Mose	

Marked but Unidentified Bears

Small female (bred 6/13) believe No. 81

Grizzled Sow (No. 65) has weaned her 3 yearlings (originally had 4 cubs)

Family No. 89 (cubs 109, 110, and 130) apparently broken up. Cubs 2 years old.

Family No. 25 (cubs 97, 100 and Sow 112) plus 1 unmarked cub broken up. Cubs 2-years old. Sow first bred on June 15, 1963. See notes on breeding history.

Family No. 38 (sow 42, cub 139 and one unmarked cub) apparently broken up. Cubs are yearlings. Cub 139 running with sow No. 132 and 133.

Sow No. 128 had 3 cubs in 1962. Now has only 2 yearlings.

Sow No. 120 appeared at T.C. alone. Apparently has weaned two unmarked yearlings (Family No. 33).

Sow No. 123 has weaned yearlings No. 137 and 138. Have not observed No. 136. This is Family No. 31.

Sow No. 84 has weaned 2-year-olds and is breeding. Bred 6/23. See breeding notes.

1963

July 19. Continued

Sows with Cubs - Trout Creek

Date First Observed	Sow No.	No. Cubs	Description
6/19	15	2	Dark cubs. One has white chest and throat. Small dark sow.
6/12	Unmarked No. 1	3	
6/18	Unmarked No. 2 (Mae West)	2	
6/19	Unmarked No. 3	2	
6/21	39	3	Sow light colored
6/24	Owl Face (2) 148	3	One with white collar. One with white throat. Took photos
7/2	34	2	
7/2	48	3	Sow is probably No. 48. May have only 2 cubs.
7/9	96 Instrumented	2	Cubs dark

Family History Data - 1963

Grizzled Sow (No. 65) has weaned her 3 yearlings (originally had 4 cubs)

Family No. 29 (cubs 109, 110, and 130) apparently broken up. Cubs 2 years old.

Family No. 25 (cubs 97, 100 and Sow 112) plus 1 unmarked cub broken up. Cubs 2-years old. Sow first bred on June 15, 1963. See notes on breeding history.

Family No. 38 (sow 42, cub 139 and one unmarked cub) apparently broken up. Cubs are yearlings. Cub 139 running with sow No. 132 and 133.

Sow No. 128 had 3 cubs in 1962. Now has only 2 yearlings.

Sow No. 120 appeared at T.C. alone. Apparently has weaned two unmarked yearlings (Family No. 33).

Sow No. 123 has weaned yearlings No. 137 and 138. Have not observed No. 138. This is Family No. 31.

Sow No. 84 has weaned 2-year-olds and is breeding. Bred 6/23. See breeding notes.

Bapa took a keen interest in the processing of the bears. Also
July 19. Continued

July 23, 1963

Passed an enjoyable evening getting re-acquainted with Bapa and
Met with Supt. Garrison and Louis Castellum. Introduced Bapa and
discussing old times, old friends and mutual interests. Bapa met Margaret
made arrangements for Bapa to observe activity in the Park and discuss the
and the family, Frank's family and Jim Berthrong. Bapa has been impressed
planning and administration with department heads.
by the Teton scenery.

Bapa saw antelope for the first time and we took photos.

July 20, 1963

The loss cub No. 154 which we shot and marked at Trout Creek on
July 23. Took Bapa sightseeing around Jackson Hole. Saw moose, bald eagles
July 19th arrived at camp with an unmarked sow and 2 littermates. Appar-
and nest, ravens, waterfowl, etc. All new and fascinating for Bapa.
ently cub No. 154 was not captured but only lost.

Visited Jackson in the evening.

Shot No. 7 and No. 96 with CO₂ gun. Immobilized No. 7 but not

July 21, 1963

sufficient to handle. Some experience with No. 96.

Sightseeing around Jenny Lake. Bapa met Supt. Fagergren and we

Discussed Indian Falconry with Bapa.

arranged a later meeting to discuss park problems, administration, etc.

July 24, 1963

Saw western tanager, pine siskins, Swanson's hawks and other birds

Traps contained one cub. We processed it and gave it No. 156.

of interest to Bapa.

Weighed 48 lbs.

Had cocktails with the Balderstons. Doree and her husband, Jim,

The bears are gaining weight rapidly and appear to be at least 2
and family were present. Doree is the daughter of Walt, one
weeks ahead of last year. May be due to the wet spring also to the gener-
of Uncle Gene's old friends.

ally excellent over-wintering condition.

Discussed wildlife conditions in India with Bapa. We have had many

It is noteworthy that following a good foraging summer (1962) and
many things of mutual interest to discuss concerning our work, families,
a bumper white-bark pine nut crop that the yearling survival was the best we
mutual friends, philosophy, world events and always of course falconry.
have ever recorded.

Have been exploring the possibility of a return visit to study the

It is possible that the large bears come out of hibernation in better
tiger or perhaps Asiatic lion.

condition and do not molest the yearlings. The yearlings being in better
July 22, 1963

condition can escape any attacks. We have no direct evidence to support this.

Returned to Canyon lab. Brought Bob Leedy a sparrowhawk ♂.

First year mortality may occur largely during hibernation.

A large boar had been caught in a trap at Pelican Creek Campground.

Attempted to capture No. 96 at Trout Creek for instrumentation.

Weighed 660 lbs. No. 155. Had fresh wounds on throat and back and a pinkish
Immobilized her after dark with 62 mg. of suxovrin. This was not enough.
colored growth on foreleg. Had extreme difficulty immobilizing this bear.

She dropped in creek. We approached with flashlights. She lunged at us and
Marked it with numbered ear tags only.

We returned.

Bear was quite old. Took a blood sample.

Bapa took a keen interest in the processing of the bears. Also

July 23, 1963

but she crossed Trout Creek and then collapsed. We approached

Met with Supt. Garrison and Louis Gastellum. Introduced Bapa and made arrangements for Bapa to observe activity in the Park and discuss the planning and administration with department heads.

Bapa saw antelope for the first time and we took photos.

July 25, 1963
The lone cub No. 154 which we shot and marked at Trout Creek on July 19th arrived at dump with an unmarked sow and 2 littermates. Apparently cub No. 154 was not orphaned but only lost.

Shot No. 7 and No. 96 with CO₂ gun. Immobilized No. 7 but not sufficient to handle. Same experience with No. 96. Used 80 mg. of

succinylcholine. Discussed Indian falconry with Bapa. Hauled her to trap and kept

July 24, 1963

Traps contained one cub. We processed it and gave it No. 156. Both weighed 48 lbs. not completely immobilized.

The bears are gaining weight rapidly and appear to be at least 2 weeks ahead of last year. May be due to the wet spring also to the generally excellent over-wintering condition. 340 lbs. Teeth were in very poor condition.

It is noteworthy that following a good foraging summer (1962) and a bumper white-bark pine nut crop that the yearling survival was the best we have ever recorded.

Immobilized No. 7. She should be an excellent bear to track.

Nov has 2 yearlings. It is possible that the large bears come out of hibernation in better condition and do not molest the yearlings. The yearlings being in better condition can escape any attacks. We have no direct evidence to support this. First year mortality may occur largely during hibernation.

July 27, 1963
Attempted to capture No. 96 at Trout Creek for instrumentation.

Immobilized her after dark with 62 mg. of succinylcholine. This was not enough. She dropped in creek. We approached with flashlights. She lunged at us and we retreated.

Bapa caught 2 fish and enjoyed the sport and

boating. Hit No. 7 again but again failed to fully immobilize her. Also stuck No. 65 but she crossed Trout Creek and then collapsed. We approached her but she had sufficient muscular control that we could not drag her back to the trap. Had to let her go also. A very discouraging and unsuccessful evening. a wild Prairie Falcon, a coyote and a badger.

Many bears were in and Bapa enjoyed the evening.

July 25, 1963

Got some paper work done. at Teton Park and discussed elk manage-

ment and Showed Bapa the Yellowstone Canyon.

Shot No. 40 at Trout Creek. Dose was too light. Returned to

Canyon and Shot No. 7 and immobilized her within a minute. Used 80 mg. of sucostrin, placed a rope on her hind legs and hauled her to trap and kept her there overnight. She fell in Trout Creek.

Waited for No. 96 but she did not show up, neither did No. 65; both shot July 24 but not completely immobilized.

Set one trap. one trap and No. 42 in the other. No. 42 has never

July 26, 1963 been before. She weaned yearlings this year and it will be inter-

esting to Processed sow No. 7. Weighed 340 lbs. Teeth were in very poor condition. She appears to be an old bear (see dental casts). Only one ear

tag remain. Re-marked with white and green rope and green flag. Used 55 mg. of sucostrin. Instrumented No. 7. She should be an excellent bear to track.

Now has 2 yearlings that are still suckling.

Tracked No. 7 from Hill-top station in afternoon. Everything appears to be functioning O.K. near Wrangle Lake.

July 31, Left for Jackson with Bapa to spend the weekend.

July 27, 1963 Shot No. 7 from the base station. Kept her almost continuously

under rope. Ran the Snake River in rubber rafts from Eagle Mt. to Moose. Derek, Charlie and Frank in one raft; Bapa, Karen and I in second raft. Made a good catch of trout and whitefish. Bapa caught 2 fish and enjoyed the sport and

Shot No. 6 with 65 mg. of succinyl. She crossed creek, drug took boating. Saw one bald eagle, some buteos and ravens. effect but failed to immobilize her.

July 28, 1963

Shot No. 34 with 80 mg. Put her out nicely. Re-marked in the right Frank ran the river with Esther, Jana, Johnny, Lance and Wim Berthrong. ear with yellow rope and orange tape.

Bapa, Margaret, I and family went to String Lake and then to Refuge.

Shot No. 39 with 80 mg. Dose was too heavy but she came out O.K. Bapa saw a wild Prairie Falcon, a coyote and a badger.

No. 39 had one cub. This cub remained with her while we ear-tagged and colored by radio. Olaus Murie is very ill. Tried to see him in hospital.

marked the sow. He tried to suckle while the sow was under the effect of the July 29, 1963

drug and we had to watch him carefully. Could not drive him away. We suspected that the 2 cubs marked July 30 belonged to this sow and were litter ment and research with him, Glen Cole and staff. mates of the cub.

Visited with Marty Murie but was unable to see Olaus. Returned to Canyon arriving at 11:30 P.M. While Maurice and Bob Leady worked on No. 39, I dropped down to Trout Creek where we had No. 128 down. We had shot No. 39 and No. 128 in side.

Frank, Maurice and crew captured No. 96 and removed radio collar rapid succession each with 80 mg. of succinyl. No. 39 collapsed in the pit and then released her. She fell in Trout Creek. and No. 128 collapsed in the middle of Trout Creek. I had difficulty in

Set 2 traps. pulling No. 128 out of the water. She weighed considerably over 300 lbs. July 30, 1963

Though nearly drowned when I pulled her out, she began recovering rapidly. Had 2 cubs in one trap and No. 42 in the other. No. 42 has never Another sow and a young bear approached. Shouting failed to turn the sow. been recaptured before. She weaned yearlings this year and it will be inter- She moved steadily toward me. I was holding sow No. 128's head out of the esting to determine if she bred this year. Will check for cubs next year. water and was in an awkward and dangerous position. I fired a shot from the No. 42 originally had 2 ear tags and 2 polyvinyl tape markers. Only one ear 357 when the approaching sow was 30 yds away. This did not deter her. I tag remained. Remarked with red and white rope and blue flag.

left sow No. 128 in mid stream but on a shallow bar and scrambled up the

Set 2 traps. steep stream bank to a position less vulnerable.

Took Mrs. Nichols and guests to Trout Creek. the bear hallway in

The cub from sow No. 39 was howling at a great rate over the hill. The trap. Tracked No. 7 most of the day from Headquarters and vicinity. She This was agitating the oncoming sow. She finally stopped. Maurice and Bob appears to be bedded down near Wrangle Lake.

Finished marking No. 39 and came over to my assistance. We dropped down July 31, 1963

again to the stream, but No. 128 had nearly regained her feet and we had Tracked No. 7 from the base station. Kept her almost continuously to retreat. It was nearly dark when we left. under radio surveillance.

Frank and crew hiked to Wrangler's Lake but failed to pick up signal there. We continued to get signal at base.

Shot No. 6 with 65 mg. of sucostrin. She crossed creek, drug took effect but failed to immobilize her.

Trout Creek - Hit No. 128 with 80 mg. of sucostrin, but this did

Shot No. 34 with 80 mg. Put her out nicely. Re-marked in the right not immobilize her. Suspect the drug did not inject. ear with yellow rope and orange tape.

Hit No. 31, a ♂ littermate of No. 6 with 60 mg. of sucostrin. Both

Shot No. 39 with 80 mg. Dose was too heavy but she came out O.K. No. 6 and No. 31 are offspring of sow No. 7 which we are currently tracking No. 39 had one cub. This cub remained with her while we ear-tagged and color by radio. She now has 2 yearlings. No. 6 and No. 31 were born in 1979 the marked the sow. He tried to suckle while the sow was under the effect of the first year of the study.

drug and we had to watch him carefully. Could not drive him away. We sus-

When we hit No. 31 she rolled to the bottom of the trap. Put a spect that the 2 cubs marked July 30 belonged to this sow and were litter rope around one hind leg and hauled him up the slope using the car. As was mates of the cub.

not fully immobilized and half way up he braced one hind leg against a ledge

While Maurice and Bob Leedy worked on No. 39, I dropped down to and the car wheels spun. We slackened the rope and jerked him free to one Trout Creek where we had No. 128 down. We had shot No. 39 and No. 128 in side, then placed tension on the rope immediately and hauled him to the brink. rapid succession each with 80 mg. of sucostrin. No. 39 collapsed in the pit I injected 20 cc. of sucostrin as he was rapidly gaining control and power. and No. 128 collapsed in the middle of Trout Creek. I had difficulty in We hauled him to the open trap and in the excitement and frenzied activity pulling No. 128 out of the water. She weighed considerably over 300 lbs. of the moment we forgot the trap was set and the heavy drop door lightly set. Though nearly drowned when I pulled her out, she began recovering rapidly. Maurice grabbed No. 31 by the scruff of the neck and I grabbed his Another sow and a young boar approached. Shouting failed to turn the sow. "name" and we hoisted him head first into the trap. Suddenly Maurice, She moved steadily toward me. I was holding sow No. 128's head out of the who had set the traps earlier realized the door was free. Both he and I water and was in an awkward and dangerous position. I fired a shot from the had our head and shoulders in the back end of the trap, grappling with the 357 when the approaching sow was 50 yds away. This did not deter her. I struggling bear while other members of the crew pushed on his hind quarters. left sow No. 128 in mid stream but on a shallow bar and scrambled up the Lance stood on the trap ready to drop the door, but unaware that the cable steep stream bank to a position less vulnerable.

was not attached. Both Maurice and I withdrew leaving the bear halfway in

The cub from sow No. 39 was bawling at a great rate over the hill. the trap. Fortunately the second dose of 20 mg. took effect and the bear's This was agitating the oncoming sow. She finally stopped. Maurice and Bob struggle subsided just enough to enable us to secure the cable, securing the finished marking No. 39 and came over to my assistance. We dropped down door and then shove him entirely into the trap.

aggin to the stream, but No. 128 had nearly regained her feet and we had

We realized the danger and knew we had been lucky, because a slight to retreat. It was nearly dark when we left.

Jar could have brought the "guillotine-like" gate down on our backs. We hav

August 1, 1963

Trout Creek - Hit No. 128 with 80 mg. of sucostrin, but this did not immobilize her. Suspect the drug did not inject.

Hit No. 51, a ♂ littermate of No. 6 with 60 mg. of sucostrin. Both No. 6 and No. 51 are offspring of sow No. 7 which we are currently tracking by radio. She now has 2 yearlings. No. 6 and No. 51 were born in 1959 the first year of the study.

When we hit No. 51 she rolled to the bottom of the dump. Put a rope around one hind leg and hauled him up the slope using the car. He was not fully immobilized and half way up he braced one hind leg against a ledge and the car wheels spun. We slackened the rope and jerked him free to one side, then placed tension on the rope immediately and hauled him to the brink. I injected 20 cc. of sucostrin as he was rapidly gaining control and power. We hauled him to the open trap and in the excitement and frenzied activity of the moment we forgot the trap was set and the heavy drop door lightly set. Maurice grabbed No. 51 by the scruff of the neck and I grabbed his "mane" and we hoisted him head first into the trap. Suddenly Maurice, who had set the traps earlier realized the door was free. Both he and I had our head and shoulders in the back end of the trap, grappling with the struggling bear while other members of the crew pushed on his hind quarters. Lance stood on the trap ready to drop the door, but unaware that the cable was not attached. Both Maurice and I withdrew leaving the bear halfway in the trap. Fortunately the second dose of 20 mgs. took effect and the bear's struggle subsided just enough to enable us to secure the cable, securing the door and then shove him entirely into the trap.

We realized the danger and knew we had been lucky, because a slight jar could have brought the "guillotine-like" gate down on our backs. We hav

been careful of this in the past, and resolved after this episode to be even more careful in the future. Tracked No. 7 from Mt. Washburn. Photographed Mt. sheep. Should have gotten some good photos of the lambs.

August 2, 1963 Processed No. 51. Took dental casts, foot cast and blood sample.

Bear started coming out of the penta before we got the foot impression. Gave 2 injections of 5 cc's of penta about 15 minutes apart and this put the bear back to sleep so we could take the paw impression. For data we see the form sheets.

Tracked No. 7 from the station and from Mt. Washburn. She crossed the canyon of the Yellowstone last night. Shot No. 128 and color marked her. Used 80 mg. First shot of 80 mg. did not immobilize her. Dart hit the hump. Second shot of 80 mg. brought her down. When we got to her we found that the first dose had injected. This must have been absorbed very slowly as she showed no effect. Total dose for this bear was 160 mgs. She was on her feet and O.K. when we left. We hit one of her yearlings but the dosage did immobilize the young bear. Used 40 mg. of sucostrin. No. 128 has 2 yearlings neither of them marked. Inge No. 12 arrived about dark. The continual shooting each evening and accompanying disturbance does not seem to be disturbing the bears greatly.

Bapa left with Supt. Garrison for a weekend trip on the lake.

August 5, 1963

Visitors drove us nearly to distraction. They kept appearing all day. First Mike and Dick, then Joel Varney, then Bob Hunkel and his wife, Dick Carson and other T.P. Co. employees.

August 3 and 4, 1963

Took the family to Frank Island. Had a grand weekend. Caught 70 or 80 trout between all members - Maurice and family, Margaret, Johnny, Karen, I, Jim Berthrong and Bob Leedy.

Suspect there are at least 20 osprey nests on the island. Counted 12.

Set 2 traps at Trout Creek.

August 5, 1963

Spent the morning tracking No. 7. Signal is coming in well but we are having trouble locating her on the ground.

August 7, Bapa wished to shoot a grizzly with the Cap-chur gun. Selected No. 75 for a target. The dart did not fly true and Bapa got a rump hit. The 80 mg. had no effect in the heavy layer of fat. Apparently drug was absorbed too slowly.

Bapa hit No. 44 and she dropped in one minute from 80 mg. of succos-trin. The effect wore off rapidly and she began to snap and thresh about after 7 minutes. Had to sit on her and color mark and ear tag. While busy with this and being helped by Karen and Lance a show separated from her cubs suddenly charged up the hill directly at us. The rest of the crew who were standing idly by bolted for the vehicles. Few of us could have made the cats but fortunately the sow came to an abrupt stop 30 or 40 yards away and then retreated. I had the 357 but it would have been difficult to have used it. It was too close a call and I am going to limit the number that accompany us next time. I couldn't work on the bear and watch for intruding grizzlies too.

Placed a blue and white rope in the right ear.

August 6, 1963

Visitors drove us nearly to distraction. They kept appearing all day. First Mike and Dick, then Joel Varney, then Bob Henkel and his wife, Dick Carson and other Y.P. Co. employees.

August 6, 1963

Gave a story on our work to Bob Henkel for Y.P. Co. publicity purposes.
attended meeting.

Shot No. 40 Marion. Used 70 mg. of sucostrin. Dropped her in about three minutes across the creek. When we got to her she could stand. I quickly loaded 30 mg. and shot her in shoulder. The second dose took effect after she had walked 50 or 60 yds. Hauled up the bank and put her in trap. Will instrument her.

Set one trap.
Jim Berthrong and Bapa. We caught a nice mass of fish.
Worked late getting a transmitter assembly ready.

August 7, 1963

About a week ago we decided that No. 7 had lost her collar.
Had a large boar in the trap. Crop-Ear.
Finally tracked it down and located it. Found it in perfect condition.
Instrumented No. 40 and thoroughly processed her. Took some movies of the procedure but light was poor.

No. 7 still sending signal from the general area of Sour Creek.
Had planned to fly in the helicopter with Bapa and arose early to do so. Had to postpone trip due to breakdown of helicopter.
Saw 11 moose at mouth of Pelican Creek.
Took photos of mule deer.

Maurice and Bapa made a count of grizzlies at Rabbit Creek.
Frank and crew tracking No. 7.
August 8, 1963

Left for Missoula for conference with President Frank Abbott and Dean Robert Coonrod. Bapa, Jim Berthrong and Karen accompanied me.
Gene Peterson arrived to take movies of processing Crop-Ear. He is a middle-aged boar, weighed 640 lbs. Gave him No. 159.

August 15, 1963

Had set 2 traps on August 14 but got no bears so took off for another fishing trip.

August 9, 1963 Jim V., Maurice, Derek and I went down 3 Mile. We made a nice catch. Spent the day in the office getting off correspondence, and attended meeting.

Showed Bapa around. He was very impressed with Missoula.

August 10, 1963 Bapa was on dump. She came out of drug quickly and we had great diff. Returned to Yellowstone via the Big Hole. Her hair was short.

August 11, 1963 got a grip. All three of us - Frank, Maurice and I, were winded and. Fished in the Canyon at 3 Mile. Karen went with me, also Pete, Jim Berthrong and Lance. We caught a nice mess of fish.

August 12, 1963 Bapa was on dump. She came out of drug quickly and we had great diff. Almost a week ago we decided that No. 7 had lost her collar.

Finally tracked it down and located it. Found it in perfect condition.

August 13, 1963 Bapa was on dump. She came out of drug quickly and we had great diff. Tracked No. 40 most of the day.

Had Garrisons to dinner. Frank was not feeling well, so Bapa, Margaret and I did the honors.

After supper Bapa showed slides of Indian wildlife. I took

Margaret, Derek and Johnny arrived.

August 14, 1963 Bapa was on dump. She came out of drug quickly and we had great diff. Captured No. 143, a female weighing 185 lbs. Took movies of this bear which was a recapture. Took blood and mixed it with heparin for chromosome work.

Took pictures today. Fortunately I sent all of them back to the base. Tracked No. 40. Sent blood specimens to Dr. Otto Stein and Dr. Donald Wimber.

Took Bapa on a helicopter flight. Saw bison, moose, elk, deer, coyotes. Lake captured a large black bear. We are holding it for testing.

August 15, 1963 Bapa was on dump. She came out of drug quickly and we had great diff. Had set 2 traps on August 14 but got no bears so took off for a

fishing trip.

Bapa is arriving tomorrow. Will leave for Moose. Bapa leaves

Sunday noon.

August 17, Joel, Jim W., Maurice, Derek and I went down 3 Mile. We made a nice catch but had to work for them. Maurice caught one weighing $4\frac{1}{2}$ to 5 lbs. 18, 1963

Returned from Canyon fishing and went straight to Trout Creek.

Shot sow No. 75 on dump. She came out of drug quickly and we had great difficulty manhandling her into the culvert trap. Her hair was short and we couldn't get a grip. All three of us - Frank, Maurice and I, were winded and bushed when we finally got the struggling sow safely into the trap and the door down.

Shot 112 but she escaped in the dark. ~~near the Wildlife Extension~~

August 16, 1963

August 21, Processed No. 75 and instrumented her.

Took movies of the process. Waited until she recovered in order to get movies of her coming out of the drug.

August 22, She raised and sat up remaining in this attitude for 15 minutes. Maurice backed one of the vehicles toward her and she suddenly charged by, passed his car and went for Frank's car, then swung back toward me. I took movies of the episode. In spite of the drug she moved with terrific speed. I asked Maurice to back up and she charged again this time raking the back door of the Ford with a terrific slap. She mounted the back end and then fell off. Should have made some good action. ~~rope and Bob Leedy and I~~ managed to Crew took pictures today. Fortunately I sent all of them back to the base. The bear moved so fast and so unexpectedly that someone would probably have been hurt had we had the entire crew around. I am always amazed at the speed and agility of these animals. ~~approaching the area. No.~~ 65 finally Lake captured a large black bear. We are holding it for testing. With a new drug SERNYLAN, ~~hitch and 5 to 12 feet of rope around each hind foot.~~

This was 11 Both No. 40 and No. 75 are coming in - the signals strong for both.

Morgan is arriving tomorrow. Will leave for Moose. Bapa leaves Sunday noon.

August 17, 1963

this manner. There is little doubt but that she will chew off the rope, but

Tracked No. 75 (see tracking notes) Took Bapa to Moose.

we felt bad about letting her depart in this manner. She would have been an

August 18, 1963

excellent bear to instrument.

Bapa spent the day with the family taking photos and visiting

Scenic Area on Black Bear at the Tower Dump. Counted over 24

scenic areas in Jackson Hole.

black, some of them very large bears.

August 19, 1963

Hit a small 300-lb. bear. Dose was just sufficient to allow us to

Returned to Canyon Station.

approach and handle the bear. Bear, however, could stand but did not appear

Prepared for meeting with Commission.

to know where it was and had difficulty maintaining its equilibrium. Doubt

August 20, 1963

if it could see judging on the lack of optic reflexes.

Met with Fish and Game Commission concerning the Wildlife Extension

While the young bear was so immobilized a huge bear examined him

program.

thoroughly. Suddenly at first and then more boldly the large bear mopped at

August 21, 1963

the abdomen of the drugged bear which was lying on its stomach, legs pulled

Captured yearling No. 162. This yearling was in very poor condi-

up and in a cowering attitude. The large bear finally took a healthy bite

tion. We processed it and released.

and at this point I heaved a rock and chased him away. Believe he would have

August 22, 1963

chewed the young bear open while he was helpless. When we have immobilized

Shot No. 65, the Grizzled Sow at Trout Creek with Cap-chur gun.

grizzlies they show no interest in the downed animal and never have shown

She collapsed in the bottom of the trough. It was nearly dark and numerous

any inclination to attack.

other grizzlies were about. Maurice and I descended the embankment and

August 23, 1963

roped her by the hind legs. Tried to pull her out of the gulley but stalled

Re-anesthetized No. 162 and immobilized with Sernylan. With this drug

the vehicle each time. Three times we managed to get her half way up the

the bear has somewhat more control than when under the influence of succinylcholine.

60° slope but no further. Had to cut the 7/8" rope and Bob Leedy and I

It salivates profusely, the tendons of the feet seem to contract and it

managed to hold the bear until Maurice could back the truck for a shorter

struggles or sways from side to side continuously unless given a very heavy

pull. We hurriedly tied the rope together each time but the slope was too

steep when it is completely immobilized.

steep and the bear too heavy. We were working madly against time as the

Hit Samneek at Rabbit Creek with 300 mg. of succinylcholine, intending

drug was wearing off and other bears were rapidly approaching the area. No.

to kill him for blood samples and autopsy. He dropped in the Rabbit Creek

65 finally became too active and dangerous to handle. We were forced to cut

the rope leaving a clove hitch and 8 to 12 feet of rope around each hind foot.

vertically 12 to 15 feet high. There were numerous grizzlies around and

This was the first time we had ever been forced to let a bear go impeded in

they could be on top of us before we knew it. The timber extends to the edge

of the pit and the caves, was all to the bear's advantage.

Scarnedk walked rapidly from the 300 mg. dose while we were taking this manner. There is little doubt but that she will chew off the rope, but we felt bad about letting her depart in this manner. She would have been an excellent bear to instrument.

Tested Sernylan on Black Bear at the Tower Dump. Counted over 24 blacks, some of them very large bears.

Hit a small 200-lb. bear. Dose was just sufficient to allow us to approach and handle the bear. Bear, however, could stand but did not appear to know where it was and had difficulty maintaining its equilibrium. Doubt if it could see judging on the lack of optic reflexes.

While the young bear was so immobilized a huge boar examined him thoroughly. Gingerly at first and then more boldly the large bear snapped at the abdomen of the drugged bear which was lying on its stomach, legs pulled up and in a cowering attitude. The large boar finally took a healthy bite and at this point I heaved a rock and chased him away. Believe he would have chewed the young bear open while he was helpless. When we have immobilized grizzlies they show no interest in the downed animal and never have shown any inclination to attack.

August 23, 1963

Recaptured No. 162 and immobilized with Sernylan. With this drug the bear has somewhat more control than when under the influence of sucostrin. It salivates profusely, the tendons of the feet seem to contract and it struggles or sways from side to side continuously unless given a very heavy dose when it is completely immobilized.

Hit Scarnedk at Rabbit Creek with 300 mg. of sucostrin, intending to kill him for blood sample and autopsy. He dropped in the Rabbit Creek pit, a very dangerous place to work as the walls on two sides are almost vertically 12 to 15 feet high. There were numerous grizzlies around and they could be on top of us before we knew it. The timber extends to the edge of the pit and the caves, was all to the bear's advantage.

Scarneck rallied rapidly from the 300 mg. dose while we were taking a blood sample. He is a tremendous bear weighing 1,000 to 1,200 lbs. All of us agreed that he was a much larger bear than any we have previously captured including No. 12 (Inge) and Scarchest No. 1.

Close inspection of Scarneck when he was down showed that he was not an old bear as we had thought but in his prime - perhaps 15 years old. Suspect it takes 8 to 10 years for a large bear to reach maximum age and Scarneck was a very large specimen when we began the study in 1959.

As Scarneck struggled in the light of the torch to get up we had to decide whether to let him go or take him as a specimen as originally intended. Maurice, Bob Leedy and I were present. I decided to go ahead with our plan and quickly injected another 300 mgs. of sucostrin to finish him quickly. This put him out again but it became evident in about 20 minutes that he was not going to die. Some of the sucostrin was apparently absorbed slowly through the fat. When Scarneck rallied again sentimentality got the best of us and we decided to let him come out of it. As a result we got no weight on Scarneck but after about 3 hours Scarneck moved off apparently none the worse for the experience.

Will have to sacrifice some other old bear for the blood studies - perhaps Short-ear.

Had been in a dangerous situation for several hours and we were relieved to get out of it in one piece, but even more at peace with ourselves because we hadn't killed an old acquaintance, regardless of how much he might have contributed to the study.

August 24, 1963

Flew with Jerry Nolan in the helicopter over the Trout Creek area. Had previously triangulated on instrumented bears and located approximate positions. Was able to "pin point" the bears from the air (see radiotracking notes of August 24).

Shot Peg Leg No. 76 at Trout Creek. He collapsed 150 to 200 yds. across Trout Creek. Gave him a second shot of sucostrin as he was getting up. Dragged him to other side of Creek. Drove pickup down the embankment and loaded Peg Leg with the winch. Unloaded him and got him into the trap where he spent the night. Had to inject penta in order to keep him immobilized so we could handle him.

August 25, 1963

Did not process No. 76 today as we wanted the effects of the penta to wear off completely before using it again.

Shot movies of bear work with Gene Peterson.

August 26, 1963

Instrumented No. 76 and took movies of the procedure. For details of instrumenting, see Radiotracking notes. Took foot and dental casts as well as blood sample. N.P.S. captured a yearling in the Canyon Housing Area. We earlier tried to shoot it with CO₂ gun without success.

August 27, 1963

Captured No. 162 in trap at Trout Creek and released it.

August 31, 1963

Processed the yearling captured by N.P.S. (No. 163). Used 60 mg. of Serrylan.

Continued filming with Gene Peterson.

The N.P.S. captured the two orphans that belonged to the sow earlier captured and shipped to zoo from the Old Faithful area. Sent both cubs off without contacting us so we got no information.

August 28, 1963

Recaptured No. 162 again and released her. This was the sixth time in eight days.

Worked on movies with Gene Peterson. We are fast becoming a zoo.

Neal Gusse arrived to study radio work.

Had dinner for Straight family.

Tracked No. 40.

August 29, 1963

Have three bears instrumented. Keeping us busy monitoring them from the field station, base and mobile unit. Can detect all three signals at one time, determine signal strength and direction and triangulate.

Gene Peterson and family left. We shot about 2,000 ft. of movies - most of it good.

Had a busy day at the office.

August 30, 1963

Tracked bears in morning. John Thune at 26 high school students arrived. Spent several hours showing them around and explaining work.

A group of Africans arrived before Thune departed. Spent several hours going over the work/^{with}them. All were keenly interested and asked intelligent questions.

Jerry McGahan and Dick Ellis arrived to work on their projects. Jerry has been studying the Golden Eagle and Dick is working on the elk.

August 31, 1963

Worked around the lab. Family arrived from Jackson with the car full of pets. Johnny has been with me the past five or six days and has added one mouse, two red squirrels and one chipmunk to the menagerie.

The tally is now:

- 1 Golden eagle
- 1 Osprey
- 1 Magpie
- 1 Sparrowhawk
- 1 English Sparrow

and the new members Johnny has acquired.

Jim Wiley left for California. He left the Prairie Falcon so she too is added to the list and Jerry McGahan brought two more Golden Eagles with him. We are fast becoming a zoo.

September 1, 1963. I retrieved the camera while the bear was occupied with the copter. Worked around lab on odd jobs in morning. Groggy from the drug but

sufficient. Captured No. 7 at Trout Creek using 95 mgs. of sucostrin. We lost her on a previous attempt and it looked as if we were going to have plenty of trouble again. She collapsed on the steep bank of Trout Creek, but was not sufficiently immobilized that we could handle her. Injected another 50 mgs. of drug with the Cap-char gun and then she lurched and rolled down the embankment into the creek. After the second dose took effect we had to haul her out of the water to keep her from drowning. With lots of manpower available we were able to put a rope on her and haul her up the steep bank and load her into a culvert trap. Had to administer penta when we had her half way up the slope. Lots of activity and excitement. Held her over night. with Bob

Howe. Worked most of the night to get a radio collar ready for No. 7.

September 2, 1963 with Mr. and Mrs. Frank Goodyear.

Instrumented No. 7 in the afternoon, took blood sample and other data. No. 7 is a fairly old bear. in right forefoot. Foot pad was

severely. Several weeks ago her yearlings were still running with her. We noted that she had weaned them. This is the first record of a weaning so late in the season. It may be due to fact that we recaptured her earlier and instrumented her. in copter from Morris Junction to Pean Pass and Electric Peak.

Arranged for Jerry Nolan to land helicopter where we were working at Trout Creek so we could take some movies from the air as she came out of anesthesia. The penta lasted longer than we anticipated, perhaps because she was not entirely free of the dose administered the evening before.

The helicopter left and then returned. No. 7 had been sleeping peacefully but the noise of the copter aroused her and she charged suddenly without warning hitting the back end of one of our vehicles. Everyone rushed for cover and the pilot hastily lifted the helicopter off the ground. No. 7 then charged the hovering helicopter, knocking my camera and tripod

over as she took off. I retrieved the camera while the bear was occupied with the copter. Took movies of the old sow, still somewhat groggy from the drug but sufficiently revived that she could stand up and defy the copter and all of us who had sought shelter in the vehicles. At an opportune moment I made a dash for the copter, got in and did some filming from the air.

Tracked No. 7 from the air for a while and located 2 of the other instrumented bears No. 75 and No. 76. These we had earlier located from the ground and simply verified their position from the signals obtained in the helicopter.

All in all it was a busy afternoon.

September 3, 1963

Laid plans and discussed the elk winter movement study with Bob Howe. Previously had drawn up objectives for the study.

Visited with Mr. and Mrs. Frank Goodyear.

Maurice shot and immobilized No. 135, one of No. 75's yearlings. Removed a tin can that had imbedded in right forefoot. Foot pad was severely cut and infected.

Tracked instrumented bears.

September 4, 1963

Flew in copter from Norris Junction to Faun Pass and Electric Peak. Saw elk above timber line. One was color marked. Country was beautiful.

Landed at Mammoth, then flew north of Park boundary between Hell

Roaring and Bear Creek. Country was rugged and beautiful. Signs of elk there in early summer but we saw none.

Flew back around Electric Peak and Holmes Peak and saw another

marked elk.

Tracked instrumented bears. Frank and Maurice went in on No. 76 and

No. 75 north of Dump. Both were in heavy timber.

September 5, 1963

Went fishing in the Canyon. Hiked several miles downstream, looking over the rapids. Can be run with rubber rafts.

September Immobilized No. 12 Ingomar with 225 mg. of sucostrin. Inge dropped across Trout Creek, hard hit by the drug. Took blood sample. Estimated his weight at 900 lbs. Examined No. 12 closely and could find no scars on abdomen. Feel certain that Scar Neck is a heavier bear than Inge, perhaps 100 to 200 lbs. heavier. Have been working with them off and on for a week.

When coming out of the sucostrin No. 12 rolled into Trout Creek. Had difficulty holding his head up. Thought we might have real trouble, but Inge rolled on his back and in this position his head remained upright above the water and all four feet protruded so that all we could see from above was a head and four foot pads. He remained in this position in one of the deeper holes of Trout Creek until he could turn over, hold his head erect and climb up the bank. It was pitch dark before Inge crawled out of the water.

After leaving Inge, Mike and Dick drove the pickup rapidly up the road above the dump. No. 148, a sow with 3 cubs became alarmed and charged up the incline probably partially blinded by the headlights. She dashed full speed into the oncoming vehicle striking the left front fender just behind the headlight. The impact killed her instantly. Three collared cubs are thus orphaned. 76 is now east of Mt. Washburn. The radio tracking showed

September 6, 1963 on valley September 7, was south of Washburn east of Cascade

Autopsied No. 148, Owl-faced Sow. She weighed 415 lbs. Washburn on

September See detailed autopsy notes. One lung was adhered to body cavity.

September 7, 1963 on September 10th. By the 11th he was across the Yellow-

stone Maurice left for Missoula. Worked around lab. Washington the Park

Left for Jackson.

September 8, 1963.

Put Frank on plane for Chicago. Discussed Osprey-training deal with Ken Nelsen. Purchased radio parts and equipment.

September 9, 1963

Worked on Raptor paper then returned to Lab.

September 10, 1963

Worked with Jerry McGahan, Dick Ellis, Mike Stephen, and Bob Ruff on their theses. Have been working with them off and on for a week.

Continued radio tracking No. 7. Moved across the Yellowstone River near Sulphur Mountains and No. 76 is moving north around Washburn Mountain.

Rafter river at Sulphur Mountain and tracked No. 7. Hiked east about 1 mile into dense timber. Signal indicated we were quite close to No. 7 but the portable receiver was not functioning well so we did not attempt to approach close and jump the bear.

Jim Lipscomb discussed the possibility of doing a television film of our work for CBS.

Went to dump but did not see No. 6 so did not shoot any bears.

Saw No. 40 whose radio has gone dead and also No. 75. This accounted for all instrumented bears.

September 11, 1963.

No. 76 is now east of Mt. Washburn. The radio tracking showed that he left Hayden Valley September 7, was south of Washburn east of Cascade Lake on September 8, moved east of Tower Creek and west of Mt. Washburn on September 9th, then down Tower Creek or along the high country below Folsom and Prospect Peaks on September 10th. By the 11th he was across the Yellowstone River in the vicinity of Specimen Ridge.

September 12, 1963. The white-bark pine and limber pine nut crop is practically non-existent. It was to be expected after the bumper crop of last season.

No. 76 went east over the ridge and we were unable to pick him up.

Tracked No. 7 and No. 75. (1963) has been unusually wet and warm. As a result there has been considerable "greening up" and green vegetation is still available.

Osprey flying better.

September 13, 1963. The general late summer and the fall food source for grizzlies has been poor. They are travelling far in search of food. The voles seem to be the most abundant source of food and we have frequently watched grizzlies

September 26, 1963

hunting mice and also seen many signs where they have dug them out of their shallow burrows. Tried to recapture No. 40 at the Dump to re-instrument but no bears were there.

September 26, 1963. Unless a decline in the voles occur from disease or some other factor during the winter, there will be a peak population of near plague

No. 76 has travelled east of Mt. Washburn and we have been unable to pick up a signal for several days. Suspect he may be at the head of Pelican Creek or at Cache Creek. It is interesting that in the five years of study of the grizzlies-

berries were the staple late-summer and fall food one year, pine nuts two years and meadow mice one year (check notes for 1959-63).

No. 7 also moved east and now is apparently out of range. No. 75 is still inhabiting the heavily forested area to the south of the Field Station. Her signal is good.

of Sulphur Mountain. It appeared very probable that a bear had made the kill.

FOOD

I suspect the grizzlies kill bull elk by stalking them and wounding them while they are bedded down or else they attack one after it has been fighting another bull elk and is either tired or wounded or both. A very high population of field mice (*Microtus* sp.) has been evident in Hayden Valley and in other parts of the Park since early spring. The population has built up during the summer and now appears to be at a or near a peak.

Large numbers of Fer. Roughlegged Hawks, Swainson's, Red-tails and Short-eared Owls have moved in to take advantage of this food supply. Large numbers of ravens also are feeding on them. The elk was still warm and the bear had just started to feed. A light snow was on the ground. There was evidence that the cow had

We had a wet spring with luxuriant growth. This appeared favorable to the bears as they put on weight rapidly.

September 27, 1963

The berry crop (*Vaccinium*) was generally poor throughout the Park and furnished relatively little food.

Located No. 7 up Pelican Creek. Frank and Maurice shot an elk to try and hold her there. Signal was good.

Dr. Vince Schaefer and wife dropped in to see us at the lab.

The white-bark pine and limber pine nut crop is practically non-existent. This was to be expected after the bumper crop of last season.

September (1963) has been unusually wet and warm. As a result there has been considerable "greening up" and green vegetation is still available.

In general the late summer and the fall food source for grizzlies has been poor. They are travelling far in search of food. The voles seem to be the most abundant source of food and we have frequently watched grizzlies hunting mice and also seen many sign where they have dug them out of their shallow burrows.

Unless a decline in the voles occur from disease or some other factor during the winter, there will be a peak population of near plague proportion (for this type habitat) next spring.

It is interesting that in the five years of study of the grizzlies-berries were the staple late-summer and fall food one year, pine nuts two years and meadow mice one year (check notes for 1959-63).

Located a kill of a bull elk across the Yellowstone River due east of Sulphur Mountain. It appeared very probable that a bear had made the kill.

I suspect the grizzlies kill bull elk by stalking them and pouncing on them while they are bedded down or else they attack one after it has been fighting another bull elk and is either tired or wounded or both.

Lucky Pelton told of coming upon a large bull elk in the midst of a windfall that had just recently been killed by a sow grizzly and a yearling or a two-year-old. The elk was still warm and the bear had just started to feed. A light snow was on the ground. There was evidence that the sow had sneaked upon the elk and attacked while the elk was bedded down.

September 27, 1963

Located No. 7 up Pelican Creek. Frank and Maurice shot an elk to try and hold her there. Signal was good.

Dr. Vince Schaefer and wife dropped in to see us at the Lab.

been caught. Drove to Trout Creek just after dark to try and shoot No. 40 and re-instrument her.

September No. 7t and her two yearlings arrived. She was nervous and paced around. Her signal has been getting weaker so we decided to try and immobilize her. We set the trap and watched her closely, intending to administer the pent. She is unpredictable and dangerous. The other day she charged the pickup as it crossed the flats. Mike and Maurice were in it; she chased them for one-half mile. She did not respond at first, but then suddenly lurched up and ran. We were concerned that she might charge the car when shot with the dart. It appeared she had been "playing possum" and had recovered considerably from the Hit her in the neck with 90 mgs. She swung instantly and attacked a sow next to her. They fought viciously for one-half minute then No. 75 climbed up on the bank and the drug took effect. She fell and rolled down the slope, the drug taking full effect in about 1 to 1 1/2 minutes. The operation went smoothly. I tied clove hitches around her hind legs with the 3/4" rope while Maurice hitched up the trap to the pickup and brought the trap to the edge of the bank. Frank kept watch and tied the rope to the bumper of the pickup. Maurice pulled forward, the bear came up the slope rear end first and I guided her to the side of the trap. We untied her and pulled and shoved her into the trap, then dropped the door. Frank took a few flash pictures as she began coming out of the drug. One-half hour from the time she was shot she had regained the use of her muscles and we were on our way back to the Lab. Will re-instrument her in the morning. We were fortunate that when hit she turned on the nearby sow. Had she come at the vehicle only 40 ft. away we would not have had time to move away from the open window or to shoot her or probably not even had time to turn on the ignition. This same bear charged our vehicles several times when she came out of the pen on August 16th. We instrumented her at this time and I took movies of her charging. She has no fear of vehicles and we have

been cautious when tracking her in heavy cover. She is all bear and not one to fool with. We had great respect for No. 75 as she was the epitome of grizzly nature. Her two yearlings were still nursing. She weighed 375 lbs. and was in good condition but not fat.

September 28, 1963
Injected No. 75 with 60 mgs. of sucostrin. This hit her quite hard and so we opened the trap and watched her closely, intending to administer the penta only when she was breathing regularly and deep and could begin to stand her ground against any of the other cubs and even the large bears. She raised her head. Maurice pinched her buttocks to determine how she was reacting to the drug. She did not respond at first, but then suddenly lurched up and came out of the back end of the trap before we could drop the gate.

October 5, 1963
We realized she had been "playing possum" and had recovered considerably from the effect of the drug. It was obvious we could not handle her and she was gaining strength rapidly. We quickly loaded a propulsive syringe with 35 mg. and moved in close enough to hit her in the neck as she reared up.

She settled down with her head on her paws and eyed us. The second dose of sucostrin gradually took effect but it was obvious that the initial dose

was being hydrolyzed as rapidly as the new dose was taking effect. The net result was that No. 75 was still in no condition to be handled and what was even more serious we could not be certain if she was "playing possum" again.

We hit her with another 40 mg. and then finally immobilized her nicely. We waited some time and when she was losing the effect of the sucostrin we administered 20 cc's of pentobarbital sodium.

October 7, 1963
This put her to sleep and she seemed to be doing fine. Then we noticed her respiration rate had dropped considerably and continued to do so until it reached about two respirations per minute. We then administered artificial respiration until her breathing became more rapid and deep.

We thought we had her over the hump when she suddenly stopped breathing and we could detect no heart beat. Gave artificial respiration again but No. 75 died.

It is interesting that No. 150 and No. 48 each have apparently adopted (for a time at least) cubs of the Owl-faced scow. This is the scow

that was Apparently the combination of drugs was too much for an old bear. We had great respect for No. 75 as she was the epitome of grizzly nature. Her two yearlings were still nursing. She weighed 375 lbs. and was in good condition but not fat.

For details see autopsy notes. She had very large adrenals and was one of the fiercest and most aggressive bears we have encountered. She would stand her ground against any of the other sows and even the large boars. She had attacked us on several occasions. We all felt depressed at losing this old friend. probably somewhere off to west, probably fairly far back or
October 5, 1963 and ridges.

Maurice saw Cub No. 154 and unmarked littermates with sow up Pelican Creek. Also saw what he thought was "Mae West", an unmarked sow and her young. He also may have seen No. 12 but could not confirm this.

Bears feeding on mice (*Microtus*) and bulblets of *Melica spectabilis*.
October 6, 1963. P.M. we left the Hilltop Station and started hiking in the

direction Sow and 3 cubs on buffalo carcass at third bridge up Trout Creek. Sow was unmarked but one of her cubs is No. 147 and color marked.

could see Marion No. 40 was also at carcass. I took movies of her with radio collar. Sow and cubs kept No. 40 off carcass. valley but it came in without

earphones Immobilized No. 150. She has 3 cubs of her own and one of the orphaned ones of Owl-faced sow. Instrumented her. See notes.

October 7, 1963 P.M. From ridge on the north side of Alum Creek we spotted

four grizzlies Number 48, an old sow was on carcass with her cubs and she too had one of the Owl-faced sow's cubs. There was one other, an unidentified bear, on buffalo carcass. Took movies. indicated that she was further north so we

followed Saw cubs of No. 150 at Trout Creek Dam in morning. Apparently she has not yet joined her cubs after we immobilized her October 6th.

likely It is interesting that No. 150 and No. 48 each have apparently adopted (for a time at least) cubs of the Owl-faced sow. This is the sow

that was killed when she charged the pickup one night.

Coyote came into carcass. Also 3 dozen ravens or more.

October 8-9th, 1963

Returned to Missoula.

Tracking No. 150. First Closing In and Sighting of No. 150.

October 10, 1963.

Unable to pick up signal from 150 at Base other than a weak erratic one at 195 degrees. The same was true at mouth of Alum Creek. Decided that grizzly was probably somewhere off to west, probably fairly far back or shielded by hills and ridges.

At 11:5- A.M. at the Hilltop Station Mike and I got a good signal at 275 degrees. The angle of strongest signal with the portables was quite wide. But null indicated above direction. Could not use the yagi as a wind-storm yesterday broke a rope and blew down the mast and antenna.

At 12:45 P.M. we left the Hilltop Station and started hiking in the direction of the signal source using this one bearing from the portable as a guide. We stopped frequently to check the signal in order to learn all we could about the characteristics of the new portable 3-B. Could not get the signal from down in the bottom of Trout Creek Valley but it came in without earphones the rest of the time and was audible at the H.T. Station without earphones. The elapsed time was roughly two hours during which we had observed

At 1:15 P.M. from ridge on the north side of Alum Creek we spotted four grizzlies feeding in the open, apparently grazing on green vegetation. We observed these animals with binoculars and scope and determined that No. 150 was not among them. Signal indicated that she was further north so we followed the indicated course. At 2:30 P.M. it was evident that we were closing in on the instrumented animal and a peninsular of timber seemed the likely retreat. I entered this upwind following the null. We moved slowly expecting to see the grizzly at any moment. At 2:40 P.M. with volume turned

down the signal thumped in, an indication that the animal was quite close, an obvious sign for her to be backed down and I wanted to approach it from probably within a hundred yards if our former experience was an indicator. This is a decision that usually has to be made. The safe approach I stopped and peered ahead and to the right through the timber motioning Mike to move with the wind so the grizzly gets your scent and takes off. At with the shotgun to be ready at any time. Mike and I then spotted her in the timber with the back lighting shining through her guard hairs. The hairs on her hump were raised and shone in the sun. Mike spotted the animal a fraction of a second before I did as she was hidden momentarily behind a tree. Both of us saw the grizzly before she saw us or at least before she knew what we were. She undoubtedly heard the beeping signal from the receiver but until this moment I dared not turn it off as it was our only means of telling where the grizzly was. With binoculars I saw the colored collar as she turned and at this moment Mike moved and she saw him. The wind was from her to us so she may not have smelled us. At any rate she took a good look then turned, gave her alarm wuff to her cubs, and ran off a short distance. For a few minutes I thought by her action that she might return but evidently she was just rounding up cubs. I did not see the cubs but heard noises that I attributed to them. As soon as the signal indicated that the sow was off a little distance I paced off the distance from us to where we had first seen her. It came to 140 feet. The airline distance we had tracked her with the portable since getting her first feeding behind a large log and moving directly toward us. They were 3½ to 4. The elapsed time was roughly two hours during which we had observed only 150 feet away. I dropped to one knee behind a lodgepole and tried to take the other grizzlies, taken photographs, made notes and plotted our course on a map. The position of the bear from the Base was just a little over 8 air-line miles with a high wooded ridge between. There were no beds at the point where we jumped No. 150 but there was an old log with an old red squirrel cache at one end. (There weren't. Checked another day.) However, I did not think to backtrack until too late and believe that there may have been grizzlies saw him. Fortunately they turned and took off into the timber. The beds just below a rocky ledge in the timber. I circled this as it seemed

After locating this family we moved on south to where Alvin Creek comes through a gorge and enters the upper end of Hayden Valley. The receiver indicated that No. 150 had moved off to the north at 310 degrees. I thought by her action that she might return but evidently she was just rounding up cubs. I did not see the cubs but heard noises that I attributed to them. As soon as the signal indicated that the sow was off a little distance I paced off the distance from us to where we had first seen her. It came to 140 feet. The airline distance we had tracked her with the portable since getting her first feeding behind a large log and moving directly toward us. They were 3½ to 4. The elapsed time was roughly two hours during which we had observed only 150 feet away. I dropped to one knee behind a lodgepole and tried to take the other grizzlies, taken photographs, made notes and plotted our course on a map. The position of the bear from the Base was just a little over 8 air-line miles with a high wooded ridge between. There were no beds at the point where we jumped No. 150 but there was an old log with an old red squirrel cache at one end. (There weren't. Checked another day.) However, I did not think to backtrack until too late and believe that there may have been grizzlies saw him. Fortunately they turned and took off into the timber. The beds just below a rocky ledge in the timber. I circled this as it seemed

an obvious spot for her to be bedded down and I wanted to approach it from upwind. This is a decision that usually has to be made. The safe approach is to move with the wind so the grizzly gets your scent and takes off. At this time I knew that she could not be more than an eighth of a mile away and so for purposes of locating her I had already obtained an objective. If possible I decided to try to see her so made the upwind approach. This is dangerous with a sow and cubs. No. 150 has three of her own and one of the Owl-faced sow's. (Earlier, but lost this cub or abandoned it.) Mike was armed with a shotgun with slugs and I had a 357u revolver. I thought that this sow would turn and run if not jumped too close and if given a chance. Fortunately all her cubs were back of her and none between her and us or behind us.

After locating this family we moved on south to where Alum Creek comes through a gorge and enters the upper end of Hayden Valley. The receiver indicated that No. 150 had moved off to the north at 310 degrees. She did not go far but at least there seemed little possibility of again running into her. At 3:20 P.M. Mike and I were moving along just at the edge of the timber and approaching the area where we had seen the four grizzlies grazing from a distance. Suddenly we saw three of them, a big sow first feeding behind a large log and moving directly toward us. They were only 150 feet away. I dropped to one knee behind a lodgepole and tried to detect ear tags with the binoculars. I also focused with the camera and tried for a picture but gave it up when the sow moved behind the log. All appeared to be grazing and moving directly toward us. I motioned to Mike to move to one tree that he could climb and I moved slowly to another. However, Mike kept going to one in the open that was easier to climb and at this moment the grizzlies saw him. Fortunately they turned and took off into the timber. The sow was unmarked and her yearlings or possible two-year-olds were marked, at least one of them. This one had a white or mixed white and another color in

right ear. The sow and one yearling were the general grizzly color but the other one was more straw-colored and reminded me of the sister of the Sucostrin and a broad collar visible in color. All cubs acted toward sow as though she was their mother and she accepted all equally.

the same bears we had seen from a distance. The fourth we did not see. I believe this one was a boar. The area where these bears were feeding is an old pasture, possibly an old homestead. Parts of it had been fenced and some sections of fence around the hot springs are still standing. There was a fall growth of white clover and timothy that the bears were grazing on.

Other animals had also heavily grazed this including Canada geese.

We followed the hot spring creek (Alum) up to the fire road and light bridge and then hiked back it to the Hilltop Station. The total distance covered was about $8\frac{1}{2}$ miles. We reached the car at 6:00 P.M. and signal from here indicated No. 150 was still in upper Alum Creek area. On the way back we passed buffalo carcass and saw five grizzlies on it or nearby. We observed them for awhile unseen and undetected. A sow and a cub were lying down watching the three others tear at the meat. One of these bears was perhaps the most beautiful grizzly I have ever seen. He was nearly coal black with a broad very white collar. At first I thought he was a bear I had never seen before. He was fat and sleek and looked like at least a yearling. As we watched, first this grizzly and then the others walked up to the sow. Two later made attempts to suckle so it appeared they were cubs and then it flashed on me that this was No. 48 with her collared cubs and one from the Owl-faced sow. I believe the very pretty one was one of her own. The sow had a very definite brown face and was marked with Al tags in both ears. She had a rope marker in her left ear. It appeared a faded blue - white and blue or white and green.

Another cub was very similar to the one already described except a more grizzled color and the broad collar not nearly as white (more silvery). It went clear around. These two cubs were not marked but believe the one

lying down by her was. The third cub had a markedly brown head like the mother and a broad collar whitish in color. All cubs acted toward sow as though she were their mother and she accepted all equally.

In tracking one grizzly we had actually tracked five counting the cubs of No. 150. We had also seen nine other grizzlies and obtained interesting information from them. The tracking had actually informed us directly or indirectly about fourteen animals.

Tracking Grizzly to Hibernation Site. Notes of F. C. Craighead.

On October 23rd we trapped grizzly No. 164 at Rabbit Creek in a light snow storm. Watched bear enter trap and get caught (approximately 8 P.M.). Charlie Ridenour and I then spent night in panel wagon beside trap. At least seven different grizzlies came around the trap - a sow with three cubs, two adults and two yearlings or two-year-olds.

At 5 P.M. on October 26th we released No. 164 after instrumenting her at Canyon. She was released at Rabbit Creek and was still lying down at 6 P.M. Two yearlings or two-year-olds approached sow and tried to help her. They acted as though they were her offspring and she warned them away when she saw us move. The young bears had ivory colored claws. Four other grizzlies came in at this time - a dark sow with light colored yearlings and a single dark bear. We apparently later caught one of these yearlings - number XXX.

On October 27, 30 and Nov. 1 and 3 we checked for a signal in the Old Faithful area. The only signal received was on October 30 between 7 and 7:30 P.M. This placed the grizzly up White Creek several miles from the highway. Signal was quite faint so grizzly may have been further away. There was snow on the ground and it was still snowing lightly.

On Nov. 3 from 2:30 to 4:15 P.M. we checked for signal in Rabbit Creek area. We hiked up narrow canyon at Firehole Lake and climbed to a high

was originating from grizzly No. 164 and not No. 150 as we thought at the time.

point. We were unable to get a signal with portables or mobile unit. Number 165 was apparently not in the vicinity and probably not within 3 to 5 miles of our positions.

On Oct. 6th we instrumented and released No. 150 in the Trout Creek area. We monitored her continuously until Nov. 4. She ranged over an area in upper Trout and Alum Creek drainages. On Nov. 3 at 6:30 A.M. we obtained a very good signal from the Base at 180 degrees. The pulse rate was checked at 92/min. This sow had been tracked and observed on Nov. 2, with her cubs. She was in the upper part of Alum Creek and appeared to be working her way up the creek toward the Trout Creek-Alum Creek divide.

On Nov. 4 we picked up a good signal from this general area from the Base Station and continued to get it. In the morning we hiked in to where No. 150 had been seen on Nov. 2. Here we obtained a possible background signal. From the Gravel Pit at 3:00 P.M. we obtained what was possibly a signal at 210 degrees. Soon after this we started hiking up Trout Creek above the bridge in the general direction of the signal source obtained from Base and Gravel Pit bearings. We didn't get a signal for several miles and when about a mile from the Trout C-Alum Creek divide we climbed a high hill. From this point we obtained a good signal at 210 to 215 degrees. Picked up the signal on receiver 2-B but not on 3-B until I had tuned it. I thought this was strange at the time. I also remember thinking that the pulse seemed slow but didn't count it. At the time I had no idea that this could be coming from any bear other than 150. At this time I figured the bear was probably no more than 2 miles from us and perhaps closer. It was snowing hard, and had been all afternoon. At 4:20 it was getting dark. There was little more we could do so we returned to car and Base. Obtained a good signal at Base at 5:30 P.M. at 180 degrees. Also got signals, though fainter at 8:30 and 9:20 P.M. The grizzly was approximately 12 miles from the Base. This signal as we later confirmed was originating from grizzly No. 164 and not No. 150 as we thought at the time.

Sometime during November 3rd and 4th we lost the signal from 150 and picked up No. 164 without realizing what had happened. The signal we received up Trout Creek Nov. 4th was definitely that of No. 164 and as later determined the grizzly was probably at the mouth of her den or very close to it at this time. Signal from a wooded hill on receiver B-2 but none with B-3. The direction was

On Nov. 5th at 1:20, 4:25 and 7:00 A.M. we obtained good signals from the Base at 180 degrees or the same general position where we had located grizzly the afternoon before. The signal seemed unusually good but as the morning wore on it became fainter as though the bear might be moving off or getting into shelter - perhaps windfall or a den. At 9:50 A.M. the signal was faint and by 10:15 A.M. it had disappeared.

Prior to this I had been trying to decide whether to drive over to the Old Faithful area and try once more to locate No. 164 or to move in on what I still thought was No. 150. I knew this was probably the last day I would have to track a grizzly as I planned to leave the next day. I also realized that either of the instrumented bears might go into hibernation at any time. I suspected that No. 164 might already be in hibernation. If we continued to get the signal from the Base I had decided to go look for No. 164 at Rabbit Creek and then move in on No. 150 the next morning before leaving for Jackson. It had continued to snow during the night but it was only a light fall. I was skeptical as to whether this was enough to put the grizzlies into hibernation.

When we lost the signal at 9:00 A.M. I decided that this bear was either moving south or was at its hibernation site - perhaps in some type of shelter. In either case it was a good bet that we would lose the instrumented animal unless we moved in on it right away. There was still time to check for the grizzly in the Rabbit Creek area another day. Accordingly Maurice, Charlie and I got our lunch and gear together and took off. At 10:45 A.M. we checked for a signal from the Hilltop Station using portables. We

obtained a possible signal at 185 degrees. We drove on up the Mary Mt. road and started hiking due south from a point due north of the Alum-Trout Creek divide where we had last located the bear. We hiked south up an open valley and then entered dense timber and windfall. After hiking about $1\frac{1}{2}$ miles we got a signal from a wooded hill on receiver B-2 but none with B-3. The direction was 190 degrees. We continued following the signal in a generally southern direction. At 12:15 it was 190 degrees and we moved on up Alum Creek in relatively open country. At 1:15 we left the valley at 185 degrees and cut up over the wooded slopes. At 2:55 P.M. the signal was quite loud and I had to turn the volume down. Not until this time did it occur to me that the pulse rate was slow. I timed it at 61-62 per minute and for the first time realized that we were not following No. 150. We continued to move in slowly on the signal source expecting any moment to see a grizzly come out of the downed timber or come on tracks or signs about a den. We climbed a north-facing slope at the head of Alum Creek and the signal pinged in even with the volume turned clear down. Experience had taught us that this sound indicated that the instrumented animal was only a 100 or so feet away. Nevertheless there were no tracks in sight. We carefully looked under all likely windfall. At times it seemed as though we must be standing right over top of the bear. We took at least 15 minutes to search the last 100 feet of our tracking trek. Then below us Maurice saw a tiny packed area of snow with traces of dirt on it. It was the approach to the den that went into the hillside directly under us. We were within 50 feet of the den opening but unable to actually see it until we moved down and around the slope and approached the den at an angle. We approached to within 20 feet of the den and took pictures. An opening just large enough to accommodate the grizzly bore directly back into the hillside. The slope had a north aspect and no doubt would be covered with 15 to 20 feet of snow. Four to six inches was on the ground at the time. At 4:20 P.M. I checked for a signal at the same point where I had earlier

We were quite thrilled at having tracked a grizzly into its den and took pictures of ourselves with direction finder and gun in front of the den. It was apparent that the grizzly had been lying out in front of the den during the day though she had not strayed more than ten feet away. It also seemed apparent that she had entered the den during the night when it was snowing and so had left no telltale tracks leading to her winter den. We would have liked to have seen the bear but decided that disturbing her might cause her to leave and we also knew that if she came out while we were close by we would undoubtedly have to shoot her. We were afraid this might happen when we approached close to take pictures. The surrounding trees were mostly tall lodgepoles with no low branches and difficult if not impossible to climb. The den itself was directly under a huge lodgepole that towered above the others. It was unique in that it was three-forked at the top. It served as a good landmark and we would need it to relocate the den, especially if we returned in mid-winter. After shooting up all our film we took off on a course of 60 degrees blazing a trail as we went. The return bearing will be 240 degrees. When we backtracked to the open valley of Alum Creek we took the top out of two lodgepoles to serve as markers from the air. Our blazed trail ended at these trees. Within 30 to 50 feet of the den we found an older den that had caved in. Grizzly No. 164 could not have arrived in this area from Rabbit Creek any earlier than Nov. 3 or we would have detected her. She apparently did not fix up or further dig out her den prior to hibernation unless this was done in late summer or early fall. She travelled directly to it and as with grizzlies tracked by their trails in the past she entered during a snow storm and remained there.

In tracking this grizzly via radio we had travelled through country that only recently had supported quite a few grizzlies yet we did not see a single track. On our return trip we also did not see any grizzly tracks. At 4:20 P.M. I checked for a signal at the same point where I had earlier

picked it up at 1:15 P.M. and was unable to get a signal. This indicated that the grizzly had previously been outside her den or just barely inside the entrance. She apparently moved clear back in at our approach and was still back where the shielding effect of the earth blotted out the signal.

Returned to the car just about dark and then checked for signal from No. 150 from several high points in the vicinity of Alum Creek Hot springs - no signal.

From the Base at 7:45 and 9:45 P.M. there was no signal at 180 to 190 Degrees. Nov. 6 check for signal from base at 1:45 A.M., 6:20 A.M. and periodically until 8:30 A.M. - no signal from hibernating bear. Evidently the grizzly is too far back in the hillside cave to pick up a signal. The cave opening more or less faces the Base and is at a higher elevation - around 8200 feet. Checked from the gravel pit and Hilltop Station. Maurice did not get a signal from either No. 164 or 150.

November 7th Maurice checked from light plane from 1 to 3 P.M. for both No. 150 and 164. He was unable to pick up a signal though he flew over entire Alum Creek area and at 300' altitude directly over den.

Tracking No. 164 into its hibernation den dramatically ended a season of radiotracking that even without this achievement would have been a highly successful year. It did, however, serve to emphasize the value and practicality of bio-telemetry as an ecological research tool. Also tracking a grizzly to its den was one of our original goals in developing the radio-tracking system though not necessarily the most important. This also served to terminate our three years of radiotracking with a dramatic achievement suitable for a popular Geographic article.

The location of a hibernation den opens new areas for research - hibernation phenomena, infant mortality, site preference, etc. Some

telemetry of physiological data can be developed, if desired, in subsequent years. The bear remained just outside the entrance or just within it for a day.

I think it is quite likely that the type of site selected by this bear may be quite typical of others and thus lead to discovery of other dens without the necessity of tracking. It appears that the grizzlies as we suspected use the same dens or hibernation sites year after year and perhaps even members of the same families (same mother) return to the area of their birth to hibernate. If this is so, hibernation sites once located can be visited and studied year after year.

The location of this den was at a relatively high altitude in relation to surrounding country. It was far removed from roads and people. The service road we used is closed to the public and not often used by rangers. The den was in dense timber on a north facing slope where the snow is bound to be deep. The entire den had definitely been dug out at one time and was not a natural or partly natural cavity. The bear had dug its own hibernation site though evidently not this season. Because we had not come across caves of this kind in our work we had felt that the grizzlies might very well spend the winter in a pile of windfall or in the tangled mats of timberline vegetation. The fact that in the past they had been active until within 12 hours of going into hibernation made us suspect that they did not do much in the way of preparation and in fact might sleep wherever the final big storm that triggered hibernation caught them. On the other hand we had observed grizzlies regularly right up to the final storm and had then followed their tracks in the storm only to eventually lose them. From this it appeared as though the grizzlies took off and headed for a predetermined destination. This might be quite some distance from their location at time of the storm. The den that we located and the behavior of the bear indicated that this is probably the case. The grizzly knew where it was going to hibernate and headed for this Creek or Rabbit Creek area. The latter spread our activities over a much

area from Rabbit Creek and apparently went straight to the den. The fact that the bear remained just outside the entrance or just within it for a day enabled us to locate her by radio.

The location of this den was such that if we had known it was within a square mile area and had then combed the area with a team of men we most likely could not have found it. To have located a den of this kind belonging to a particular bear as we did would be almost impossible using standard field observation methods. It is probably safe to say that this achievement could not have been accomplished without using a radio or some similar type tracking method.

Even though our tracking system has the capability of picking up instrumented grizzlies 12 to 14 miles away and up to 20 and even though with our portable receivers we can "home" in on a grizzly with an accuracy measured in feet we still had considerable luck when we tracked No. 164 to its den. I knew that we had the capability of doing this but was not counting too much on it. Our best chance was to locate a den by following a grizzly prior to the time it hibernated. It seemed likely that the bear would visit the den one or more times before hibernating. Failing in this as we did, it meant that we would have to be able to follow the grizzlies when they made their one and only trip to the den, usually in a snow storm and at night. If they utilized a cave it was obvious that once inside we would have little chance of finding them. There are times in life when the breaks all come resulting in the success of a venture. The right decisions are made, some intuitively, some by reasoning and others by pure luck. Finding the den of No. 164 was one of these occasions. Numerous decisions made along the line if made differently would have resulted in failure.

There was the question of whether or not to instrument one more grizzly and thus increase our chances. Should this be done at the Trout Creek or Rabbit Creek area? The latter spread our activities over a much

at some point we lost the signal of No. 150 at 92 pulses per minute and

greater area when we were short for both time and manpower. We decided to go ahead and so instrumented No. 164. We felt our best chance here was probably to get some idea of this bear's daytime retreat and then check the area for a signal after she hibernated. We also debated whether to take down the Base antenna prior to closing up and decided to leave it, reinforcing it with guy lines. Had we taken it down there is little likelihood that we would have located No. 164. The opposite decision was made with relation to the Field Station and this was a poor decision. If we had left this up we might have been able to follow No. 150. On the morning of Nov. 5 I had decided tentatively to go over to Old Faithful to look for No. 164. When we lost our signal at the Base I changed my mind. Had we gone to Old Faithful we would not have located either bear. Number 164 went into her den either some time on Nov. 3rd when we hiked to within 2 miles of her or during the night. At any rate she was close to her den on the 3rd and had been there for at least 12 hours prior to our hiking in on the 4th. If this bear had remained in her den instead of at its entrance we would not have picked up her signal the morning of Nov. 4 and even if we had hiked toward the spot where we had located her the afternoon before we would have been unable to pick up the signal and close in on her with the portables. It seems likely that this is what happened to No. 150. She entered her den, perhaps in this very same area at the same time but remained inside. The other alternative is that when the storm that triggered hibernation came she left her upper Alum Creek foraging area and took off for a distant den - perhaps as much as 8 to 10 miles away. Although there is some bear movement between Old Faithful and Hayden Valley there is not a great deal. Bears in each area tend to remain in the vicinity, at least during summer and early fall. It was just pure luck that the bear we trapped and instrumented at Old Faithful had a den in upper Hayden Valley where we were tracking No. 150. moving or shaking it could have started it

An interesting aspect of these last few days of tracking was that at some point we lost the signal of No. 150 at 92 pulses per minute and

picked up No. 164 at 60 pulses per minute without realizing that we had a new signal. During the summer we were readily separating out bears with pulse rates much closer together than this. The difference in the pulse rates of these two transmitters is immediately evident without counting. Had these two both been in the same area and we knew it, identification of the particular bear would have been instantaneous. The mind at times plays strange tricks on you and this was such a case. Apparently convinced that there was only one instrumented bear in this area the conscious mind disregarded the evidence to the contrary. On Nov. 3rd I counted the pulses from the Base at 92/min. On Nov. 3 when up near the headwaters of Trout Creek I felt that the pulse rate was slow but this was a subconscious thing and I did not count it, though it would have been simple to do so. Convinced that there was only one bear here my mind rejected evidence to the contrary. Even the next day when we were tracking with portables I did not recognize the obvious fact that the pulse rate was much slower. It was not until we were quite close to the bear and the signal unusually loud and clear that it suddenly dawned on me that this was not the signal of No. 150. When I counted it and got 60 to 61 per min. I immediately thought of No. 164 but then rejected this as impossible or unlikely. Imprinted in my mind was the pulse rate of 49/min. for No. 164. This was actually the pulse rate of the transmitter prior to putting it on the bear. Usually the pulse rate changes by a few per minute when the collar-transmitter is put on the bear. In this case the change was greater than usual - from 49 to 61 and I recorded this on our form sheets. Nevertheless the pulse rate I had in my mind was the original one. For this reason even after locating the grizzly I was not sure which bear it was and even suspected Marion No. 40. Her pulse rate of $7\frac{1}{4}$ /min. could possibly have dropped to 61. Marion's transmitter stopped after one month, apparently due to a broken connection. It was possible that moving or shaking it could have started it working again. This seems to me an interesting example of the mind subconsciously

rejecting an apparent fact because a preconceived notion has already become fixed - that is that there was only one instrumented bear in this area. Possibly this fuzzy thinking was partially due to being tired. It was not until I quit the work and let down that I realized that I was much more tired from the last few months of work than I realized. I was also more than 10 pounds below my normal weight.

Grizzly No. 164 dug her den under the roots of a large lodgepole. This at first would seem to be a difficult spot to dig. On second thought it has advantages. It is less likely to cave in. There is a possibility that some of the overwinter mortality, particularly of old and big bears may result from cave-ins.

Number 164 either had yearlings or two-year-olds with her at Rabbit Creek. The former appears most likely but the latter is possible. If yearlings, there is a very good chance that they are both in the den with the sow. It should be possible to locate dens with search parties. It would be well worth the effort.

Tracking No. 164 into hibernation has to some extent verified some of our observations over the years.

October 27, 1953
It appears that a snow storm definitely triggers hibernation though there may be other factors involved.

Most or all of the grizzlies in a given area where weather and temperature conditions are the same go into hibernation at the same time even though other factors affecting them may vary. Though widely separated they all seem to sense that this is the time.

The bears go into hibernation during a snowstorm and this serves to cover their trails. Following the "hibernation storm" there are no tracks evident even in areas where numerous bears were known to be a day or so previously.

October 27, 1953
The grizzlies, at least the mature ones, have definite sites that they travel to hibernate. These may be a considerable distance from their

late fall foraging areas. It may be that very few are close to their dens prior to the final trek.

There seems to be little preparation of a hibernation site in the days and weeks just preceding hibernation. It will be interesting to determine just when the dens are excavated. Possibly this is done in summer or early fall.

If members of a family, that is, the various litters from a single sow tend to return to the area of their birth to hibernate we may find that there are areas where grizzlies concentrate to hibernate.

It appears that grizzlies hibernate two or more winters in the same den or in a new den in the same area. This means that once some dens are located there will be considerable opportunity for studying hibernation and gathering data relative to reproduction, mortality, etc. during the hibernation period. If a typical hibernation site can be determined by isolating criteria it should be possible to locate dens with search parties. It would be well worth while to try this in early spring with snow on the ground if manpower is available.

October 25, 1963

Frank and Charlie Ridenour captured a bear (large sow) at Rabbit Creek. Maurice and I returned to Lab. in Yellowstone to help instrument bear.

October 26, 1963

Immobilized sow at laboratory. She weighed 410 lbs. Dick Nelson and Mr. Canavena from Glacier were present. Gave this bear No. 164 and instrumented her. This was the ninth transmitter we have put on this summer and the thirteenth since starting the study. Had difficulty getting penta into lungs. Released No. 164 at Rabbit Creek. Set culvert trap for another grizzly.

October 27, 1963

Captured a two-year-old at Rabbit Creek and brought her back to Lab.

Attempted to pick up signal from No. 164 with mobile unit but could not get signal. Finally gave up the hunt and returned to camp.

Checked the hibernating den at Gem pool. Den was freshly dug out at entrance and bear was at back of den apparently "hibernating". This may be the same black bear we immobilized last winter while in deep sleep. Have seen no black bears along road. Two cubs, however, have been reported on road up Mt. Washburn. Sow had been shot by a tourist.

Suspect most of the black bears are now in hibernation.

October 28, 1963. When we were about 200 to 225 yards away. The family

immobilized the two-year-old sow we captured at Rabbit Creek. Used Sernylan (1 gm. per 1 cc. of distilled water). Administered 35 mgs. of Sernylan and this proved to be an excellent dose.

Took many photos of this bear. She appeared gentle and serene and allowed us to sit her up, stand her up and roll her over at will. Pupil of eye contracts. With this drug bear can hear well but apparently cannot see.

She became nervous and appeared "wild-eyed" as she came out of the drug. She shifted her head rapidly from side to side and attempted to crawl toward sounds with head outstretched. Gradually was able to get to her feet. I started taking movies and she suddenly charged the sound. I left camera with her close on my heels. I stepped in a hole and fell flat. She ran into a tree stump that stood between me and the car and this stopped her. In the meantime I had gotten up and moved fast out of striking distance.

For 20 minutes she moved around somewhat unsteadily but moving in on each sound or rustle in the grass. Apparently she still could not see.

Maurice, Frank, Charlie, Gerry and I played quite a game of blind man's bluff. She made several charges, eventually heading back into the woods.

In the afternoon we tracked No. 150 at the head of Alum Creek. Frank and Charlie Ridenour have been tracking her and cubs for a week or more.

We approached very close using the directional receiver but were unable to see her in the heavy timber. Finally gave up the hunt and returned to some open meadows where we had seen 4 other grizzlies grazing in an open meadow. Thermal activity quite evident here. Alim Creek itself is too warm to bathe in. It was overcast and snowing. The river was full of large rock lobsters.

Identified the grizzlies as a sow and 3 yearlings. The sow was unmarked but all 3 yearlings have been marked and are Nos. 132, 133 and 139. We approached them from 1/4 mile away over the open meadow and stopped to observe and photograph when we were about 200 to 225 yards away. The family moved slowly towards us unaware of our presence on the top of a slight elevation. When within about 175 yards we began to get concerned as all 4 grizzlies were coming directly at us and all were still unaware of our presence - the wind being from them to us. Maurice, Charlie, and I were together and Gerry Atwell and Frank were down the slope 50 yards from us and that much closer to the grizzlies. It became quickly apparent that we could soon be in trouble. I left my movie camera, stood up and yelled to attract their attention while Maurice moved to windward in an attempt to get our scent to them. They kept coming - 4 abreast - aware of our presence, alerted to something but not yet certain of what lay in front of them. They moved on to within 150-175 yards. We were dispersed in such a way that it would have been difficult if not impossible to have protected ourselves from a determined attack. Frank had the 357 revolver, Gerry and Maurice 12 gauge shotguns with slugs for close work, and Charlie and I had the directional receiver and camera and tripod respectively. stood against us. We suspect that at this time

Suddenly, as we stood tense and ready but not prepared for action, the sow caught our scent. All four grizzlies turned and raced off at right angles to us toward the nearest timber. I got to the tripod and camera and took some action movies. Prior to the episode the grizzlies had been grazing and catching mice.

We were fortunate the situation did not develop adversely. We could have been in for a bad time even though armed.

October 29, 1963

Frank, Maurice, Charlie and I backpacked into the outlet of Shoshone Lake. It was overcast and snowing. The river was full of large Lock Levan (German Brown Trout) that had moved from the lake to spawn. We set up camp on the bank of the river. In about $1\frac{1}{2}$ to $1\frac{3}{4}$ hours of fishing I caught 14 trout - $2\frac{1}{2}$ to 3 lbs. We used both fly and spinning rods. Others caught an equal number. Charlie hiked to the outlet and brought back 4 trout each 4 lbs. or better. Tried the fishing after dark and it was good. Returned most of the fish but kept enough for supper.

October 30, 1963

From 8:30 A.M. until 12:00 I caught about 25 additional trout. Kept 5 about 4 lbs. each. The four of us must have caught at least 150 browns. We released all but 1 limit each and backpacked these 3 miles to our car. It was snowing hard when we reached the cars.

Frank and Charlie drove on to Rabbit Creek and picked up the radio signal of No. 164 at about 8:00 P.M. Maurice and I returned to base and prepared supper.

We were cheered by the news. No. 164 and No. 150 are our best and only hopes of tracking a grizzly to "hibernation" and thus climaxing 3 years of effort. Much of our time and effort this summer has gone into the radio-tracking. The odds of tracking one of these instrumented bears into hibernation are still heavily weighted against us. We suspect that at this time of year some grizzlies and probably most are in the general vicinity of their winter dens. From the summer concentration areas they disperse widely over the 3,000 sq. miles of Yellowstone and beyond. The actual area involved is probably closer to 6,000 sq. miles. Eighty-five per cent of this area is

possible winter quarters.

heavily forested. The probability is high that most winter dens are in timbered or partially timbered areas. Evidence to date suggests that when the first severe snow storm arrives - generally in late October or early November - the grizzlies travel 3 to 10 miles or more direct to the winter dens. If these are comparable to the black bear dens they may extend 20 or 30 feet into the slope or mountain side. The shielding effect is great and the radio signal could be completely blocked from above and from all sides except directly in front of the entrance. The chance of detecting the signal under such conditions are slight. The best chance would be to locate a den prior to hibernation and later check for the signal or to be fortunate enough to have an instrumented bear spend the pre-hibernation days in close proximity to the den so that the signal can be detected from the area where the instrumented bear was last observed. Whatever the situation the odds of tracking 150 or 164 into hibernation are great.

October 31, 1963

Visitors arrived from the Bozeman Electronic Lab.

Frank explained the tracking system to them. Took them to the head of Alum Creek and tracked No. 150.

Maurice, Charlie and I got within 100 yards of 150. She was on a ridge above us and the signal was strong with no null. Timber was very dense and although we knew the bear had to be close we could not see her. There was a light skiff of snow but no bear tracks except on the slope. Apparently No. 150 and cubs had not moved much in the past 24 hours. Our plan for tracking 150 to her winter den consists of:

1. Monitoring the signal constantly both from the lab and from the field.
- 2/ Close in on 100 whenever possible.
3. Scout the immediate area for dens and signs indicating possible winter quarters.

4. Close in on 150 immediately if a storm threatens.

Accordingly we decided to inspect the ridge for den sites. No. 150 and cubs moved out ahead of us and left tracks in the snow. We found one possible den site but it showed no evidence of use. The directional receiver indicated that 150 was not moving far possibly keeping only 2 to 300 yards ahead of us.

The bears have been eating tubers of Melica spectabilis. Found nutlets in the feces along trail and places where the bears were digging the tubers. Spent several hours scouting the area then returned to the head of Alum Creek where we had left our vehicle.

While returning we came upon a band of 20 to 25 elk. One cow was color marked and her pendant number was 137.

November 1, 1963

We checked for 164 at Rabbit Creek but got no signal.

Checked the hibernating black bear at Gem Pool. She growled when I flashed the light in the cave. She has a yellow ear tag in left ear (G 95) and is the same bear we immobilized here last winter.

Made an impromptu decision to immobilize her so we could get a blood sample during early hibernation for comparison with last year's sample and one we plan to take again in February. This would show us if any important blood-chemistry changes occur during hibernation and from one year to the next. Especially interested in the cholesterol level and protein bound iodine. The cholesterol level in the blood sample taken last winter (Feb.) was _____ and the P.B.I. was extremely low _____ indicating extremely low basal metabolism.

We had on hand all equipment needed except a good flashlight and the pentobarbital sodium.

We loaded a syringe with 30 mgs. of succostrin. The bear remained at the back of the den in a small chamber. She was approximately 20 feet

from the entrance. I stuck my head and shoulders in the entrance and using the CO₂ gun and flashlight managed to hit her in the neck with the syringe dart. She lurched forward growling but then quickly retired again to the chamber. The flashlight was so poor I had difficulty seeing the bear. The dosage appeared to have no effect and we decided either the syringe had not fired or the dose was too light. Forty mg. last winter had very nearly finished her so we were being cautious. Loaded another 30 mg. dart. In crawling down to the entrance the bolt was released and so when I fired the second shot the CO₂ escaped at the break and there was no power behind the syringe. In spite of this it struck G 95 in the shoulder. We waited 25 minutes and since there was no effect decided the syringe had not fired. Loaded up a third dart with 30 mgs. on the assumption that G 95 had not yet received a dose. The third dart struck her in the neck close to the first dart and once again she lunged toward the entrance and then retreated. Within a few minutes it became evident that the drug was taking effect. After 5 minutes I crawled in to check her. The problem was to judge whether the bear was actually immobilized or was only partially so but inactive from combination of "deep sleep" and the drug. At the end of the narrow tunnel was no place to find that G 95 still had plenty of "life". However, there was no alternative but to crawl back and investigate. My body in the small tunnel cut off light from the entrance and the flashlight just barely illuminated the ground in front of me.

The chamber dropped about 1 foot below the level of the tunnel and was approximately 7'x7'x4'. I grabbed the bear behind the ears and tugged. She raised her head and growled but it was evident that the drug had taken effect and she was indeed immobilized. The question was for how long? Our original plan was to haul the bear out as we had done last winter. It soon became obvious that the bear was now larger and that she would have to be

pulled up a steep 1 foot grade from the chamber and into the tunnel then out 10 feet of tunnel to the entrance. It would be a tight squeeze in the tunnel to get blood on our skin was limited and G. 95 was gradually gaining strength and only one man could work.

I tried to move the bear forward but could not budge her. Frank and Maurice came in one behind the other with a chain but even the three of us could not move her in such cramped and awkward quarters. Besides we recognized that if the bear die "come around" while we were hauling her out that we would have to retreat hastily leaving the chain hitched to her forepaws. We quickly abandoned this idea and decided to try and take the blood sample right there in the den. Fortunately we had located a brighter flashlight among our gear. Maurice passed this back and the vacutainers for getting the blood sample. I moved to the back of the chamber placing the bear between me and the entrance. I had to crawl over her to do this. I checked her first and noted she was still helpless. It soon became evident that I would need help to get the blood sample. I could not hold the bear's head down and insert the needle in the femoral artery and at the same time hold the flashlight. The question in my mind was whether it would be safe for more than one person to be in the cave? There could be no fast retreat if necessary. I checked her respiration and noted she could raise her head slightly - beady eyes looking directly at me - and could also move her limbs but was still unable to get up or to bite with any real power. I yelled "Let's give it a try". In came Frank followed by Maurice. Frank came into the chamber and held the bear's hind legs. Maurice remained in the tunnel where it joined the chamber and held the bear's head. I tried unsuccessfully to find a pulse and an artery or vein. As I probed for the artery I thought, this is certainly no place for a person subject to claustrophobia. The bear took up most of the floor and the quarters were so tight that we could move only a limited amount and we could not shift the bear at all. Only a thin sliver of light came through the entrance. Frank had been standing by on the outside. When we emerged he wore a broad grin and said - "Boy you should have heard your

from the entrance. It seemed miles away. After ten minutes of probing unsuccessfully for an artery I changed places with Frank. We worked feverishly to get blood as our time was limited and G 95 was gradually gaining strength and coordination. Frank had no success. The bear continued growling and could now raise her head some. We decided to retreat while we could. Maurice backed out the tunnel followed by Frank crawling head first after crawling over the bear while I held her head down. Once they were out and the possibility of a frenzied 3-way scramble for the entrance no longer a phantom - I checked the bear and found that although regaining coordination she was recovering very slowly. We had been 20 minutes in the cave. I suspected that at least two of the darts had fired. Our last winter's experience with this bear had taught us that for some reason the effect of the drug is delayed when the bear is hibernating. The choline esterase level is possibly very low. I decided we still had some time and would make one final attempt to get the sample. Frank and Maurice returned and we repeated our former efforts with the same result. By this time I had been in the den at least 30 minutes. The temperature must have been 70 or 80 degrees at the back end of the chamber. I was perspiring profusely and was soaked through. We very much wanted the blood sample as it could be the key to chemical changes in hibernation but G 95 was struggling and we could no longer hold her legs in position to locate the femoral artery. We had to admit defeat. All three of us scrambled and crawled single file to the entrance while G 95 growled and rolled over on her belly with head up and jaws chomping but fortunately still unable to pursue the three retreating forms that blocked off all light from the entrance.

Outside I shivered from the sudden change in temperature. We were dirty and soaked from perspiration and unsuccessful but it had been a unique experience.

Charlie Ridenour had been standing by on the outside. When we emerged he wore a broad grin and said - "Boy you should have heard your

conversation in there." "If I had had a tape recorder we would have made a million."

G 95 probably weighed 200 lbs. or more. She was in good condition but not fat. She may produce cubs this winter.

November 2, 1963

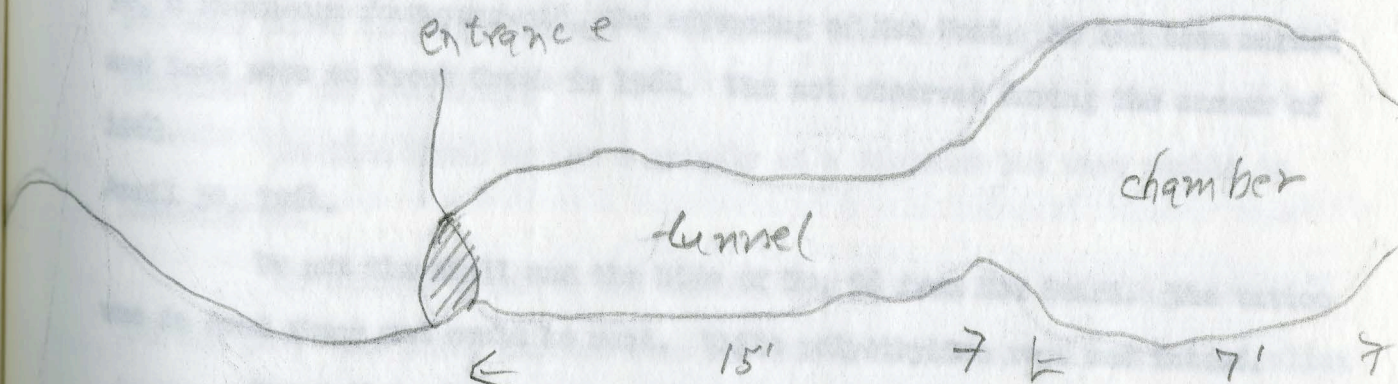
Cleaned up around the Lab and then left for Missoula. Frank, Maurice and Charlie will remain for another week with the hope of tracking No. 150 or 164 into hibernating dens.

November 5, 1963

Frank phoned to say that they succeeded in radiotracking No. 164 to a winter den. She came over the divide from Rabbit Creek into the same general area as No. 150. At first they mistook her signal for 150. They first got the signal from the base about 10 miles away. Tracked her down that same day as a storm was moving in and located her in a cave at the head of Alum Creek.

No signal from 150 so she too may have entered a den. Maurice will continue to try and track or locate her for a few days and then return to Missoula. He will track from the air one day.

It is very doubtful if we could have located a den without the radiotracking technic. It has been indispensable.



January 28, 1964

Visited black bear den at Gas Pool. Bear was not there. Rangers reported that they had found a black bear in the hot pool below "hibernating" cave. We checked and found grubs on top of water and black bear hair. It is possible that the hibernating bear had adversely affected the bear or that she came out of cave while still affected by the drug, stumbled and fell in the hot pool.

GRIZZLY BEAR NOTES

YELLOWSTONE NATIONAL PARK

Took air temperature at back of den when air temperature outside was 15° F.

April 29, 1964

1964

We learned that a married grizzly had been killed on Duck Creek on April 28th. Checked with Ken Sears and got the story.

A rancher, who had been hunting for a grizzly kill a short-wooled elk. The act enraged him and he ran out of the house and shot the bear. Realizing he had broken the law he reported the incident to Ken Sears, the local warden, and brought in the hide and skull.

The same grizzly may have made two other elk kills in the same vicinity. Ken shot one elk that apparently had been wounded by the bear and escaped.

We checked the markers and ear tags and found the grizzly was No. 98, a known-age four-year-old, the offspring of Mac West. He had been marked and last seen at River Creek in 1962. Was not observed during the summer of 1963.

April 30, 1964.

We got the skull and the hide of No. 98 from Ken Sears. The tattoo was in good shape and could be read. While polyethylene rope was intact.

Drove through the Park to look for grizzlies. Saw our first grizzly of the season in Hayden Valley. Spotted the color combination through the

January 28, 1964

Visited black bear den at Gem Pool. Bear was not there. Rangers reported that they had found a black bear in the hot pool below "hibernating" cave. We checked and found grease on top of water and black bear hair. It is possible that the immobilizing on November 2nd adversely affected the bear or that she came out of cave while still affected by the drug, stumbled and fell in the hot pool.

Took air temperature in den. It was 64° F. at back of den when air temperature outside was 18° F.

April 29, 1964

We learned that a marked grizzly had been killed on Duck Creek on April 28th. Checked with Ken Sears and got the story.

A rancher, saw a grizzly kill a short-yearling elk. The act enraged him and he ran out of the house and shot the bear. Realizing he had broken the law he reported the incident to Ken Sears, the local warden, and brought in the hide and skull.

The same grizzly may have made two other elk kills in the same vicinity. Ken shot one elk that apparently had been wounded by the bear and escaped.

We checked the markers and ear tags and found the grizzly was No. 98, a known-age four-year-old, the offspring of Mae West. He had been marked and last seen at Trout Creek in 1962. Was not observed during the summer of 1963.

April 30, 1964.

We got the skull and the hide of No. 98 from Ken Sears. The tattoo was in good shape and could be read. While polyethylene rope was intact.

Drove through the Park to look for grizzlies. Saw our first grizzly of the season in Hayden Valley. Spotted the color combination through the

scope at considerably over 1/4 mile. It was No. 145 one of the Grizzled Sow's (165) two-year-olds. No. 145 was across the Yellowstone River walking on about 2 to 3 feet of snow and breaking through about every fourth or fifth step. Geese and ducks flew up as he approached but some watched him from the safety of the river, alert and curious. He was not seriously stalking waterfowl but was hunting mice. Took movies of him doing this. We left him heading north along the river toward Chittenden Bridge.

Saw 2 young grizzlies at Mud Volcano catching mice (*Microtus*) on slopes where snow had melted. One was marked but we were unable to definitely identify either bear for certain.

Took movies of them catching mice. They appeared to be 2-year-olds.

Saw No. 145 again at 6:25 P.M. at Sulphur Mountain. He had crossed the Yellowstone River and headed south and was about 2 1/2 to 3 miles from where we last observed him at 11:00 P.M. He was mousing on the exposed slopes of Sulphur Mountain.

Saw sow No. _____ and her 3 yearlings (cubs last fall) at Mud Volcano near spot where we had earlier seen the unidentified 2-year-olds. Two of the yearlings were color marked and the sow had yellow ear tags. Maurice and I identified the yearlings as Nos. 157 and 158. We watched them dig up *Microtus* and I took movies of the sow and cubs catching mice. The sow made three bluffing charges of 20 to 40 feet but stopped each time and returned to her yearlings.

At Alam Creek we saw a grizzly at a distance but were unable to identify it.

At Cascade Creek we saw Sow No. 125 and her two yearlings Nos. 141 and 142. The color markers were in excellent shape. All three grizzlies were laboring in the deep snow and came down to the road in spite of us and ran up the road and finally off into the snow.

The yearlings had green and white rope with orange flags - one in right ear the other in left.

May 2, 1964 The sow had an ear tag in right ear - leading edge - and the remains of blue vinyl tape in back edge of same ear.

About dark we arrived at "Bearer Dam" near Obsidian Cliff. Saw a large bear across the lake thumping in the deep snow. He would break thru at every step. Had an aluminum tag in right ear and we suspect he may have been No. 88. He had a light colored mark on right flank. May be able to identify him with certainty later.

May 18, Mr. Nelson later told us that a large bear had been reported in this area two days ago. Also he said that prior to grizzlies being sighted in the area, rangers had reported a cow elk in late stages of malnutrition at Obsidian Creek. A day later a large bear grizzly was seen on a cow elk carcass 50 yards from the road. The bear probably made a kill as elk was moving and feeding when last observed alive.

We checked the carcass on May 1st and found the cow elk was not an old animal but was weakened from lack of food. Could not be certain whether bear killed the elk or found it after it died.

During the course of the day, April 30th, we saw 12 individual grizzlies - 10 of them marked. This is the most we have ever seen at this time of year. The snow is still deep over most of Yellowstone due to a late spring. The bears are out but travelling conditions are difficult. There are lots of Microtus available.

May 1, 1964 Large unmated male arrived with a dark unmated female.

Met with Mr. Nelson and other Park officials to work out details of elk migration study contract and grizzly contract.

Three grizzlies were reported on carcass at Beaver Dam. Three grizzlies were reported on carcass at Beaver Dam. Three grizzlies were reported on carcass at Beaver Dam.

Drove to Hayden Valley but saw no grizzlies.
Bob and Gerry checked for the instrumented elk with no success.

May 2, 1964

Drove to Hayden Valley and around Loop Road but saw no grizzlies where on April 30 th we had seen many. A storm was coming in and it was snowing. Some grizzlies may have returned to their "hibernating" dens. If time were available we would have tried back-tracking some of the grizzlies that left tracks in the snow.

Left Park for Missoula.
May 18, 1964

Saw No. 145 at Sulphur Mountain. He probably has been in this area since my visit in early May. Drove around the Southern loop but saw no other grizzlies. Still large patches of snow.

Observed at Rabbit Creek.
May 19, 1964

Watched a pair mating. The sow turned out to be No. 164 the sow we tracked into hibernation. She was caught and marked and instrumented at Rabbit Creek last fall, went over the divide into Alum Creek to winter and has now returned. The radio collar is missing but her color markings are intact.

Could not identify the male copulating with No. 164. He had an aluminum tag in the left ear at very tip of ear.

Copulation lasted 20 minutes and was under way when I first observed the pair. There is no doubt that 164 got bred. Probably No. 120.

A large unmarked male arrived with a dark unmarked female. Male had a notch in the right ear. He mounted No. 164 20 to 25 minutes after the first bear had mated and left her. The female he arrived with fed at the dump. No. 164 was receptive to this second male. The mating lasted over 15 minutes and appeared to be successful.
Saw was honey-colored and had white rope in right ear. She also had

light gold patches on her flank.
with a light-colored nose.

Rabbit Creek Count

- 2 - Yearlings
- 2 - 3-year-olds
- 2 - Large adult males
- 2 - Females (includes 164)
- 8 - Total

Family was too distant
be No. 6 or No. 164.

Grizzlies and Elk

Mr. Owen, Assistant Manager at Old Faithful said he observed 3 grizzlies (sow and 2 yearlings) chasing a herd of elk about May 3rd. The herd split and turned back on itself with the bears in rapid pursuit. The sow did not press the chase after the elk doubled back. Mr. Owen said she appeared bewildered and lost them although only 100 to 200 yards behind the running elk.

Owen earlier saw 2 adult grizzlies chase an elk but did not catch it. Owen is a reliable observer. Has been very interested in grizzlies.

May 19, 1964

Saw sow No. 39 and 3 yearlings at Mud Volcano. Took photos.

Saw 2 2-year-olds at Trout Creek dump, both unmarked.

Saw 150 and her 3 yearlings. The sow had been instrumented and we followed her until she went into hibernation but did not locate the den last fall. (See 1963 notes).

The radio collar is intact but the rubber hose casing is beginning to wear loose. She and yearlings were catching Microtus. Took movies.

Jack Hughes saw a 2-year-old at Trout Creek. Probably No. 120. Was first observed May 12th or 13th and observed off and on over the past week.

A buffalo carcass had been hauled to dump and deposited there May 18th. Judging from look of tracks in snow and mud very few grizzlies have been at the dump but the carcass is now attracting them.

As I was driving to the gate at Trout Creek I saw a sow with 2 small cubs. Sow was honey-colored and had white rope in right ear. She also had

light gold patches on her flank. Sow was grazing. Both cubs were dark; one with a light-colored nose.

GRIZZLY BEAR STUDY

Family was too distant to identify the sow with certainty. May be No. 6 or No. 165.

YELLOWSTONE NATIONAL PARK

... job of the study ...
... the project for the next ...
... months ...
... I left ...
... arrived at ...

... to Minnesota for graduation ...
... the country and ...
... in the ...

Journal of

John J. Craighead

... with ...
... in her first litter ...
... with her.

... on a new bank ...
... with Janet, Johnny, and Maurice.

...
Narrative Notes, Observations and Remarks
for the year 1964

... She left ...
... This ...

... and ...
... a large ...

... At the ...
...
... while we were observing.

June 9, 1964

I sent Maurice and GRIZZLY BEAR STUDY to Trout Creek on June 3 to open the lab and make observations. YELLOWSTONE NATIONAL PARK

I have hired Bob Reiff to take Maurice's job on the study when he leaves July 1. Bob has been understudying on the project for the past three months.

I left Missoula June 8 with Derek and Johnny. Stopped overnight in West Yellowstone arriving at lab at 9 A.M. June 9.

Maurice was away and Bob had returned to Missoula for graduation. Lab was clean and in good shape. Unpacked, put the osprey and sharp-shinned in the enclosure and then drove to Trout Creek.

Journal of

Saw 150 and her three yearlings. The radio collar was missing.

John J. Craighead

No. 140 - "Marion" was out on the flats. Had only one cub with her. She is an established five-year-old and this is her first litter. Maurice has seen two cubs but only one was with her.

Took a movie shot of No. 140 and her cub frolicking on a snow bank.

Drove to Trout Creek about 6 P.M. with Derek, Johnny, and Maurice.

Took a census - see form sheets.

Narrative Notes, Observations and Remarks

Made the following general observations:

for the year 1964

- No. 40: Marion was present with only one cub. She left cub at a distance and fed in dump with other bears. She is not an attentive mother. This may be because she is young (3 years) or it may be a personality trait.
- No. 41: Ivan came in; tried to breed No. 29, a known-age five-year-old and sister of "Succotrin Kid". She was receptive but a large unmarked bear drove him off before a successful mating was accomplished. The other bear followed No. 29 for nearly half a mile. She would run ahead then stop. At the close approach of the bear she would take off. She apparently was not receptive to this particular male. He never caught up with her while we were observing.

-2-

June 9, 1964 we saw at Crystal Creek in May with 3 unmarked cubs arrived

I sent Maurice and Bob Ruff to Yellowstone on June 3 to open the lab and make observations.

I have hired Bob Ruff to take Maurice's job on the study when he leaves July 1. Bob has been understudying on the project for the past three months.

I left Missoula June 8 with Derek and Johnny. Stopped overnight in West Yellowstone arriving at lab at 9 A.M. June 9.

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Saw 150 and her three yearlings. The radio collar was missing.

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Took a movie shot of No. 140 and her cub frolicking on a snow bank.

Drove to Trout Creek about 6 P.M. with Derek, Johnny, and Maurice.

Took a census - see form sheets.

Made the following general observations:

No. 40: Marion was present with only one cub. She left cub at a distance and fed in dump with other bears. She is not an attentive mother. This may be because she is young (5 years) or it may be a personality trait.

No. 41: Ivan came in; tried to breed No. 29, a known-age five-year-old and sister of "Sucostrin Kid". She was receptive but a large unmarked boar drove him off before a successful mating was accomplished. The other boar followed No. 29 for nearly half a mile. She would run ahead then stop. At the close approach of the boar she would take off. She apparently was not receptive to this particular male. He never caught up with her while we were observing.

No. 39: The sow we saw at Crystal Creek in May with 3 unmarked cubs arrived at Trout Creek for the first time since observations have begun. She was timid and did not remain again with only one cub.

Scarneck: Scarneck and Inge have both been at Trout Creek this season, but only Scarneck came in tonight. As he approached all the bears alerted, some scattered, but soon returned and continued feeding. Little aggressive behavior was exhibited during the evening and no other bears challenged Scarneck. He is much lighter in weight than last fall but appears to be in good shape. The family remained on the sage flat about one-

No. 6: No. 6, the only other known or established five-year-old female in the population, has not shown up yet this year. She was bred last season.

Two-year-olds: Maurice, Bob, Behavior of seven two-year-olds (148, 135, 145). Relation of age of mother to intensity of natural behavior.

Yearlings: No. 40 - five-year-old shows relatively little maternal attention. No. 39 - the dump sow - old sow and a good mother.

No. 81: No. 96 is an established five-year-old that had a litter of 2 cubs. She is now 6 years old. She was a very poor mother. Lost one cub for awhile. Was not attentive to cubs when feeding. Showed relatively little maternal care. Exhibited dominance over Scarneck. Both attempted to bluff the other.

No. 15: Was a five-year-old last season. Had 2 cubs and was a very attentive mother.

No. 48: This is a very old bear that abandoned 2 litters of cubs (see notes), last year (1963). However, she took excellent care of three cubs that constituted her third litter in five years. In addition, she apparently adopted a cub (unmarked) that was orphaned when the Owl-faced sow (148) was killed.

No. 109: Three-year-old with foot missing. stiff-legged affect.

No. 65: This is an old sow with an established record of being a good mother.

Mae West: A young sow but very good mother.

June 10, 1964

General Activity at Lab

Phoned Allison at Geographic about the eagle study.
Trout Creek

Arranged to write an article on the Golden Eagle for the National Geographic Society. Truslow will do the photos and I will write the text.

New Bears - Two new bears arrived. One was dark with an ear tag. Other was a light-faced animal with long scar above the left eye. Has a massive head.

Phoned Jerry McGahan and Bill Staniger. Bill will work with Truslow on the eagle photographing.

No. 160: 160 and her two yearlings were at dump. Sow has red and green rope.

No. 39: Margaret and Karen arrived. The Halls came in at supper time. No. 39 and her three yearlings were present when we arrived but ran off as they did yesterday. The family remained on the sage flat about one-half mile south of dump. Did not return while we were there. The yearlings

Have instructed Bob Ruff that his job, as Maurice's has been, will be to rewrite the field form sheets each day and to keep an official log of chronological data including his observations and Frank's and mine that do not readily fit into the form sheets. In addition, he will be responsible for making censuses at the dump, sometimes with Frank and me and sometimes on his own. Maurice will help him to identify the bears and I will aid him

Two-year-olds: Maurice, Bob, and I counted seven two-year-olds (148, 135, 145).

Yearlings: There were eight yearlings (150's - 3 yearlings, 160's - 2 yearlings, and 39's - 3 yearlings).

No. 81: Large bear with round aluminum tag in right ear. census will be his major responsibility.

Scarneck: Scarneck scattered all bears as he did last evening. Later in evening the large light-faced bear with scar came in from the sage flats and exhibited dominance over Scarneck. Both attempted to bluff the other with false charged and swaggering. Scarneck left with the bear moving slowly after him.

Behavior

When preparing for an encounter the large bears walk "stiff-legged" toward one another in a swaggering gait. The hind legs are thrown outward and forward that gives the bear a rolling movement. The hind feet are alternately stomped downward and this gives the stiff-legged effect.

to the way individual form sheets must be recorded on these. Again the data is taken by many but the recording job is the responsibility of one.

General Activity at Lab

It is my responsibility to check the recordings frequently for accuracy and completeness. It is Frank's responsibility to do the same on the radio-

Arranged to write an article on the Golden Eagle for the National Geographic Society. Truslow will do the photos and I will write the text.

Over the years I have kept a brief independent log dealing primarily with experiences, ideas, and concepts that may not get into the official log.

Phoned Jerry McGahan and Bill Staniger. Bill will work with Truslow or that I wish to record for personal reasons. At times it has been a heavy burden with all the other work but it has helped me to keep close to the work.

Margaret and Karen arrived. The Halls came in at supper time. Have instructed Bob Ruff that his job, as Maurice's has been, will be to rewrite the field form sheets each day and to keep an official log of form sheets. The unsystematized data is no problem; it goes on chronological data including his observations and Frank's and mine that do not readily fit into the form sheets. In addition, he will be responsible for making censuses at the dump, sometimes with Frank and me and sometimes

on his own. Maurice will help him to identify the bears and I will aid him after Maurice leaves. In the interest of efficiency and accomplishing the myriad jobs that must be done to keep this and other projects going, the census will be his major responsibility.

I can recognize most of the bears but someone must be able to identify all bears accurately and rapidly without recourse to our list of marked bears and their identifying markers. This requires day to day observation which Frank and I can no longer do and which we in the past eventually turned over to Maurice. Bob seems to have a knack for it. We have a long history of past experience with each bear and each family group. With this knowledge we can instruct Bob as we did Maurice what types of information should be recorded for each. In time the observer can make independent judgments on what is important to record in the chronological log. Any data that will adapt to the many individual form sheets must be recorded on these. Again the data is taken by many but the recording job is the responsibility of one.

June 11, 1964

June 15-July 15 - 21 horse days

Aug. 15 - Sept. 1 - 30 horse days

1 horse for 60 days.

Horses to be kept at Canyon
Horse trailer to be furnished

Maurice and Bob observed at Trout Creek. See Notes.
It is my responsibility to check the recordings frequently for accuracy and completeness. It is Frank's responsibility to do the same on the radio-tracking work.

Maurice saw 2 collared yearlings at Alum Creek. Suspect these may be the orphaned cubs of the Owl-faced sow No. 148. They also could be the cubs of No. 48 "the old sow". If so, she has weaned them. Should know definitely before the summer is over.

Over the years I have kept a brief independent log dealing primarily with experiences, ideas, and concepts that may not get into the official log. At times it has been a heavy burden with all the other work but it has helped me to keep close to the work.

No. 29 This five-year-old female was bred by an unmarked bear at Trout Creek early in the morning. She was also bred June 9 by Ivan, No. 29.

Witnessed by Maurice.
form sheets. The unsystematized data and the data that cannot readily be categorized or its importance recognized or evaluated at the time of recording go into the official chronological log or into my personal log.

June 13, 1964
Fished for grayling on the Upper Gibbon. Maurice, Bob, Derek, and I each caught a limit.

June 11, 1964
Witnessed Maurice observed the sow enter the den. According to Dave Martinson reported seeing No. 65 and her 3 cubs on the east bank of the Yellowstone River. She was traveling west toward Trout Creek. \$400 per month for two months to help on Golden Eagle photographing.

Observations at Trout Creek
Met with Luis Gastelum, Bob Howe, Walt Kittams, John Good, and Wayne Howe to renew the research agreement on elk.

No. 40 Marion was back with one cub but the second one is still missing.
No. 29 This five-year-old sow is in estrus. She was mounted twice by No. 88 but breeding was interrupted and the mating was unsuccessful.

The white-faced bear trailed No. 29 far out on the flats and mounted her for 53 minutes. It was a successful copulation and establishes a record for continuous breeding activity. She appeared to arouse slowly but clutched the male.

I tentatively scheduled horse use as follows:
June 15-July 15 - 21 horse days
3 horses - 1 week

July 15-Aug. 15 - 120 horse days
4 horses for 30 days

Aug. 15 - Sept. 1 - 30 horse days
2 horses for 15 days.

Sept. 1 to Oct. 30 - 60 horse days
1 horse for 60 days.

Horses to be kept at Canyon

Horse trailer to be furnished

Maurice and Bob observed at Trout Creek. See Notes.

June 11, 1964

Harry Reynolds and Raphael Jingu

Drove to house to work around cabin and check on land situation.

June 12, 1964

Photographed a pair of trumpeter swans and 3 cygnets at the Marie

Slough. Maurice saw 2 collared yearlings at Alum Creek. Suspect these may be the orphaned cubs of the Owl-faced sow No. 148. They also could be the

Bob Huff saw No. 65 and her 3 cubs on east side of Yellowstone River opposite Trout Creek. She entered water once and was apparently trying to cross river. She entered water once and was apparently trying to cross river.

No. 29 This five-year-old female was bred by an unmarked boar at Trout Creek early in the morning. She was also bred June 9 by Ivan, No. 29.

Witnessed by Maurice.

June 13, 1964

They walked back into the timber and saw a sow grizzly moving off with a calf in her jaws. Fished for grayling on the Upper Gibbon. Maurice, Bob, Derek, and I each caught a limit.

Some fishermen actually observed the sow catch the calf. According to their observations, the sow drove the calf out of the timber into bank of the Yellowstone River. She was traveling ups tream toward Trout Creek. The sow plunged into the Gibbon River about 15-20 feet

Observations at Trout Creek
wide and 3 to 5 feet deep. The calf also plunged in but before it could swim No. 40 Marion was back with one cub but the second one is still missing. The grizzly caught it in mid stream and carried it into the timber.

No. 29 This five-year-old sow is in estrus. She was mounted twice by No. 88 but breeding was interrupted and the mating was unsuccessful. The grizzly carried it away 3 to 400 yards from the scene of capture. It con-

The white-faced boar trailed No. 29 far out on the flats and mounted her for 53 minutes. It was a successful copulation and establishes a record for continuous breeding activity. The boar appeared to arouse slowly but

clutched the sow firmly and held her until he was sufficiently stimulated to copulate successfully.

Bob and Maurice made a count. Made a census - see notes.

No. 101, a 7-year-old (established age) female arrived with one cub.

Saw 11 elk - one was marked with our collars. Could distinguish the red area color only.

June 14, 1964

Drove to Moose to work around cabin and check on land situation. ^{notes}
this morning. Photographed a pair of trumpeter swans and 3 cygnets at the Murie
Slough. Cygnets appeared to be at least a week old.

No. 12 Bob Ruff saw No. 65 and her 3 cubs on east side of Yellowstone River
opposite Trout Creek. She entered water once and was apparently trying to
cross river. ^{she} stretched out belly down in mud and water. Remained
spread-eagled for 10-12 minutes. Behavior ^{is} observed in males

following Grizzly Kill. Other occasions: ^{usually} ^{she} ^{was} ^{seen} ^{last} ^{month}

Bob and Dick were fishing on the upper Gibbon when they heard a calf
elk bawling. They walked back into the timber and saw a sow grizzly moving
off with a calf in her jaws. ^{Little Brown Bear, White-headed bear with scar}
^{were all} Some fishermen actually observed the sow catch the calf. According
to their observations, the sow chased the cow and calf out of the timber into
the meadow. The cow plunged into the Gibbon River which about 15-20 feet
wide and 3 to 5 feet deep. The calf also plunged in but before it could swim
across, the grizzly caught it in mid stream and carried it into the timber.
The bear did not kill the calf immediately. It was still bawling as the in-
grizzly carried it away 3 to 400 yards from the scene of capture. It con-
tinued to bawl as the grizzly moved out of sight in the timber. ^{receptive to him.}

No. 81 Jerry McCahan and Bill Staninger arrived and we discussed the eagle
study. ^{This 7-year-old sow was present with her first cub.}

Dominance: Trout Creek

Bob and Maurice made a count. ^{group.} The white-headed bear is second
in the hierarchy. No. 101, a 7-year-old (established age) female arrived with one cub.
This is her first family. See notes.

^{See} ^{also} ^{No. 100} arrived with her 2 yearlings. An unmarked sow with 2 unmarked
yearlings arrived at camp for first time this season. Now a total of 13 year-
lings.

June 15, 1964 arrived.

June 16. Has been raining since we arrived and is still raining. Wrote notes this morning. Caught 2 yearlings in traps at Trout Creek - No. 157 and an unmarked yearling that we numbered 165.

Trout Creek

No. 12 Inge was breeding No. 29 when we arrived. Breeding continued for 15 minutes. Sow "rolled out" from under Inge biting as she rolled aside. Inge moved off 150 yds and stretched out belly down in mud and water. Remained spread-eagled for 10-12 minutes. We had observed this behavior in males following copulation on other occasions.

Inge arose and chased Scarneck out of the immediate area. Inge and Scarneck both displayed the stiff-legged foot thumping swagger.

No. 88 No. 88, Scarneck, Little Brown Boar, White-headed boar with scar were all present. This was probably the result of a rope we fastened around her

No. 29 After Inge had bred No. 29, Scarneck mounted her and copulated for 18 minutes. The white-headed boar chased Scarneck off before a successful mating occurred. 29 turned and "rolled out" from under Scarneck as she had done with Inge. Took movies of cubs.

No. 29 was receptive to both males and assumed lordosis almost immediately upon being mounted.

Observation: The White-headed boar mounted No. 29 but she was not receptive to him.

No. 81 This sow showed signs of coming into estrus.

No. 101 This 7-year-old sow was present with her first cub.

Dominance: (165) belonged to her. Now the entire family is marked.

2-Year-Old Inge definitely dominated the group. The White-headed boar is second in the hierarchy. He clearly dominates Scarneck and No. 88.

Yearlings: - Now a total of 13 yearlings.

Now Here: No. 160 arrived with her 2 yearlings. An unmarked sow with 2 unmarked yearlings arrived at dump for first time this season. Now a total of 13 yearlings.

Behavior

Gerry Atwell arrived.

June 16, 1964

The grizzlies exhibit a very characteristic behavior pattern when they arrive at the Trout Creek dump for the first time each year. Almost without exception they move in cautiously and alert, standing to full height frequently to catch any scent. After standing and pivoting half around they drop to all fours and move rapidly toward the dump. Any unusual noise or activity will frequently send them scampering in retreat. They then approach the dump and the

No. 157 was a male; 165 a female. We processed them, taking blood samples (See form sheets).

No. 6 We have been watching for this bear for several weeks. She is a known-age five-year-old and should have arrived with cubs. She came into the Trout Creek meadow about 11 A.M. without a family. She was bred last season; see notes.

"greeted" with a quick sniff.

No. 65

Maternal Behavior

This sow was at the dump with her three cubs. She has the right hind foot amputated. This was probably the result of a rope we fastened around her leg last year and were unable to remove it when she recovered from the drug

No. 65. This sow has 3 small cubs. She parks them at a distance from the dump and then feeds. She returned to them three times last evening

One of the cubs has an injured forepaw. It appears to be deformed on the run when other sows or large males approached the cubs too closely. and atrophied. Took movies of cubs.

Gerry, Derek and Dick drove to the Lamar Valley to check on marked elk. Two sows viciously charged No. 88 in a concerted attack.

Trout Creek

Two collared cubs (cubs of 13 or the Owl-faced sow) were again seen at Trout Creek. The 3-year-olds of No. 75 (135 and 136) orphaned last fall as yearlings both made it through the winter.

No. 37 Sow appeared with one yearling. The two we captured this morning (157 and 165) belonged to her. Now the entire family is marked.

2-Year-Olds - Now a total of 15 at Trout Creek. See Census sheets.

Cubs Only 5 cubs showed up so far.

Yearlings - Now a total of 13 yearlings.

New Bears: Brune No. 14, Mae West and 2 yearlings arrived last evening. We processed the bear and released it.

Rabbit Creek

Behavior

The grizzlies exhibit a very characteristic behavior pattern when they arrive at the Trout Creek dump for the first time each year. Almost without exception they move in cautiously and alert, standing to full height frequently to catch any scent. After standing and rotating half around they drop to all fours and move rapidly toward the dump. Any unusual noise or activity will frequently send them scampering in retreat. They then approach the dump and the concentration of other bears again, moving cautiously as before. When almost at the dump they frequently stand and survey the situation then move rapidly to the group. Sometimes they are challenged by aggressive males and some are "greeted" with a quick sniff.

d Maternal Behavior

No. 133 The age of the mother may have some relation to her maternal instinct toward young.

No. 65. This sow has 3 small cubs. She parks them at a distance from the dump and then feeds. She returned to them three times last evening on the run when other sows or large males approached the cubs too closely. She is a disciplinarian.

Two sows viciously charged No. 68 in a concerted attack.

Two collared bubs (cubs of 48 or the Owl-faced sow) were again seen at Otter Creek.

Set traps.

June 17, 1964

Caught one unmarked bear; a male 4 to 5 years old. Immobilized it with Sernylan. The bear got up and raced out after we took it out of the trap. Had to use the Capchur gun and inject another drug dose. Pupils of the eye were contracted to "pin points". As in previous cases, the bear apparently could not see but could hear very well and would approach any noise. We processed the bear and released it.

Rabbit Creek

No. 151 This sow arrived without her cub. It may be with No. 40. Bob, Maurice and I made a count at Rabbit Creek.

Breeding

7 - 2-year-olds

No. 129 This sow was mounted by Bruno No. 14 and "checked out" by Short-ear. 4 - large adult males

Short-ear arrived at dump for the first time this year. He is thin 1 - female

and his coat is shaggy. Searneck immediately ran him off.

Earless and White-fang were present. White-fang is perhaps the largest White-Clay. This unmarked sow was pursued by No. 28. No copulation. grizzly in the Park but very shy. Old Yeller No. 2 was also present. He has a

Dominance

round aluminum tag in the left ear. This bear bred No. 164 on May 18 (see

No. 37 The Dump Sow was very aggressive. She and her three yearlings faced notes).

up to Inge several times during the evening. She is near the top of the dominance hierarchy. Split-ear who also bred her on the same day was not at the dump this evening nor was Sow No. 164.

No. 140 Present but not breeding actively. She attacked the White-headed Sow no yearlings or cubs.

bear.

No. 133 This 2-year-old male was marked at Trout Creek last summer and seen

No. 14 Bruno is a large bear that frequently has his mouth open and appears last fall with its litter mate No. 132 and unmarked sow at the head of Alum to be smiling. Though large he is not aggressive.

Creek. Last fall No. 139, one of the weaned yearlings of No. 42, was with

No. 12 Inge asserted dominance over all the bears. Put the run on Searneck, this family.

the White-headed bear, Bruno, Short-ear and No. 28.

Last fall the sow, 133, 132, and 139 moved in on us in the open areas New Bears A new two-year-old arrived. She has a very thin, pointed muzzle of Alum Creek. (See notes)

and light hair on throat. She appears fix-like and we will call her "Foxy".

Behavior

There are now 16 two-year-olds.

We suspect that 139 hibernated with her adopted family. It is inter-

Remarks

esting that No. 133 is now at Rabbit Creek while his litter mate 132 and

No. 125 This sow was seen at Cascade Creek on April 30 with her 2 two-year- adopted yearling 139 of sow No. 142 are both at Trout Creek. The sow is unmarked olds (141 and 142). Both are now weaned. Probably weaned in May and cannot be recognized. (This should be recorded under family history).

No. 160 and her two yearlings and Mae West and her two yearlings

June 18, 1964

were both in. Are coming in from the S.E.

Did not set the traps last evening.

No. 142 This sow came in for the first time with 2 cubs.

Trout Creek

No. 120 has been mistaken and misidentified as No. 42. This should No. 40 Marion arrived with 2 cubs. She may have retrieved her lost one or it be changed throughout the notes. may be the cub of another sow.

Boars with Cubs at Trout Creek:

No. 101 This sow arrived without her cub. It may be with No. 40.

No. 101- 1 cub Breeding

No. 129 This sow was mounted by Bruno No. 14 and "checked out" by Short-ear.

Short-ear arrived at dump for the first time this year. He is thin and his coat is shaggy. Scarneck immediately ran him off.

White-Claw - This unmarked sow was pursued by No. 88. No copulation.

off correspondence. Dominance

No. 37 The Dump Sow was very aggressive. She and her three yearlings faced up to Inge several times during the evening. She is near the top of the dominance hierarchy.

No. 140 Present but not breeding actively. She attacked the White-headed boar.

No. 14 Bruno is a large boar that frequently has his mouth open and appears to be smiling. Though large he is not aggressive.

No. 12 Inge exerted dominance over all the bears. Put the run on Scarneck, the White-headed boar, Bruno, Short-ear and No. 88.

New Bears A new two-year-old arrived. She has a very thin, pointed muzzle and light hair on throat. She appears fix-like and we will call her "Foxy". There are now 16 two-year-olds.

Breeding

Remarks

No. 125 This sow was seen at Cascade Creek on April 30 with her 2 two-year-olds (141 and 142). Both are now weaned. Probably weaned in May.

No. 160 and her two yearlings and Mae West and her two yearlings were both in. Are coming in from the S.E.

No. 142 This sow came in for the first time with 2 cubs.

No. 120 has been mistaken and misidentified as No. 42. This should be changed throughout the notes.

Sows with Cubs at Trout Creek:

Fighting

No. 40 - 2 cubs has lost 1 and it is presumably dead

No. 101 - 1 cub

No. 42 - 2 cubs

No. 65 - 3 cubs

Total 8 cubs

June 19, 1964

No success with the traps. Spent morning writing notes and getting off correspondence.

No. 65 Had only 2 cubs in the morning but she had retrieved it by evening. Remarks

Bears came in from all directions and were very active. It was cold with snow flurries.

New Bears

No. 7 No. 7 arrived and still has the radio collar intact. She was alone. Will observe to see if she comes in estrus. She weaned yearling late last summer. Came in from the Southeast.

Unmarked Sow. This sow was in estrus when she arrived. She was mounted by 88 and bred by No. 12. The new sow is very light colored.

No. 125 Present but not receptive.

Breeding

When the new unmarked sow arrived No. 88 mounted her five times in about 12-15 minutes. No. 12 then moved in from the flats and immediately moved over to her, smelled her genitalia and attempted to mount. She moved aside. No. 2 grabbed her by the scruff of the neck, applied his weight and she stood submissive. No. 12 mounted and dismounted several times (4) then remained on the sow for 41½ minutes and was still mounted when we left. Coitus occurred. The new bear was apparently bred. We will attempt to mark this unmarked sow.

June 20, 1954

Fighting

Left the Lab at about 4:30 A.M. to try our luck on trout at Trout Lake.

The White-faced bear and Scarneck fought out on the flats. The W.F.

Spotted a number of marked elk up the Lamar near the ranger station.

boar charged Scarneck and bowled him over. Each went for the other's throat.

Got five of them identified to individuals. Gerry followed them

Scarneck lay on his back with the W.F. boar on top. Scarneck got to his feet during the day. The rest of us fished Trout Lake with indifferent success.

and they parried, snapping at one another with fangs bared. They rolled and

The unmarked yearlings were at Otter Creek.

bit and slapped. Scarneck seemed to be getting the worst, but he grabbed the

Trout Creek

W.F. boar by the throat while he was on his back and the W.F. boar had him by

No. 42 - Arrived with 2 cubs

the side of the neck. The W.F. boar released his hold while Scarneck still

101 - 1 cub

retained his grip on the other's throat. The W.F. boar backed up a step and

120 - 2 cubs

Scarneck released him. Both got to their feet and stood eyeing each other,

Behavior:

heads thrust forward, jaws apart and teeth showing. Both were breathing

Two male two-year-olds have been traveling together and play together

heavily. The fight appeared to be a draw. The two bears stood eyeing each

and feed together at the dump.

other for a full three to four minutes. Scarneck remained at the scene of the

No. 135, the smaller of the two males, frequently mounts No. 145, a

fight and the W.F. boar came into the dump. Neither appeared to be injured.

large male. This play-copulating is not uncommon and frequently is noticed

among the yearlings as well as the two-year-olds and also the cubs.

Mating

(Write detailed description of mating)

Took movies of No. 135 mounting No. 145 both two-year-olds.

No. 135 has a crooked ear.

No. 125 not present.

Maurice was photographing at Norris Junction. In attempting to photo-

graph a cow calf in the timber he was attacked by the cow which had been hidden

from him until it suddenly approached at close quarters striking out with her

forefeet and grinding her teeth.

Saw a tiercel hawk catch a cliff swallow. He dove several times

searing the swallows from the Trout Creek bridge. On the final stoop he went

straight down and picked a swallow out of the air with ease. It was a beautiful

sight.

White cow in estrus earlier not present.

130's yearlings were nursing vigorously. They have been observed

nursing frequently.

June 20, 1964

Left the Lab at about 4:30 A.M. to try our luck on trout at Trout Lake.

Spotted a number of marked elk up the Lamar near the ranger station.

Got five of them identified to individuals. Gerry followed them

during the day. The rest of us fished Trout Lake with indifferent success.

Two unmarked yearlings seen at Otter Creek.

Large areas of sagebrush on both sides of Hayden Valley have been

Trout Creek

severely injured or killed by the fire. In some areas the sage is girdled

No. 42 - Arrived with 2 cubs

101 - 1 cub

120 - 2 cubs

Behavior:

Breeding

Two male two-year-olds have been traveling together and play together

No. 135, the smaller of the two males, frequently mounts No. 145, a

Took movies of No. 135 mounting No. 145 both two-year-olds.

No. 135 has a cropped ear.

No. 125 not present.

Maurice was photographing at Norris Junction. In attempting to photo-

graph a cow calf in the timber he was attacked by the cow which had been hidden

Saw a tiercel duck hawk catch a cliff swallow. He dove several times

straight down and picked a swallow out of the air with ease. It was a beautiful

White sow in estrus earlier not present.

150's yearlings were nursing vigorously. They have been observed

nursing frequently.

No. 125

June 21, 1964

This is a dark sow with blue tape in left ear.

Sunday - day off. Caught a limit of trout in Yellowstone Lake.

Behavior

Bob Ruff, Derek and I checked the bald eagle nest 1 mile below Fishing Bridge. It is not in use and we saw no eagles.

Some of the two-year-olds rolled and tussled most of the evening.

Spotted a marked elk and identified her as No. 39 marked in 1963.

Wolves No. 76 and a small bear played at fighting for 10-12 minutes.

Large areas of sagebrush on both sides of Hayden Valley have been

Took movies

severely injured or killed by the Microtus. In some areas the sage is girdled and in other areas the root systems appear to be injured. Will inspect the damage more closely. The kill of sage could have an important effect on the

ecology of Hayden Valley.

Black Bear

Breeding

Scarneck bred the light unmarked sow for 29 minutes. This same sow was bred by No. 12 (Inge) June 19 for 41½ minutes.

No. 14 sniffed around this sow earlier and made a half-hearted attempt to mount her. She was very receptive, backing into No. 14. He showed little interest. No. 88 checked.

Total of 39 bears present:

After Scarneck bred her she was not receptive to No. 88.

No. 150.

150's yearlings nursed her vigorously. Have observed them nursing on several occasions.

65's yearlings are also nursing rather frequently.

June 22, 1964

No. 30

Arose at 4 A.M. to look for elk. Spotted 3 marked elk and identified to individual. This is a large bear with A1 ear tag at base of right ear. This bear charged us in 1959 when we marked him and scattered our gear. I got several photos of him charging (See 1959 notes).

No. 166

Captured one of Sow 39's yearlings. We now have caught all three of them this season. Judging his size against other known three-year-olds in the population.

(Judged against known-age 130).

Fred Truslow and Bill Steniger discussed the Golden Eagle project.

No. 125 Took some movies as the grizzlies came in to Trout Creek.
This is a dark sow with blue tape in left ear.

Behavior: No. 35 and No. 45 exhibited more "play" copulating behavior.
It was cold and snowing. The bears were far more playful than usual.
Some of the two-year-olds rolled and tussled most of the evening.

Pegleg No. 76 and a small boar played at fighting for 10-12 minutes.
Took movies.

Lance and Charlie arrived. Frank remained at the cabin at Moose and will drive up tomorrow.

Remarks:
Black Bear. apparently come in estrus again. She was mounted by No. 88. No. Maurice saw the large light-colored black bear sow at Tower with 2 yearlings several weeks ago. Today he saw her again and the yearlings are weaned. The sow was with a large boar. 129 broke away from under 88 and both took off. Most of the large boars were present with the exception of No. 12. No. 12 made census (see notes).

Total of 39 bears present:

June 24, 1964	6 yearlings
	3 cubs
June 26, 1964	11 2-year-olds
Conferred with Frank in	3 3-year-olds
Call that President Bob	3 3-4-year-olds
	1-5-year-old
Got permission from the	13 adults - 7 males, 6 females

June 22, 1964

Arose at 4 A.M. to look for elk. Spotted 3 marked elk and identified to individual. No. 39 did not appear.

Gerry, Derek, and Charlie observed a number of marked elk in the Lamar Valley.

Captured one of Sow 39's yearlings. We now have caught all three of them this season. National Park Service contract for the elk study.

Gene Peterson arrived. the bear movie and set up priority shots.

Fred Truslow and Bill Staniger discussed the Golden Eagle project.

Took some movies as the grizzlies came in to Trout Creek.

Trout Creek

No. 35 and No. 45 exhibited more "play" copulating behavior.

For bears present - see census.

June 23, 1964

Arose at 4 A.M. and photographed with Gene Peterson. Took photos of bear and moose.

Got some good photos of bears standing.

Trout Creek

Breeding:

No. 129 has apparently come in estrus again. She was mounted by No. 88. No. 7 was standing by. Successful mating did not occur.

No. 12 spotted 129 and No. 88 copulating at about 1/4 mile and headed for them. As he approached No. 129 broke away from under 88 and both took off on the run. 129 snapped at 88 as they disengaged. No. 12 pursued. No. 12 mounted No. 129 four minutes later.

Engel checked No. 6.

June 24, 1964

Conferred with Frank in morning and made plans.

Call that President Bob Johns will arrive June 28th.

Got permission from the Park Service to shoot an aged bear for blood specimen and autopsy.

Drove to Rabbit Creek to shoot "White Fang". Waited from 5 P.M. until 9 P.M. but White Fang did not appear.

Saw sow with three cubs and there is another sow with two cubs.

June 25, 1964

Made arrangements for President John's visit.

Rewrote the National Park Service contract for the elk study.
outline

Wrote out another for the bear movie and set up priority shots.

Hiked up Trout Creek with Gene and Maurice. Photographed elk. Saw
June 27, 1964

five bulls and a number of buffalo. No grizzlies.

Cleaned up the lab in preparation for Dr. John's visit.

Trout Creek

Phoned Kittans and discussed the new elk contract. I was not satis-

No. 12 mounted No. 81 twice and then a third time. She was receptive
fied with it as it bound us to certain unnecessary stipulations and did not hold
but No. 12 though interested did not breed her, but kept other boars away.
the Park Service to others that are essential to a proper execution of the study.

Bruno mounted No. 81 when No. 12 wandered off. No. 12 returned and
will have to rewrite several portions of the contract.
chased Bruno away. No. 12 mounted No. 81 again but remained only a few minutes.
No. 6: Shot No. 6 at Trout Creek with succinyl but 60 mg. was insufficient
No breeding occurred. and she got away.

Inge (No. 1v) and Bruno were still vying for No. 81 when we left after
No. 7: Shot No. 7 also but she too got away. It was dark when we shot her.
dark. Bruno was more persistent than at other times. He appeared ready to breed
No. 12: Inge mounted No. 81 and copulation continued for 45 minutes. The
and No. 12 did not. Saw 81 was receptive to both.
saw got bred.

Behavior:

June 28, 1964

No. 7 chased her offspring No. 6 for 1/4 mile on a dead run. No. 7
Worked around the laboratory in the morning.
is antagonistic to No. 6.

President Johns and family arrived about 2:00 P.M. with their camper.

New Bears:

Dean Bob Coonrod and family arrived 3:00 P.M.

Bob recorded 3 new bears. No. 128 was among them.

Pat prepared a fish fry supper for all.

One of No. 7's yearlings may have arrived. He is unmarked and we
Took Dr. Johns, Coonrod, and families to Trout Lake and explained our
can't identify her for certain.

June 26, 1964

Had a very interesting and congenial talk with Dr. Johns.

Hiked to "3-Mile" and spent the morning fishing in the Canyon. All

Margaret and Karen arrived and they visited with the Coonrod and
got a limit of fish.
Johns families.

Gene and I shot movies at Trout Creek from 5:30 to 7:30 P.M. Got

June 29, 1964
some good action but all back-lighted.

Took Dr. Johns and Dr. Coonrod fishing on Yellowstone Lake. The Y.P.

Some new bears arrived. Most grizzlies when approaching the dump for
Company supplied one of their cruisers gratis. First attempted to arrange a
the first time of the season are alert and apprehensive. They rise on their
semi-official trip through the National Park Service without success.

hind legs frequently and shift the wind. We got some good cinema shots of
Drove "presidential party" to top of Mt. Washburn. Demonstrated
several bears doing this. Load carried by No. 32,
transmitter and receiver. Spotted elk.

June 27, 1964

Received report of a dead grizzly at Mud Volcano. Maurice investigated. It was No. 355 and had been dead for several weeks. Cause unknown. Salvaged skull and claws only.

Cleaned up the Lab in preparation for Dr. John's visit.

Phoned Kittams and discussed the new elk contract. I was not satisfied with it as it bound us to certain unnecessary stipulations and did not hold the Park Service to others that are essential to a proper execution of the study. Will have to rewrite several portions of the contract.

No. 6: Shot No. 6 at Trout Creek with sucostrin but 60 mg. was insufficient and she got away.

No. 7: Shot No. 7 also but she too got away. It was dark when we shot her.

No. 12: Enge mounted No. 81 and copulation continued for 45 minutes. The sow got bred.

June 28, 1964

There are actually three parties involved - the Regional office, the Yellowstone Park Administration, and Montana State University.

Worked around the laboratory in the morning.

President Johns and family arrived about 2:00 P.M. with their camper.

Have now accounted for 20 out of 26 yearlings.

Dean Bob Coonrod and family arrived 5:00 P.M.

The White-faced bear is challenging Inge ever more aggressively.

Pat prepared a fish fry supper for all.

Bob Huff is doing an excellent job assuming Maurice's duties. The Took Dr. Johns, Coonrod, and families to Trout Lake and explained our transition should be very smooth. Will really miss Maurice, he's done an outstanding job.

Had a very interesting and congenial talk with Dr. Johns.

July 1, 1964

Margaret and Karen arrived and they visited with the Coonrod and Johns families.

June 29, 1964

Visited with Mrs. Richards in Mammoth.

Discussed the elk contract with Lois MacKellan and John McLaughlin.

Took Dr. Johns and Dr. Coonrod fishing on Yellowstone Lake. The Y.P. Company supplied one of their cruisers ? gratis. First attempted to arrange a semi-official trip through the National Park Service without success.

Maurice and Bob autopsied a black bear.

Drove "presidential party" to top of Mt. Washburn. Demonstrated transmitter and receiver. Spotted elk.

July 2, 1964
Received report of a dead grizzly at Mud Volcano. Maurice investigated. It was No. 155 and had been dead for several weeks. Cause unknown. Salvaged skull and claws only.

Discussed possibility of ERI affiliating with Montana State University. President was very encouraging.

June 30, 1964
President Johns and family left.

Took some indoor movie shots of laboratory with Gene Peterson.

Phoned Walt Kittams on elk contract. Agreed to original contract providing we could meet later and draw up a more suitable contract for future and work out a Memorandum of Understanding with Yellowstone National Park. There are actually three parties involved - the Regional office, the Yellowstone Park administration, and Montana State University.

Trout Creek

Have now accounted for 20 out of 26 yearlings.

The White-faced bear is challenging Inge ever more aggressively.

Bob Ruff is doing an excellent job assuming Maurice's duties. The transition should be very smooth. Will really miss Maurice, he's done an outstanding job.

July 1, 1964

Visited Frank Goodyear and discussed problems relative to ERI.

Visited with Mrs. Nichols in Mammoth.

Discussed the elk contract with Luis Gastelum and John McLaughlin.

Trout Creek

Captured sow No. 42 and 1 cub. See notes. 170 will return to Gardiner.

Maurice and Bob autopsied a black bear.

July 4, 1964
Took milk and blood samples from sow No. 42.

Spent three days at the cabin. Worked on National Geographic article. Had a nice Fourth with the family.

July 2, 1964 ... Mr. Gould, but he was leaving on a trip.

July 7, 1964 Received call from the sheriff and also from Justice of the Peace, Mr. Harr, of Gardiner. Grizzly sow was coming into the town. They had her trapped and her two cubs were nearby. ... I shot the two cubs with sucostrin along the Gardiner River just below the highway bridge. Harry, Bob and I hauled them up the slope and put them in a trap. Quite a crowd around. Lance and Gene Peterson took stills and movies. Karen helped out. ... Got permission from the chief ranger to mark and release the sow and two cubs at Trout Creek.

No. 34. Number 34 returned to Trout Creek dump with 2 yearlings. She weaned cubs and then mated the next year. Appeared with second litter of cubs in 1963 - now has yearlings (See notes). ... The Wolf's arrived with John's classmates and we showed them around the lab. one bear, believe it was a grizzly, at 9,000 ft. on Two Ocean Plateau. Helicopter Patton of National Geographic phoned. Is arriving in August to spend 10 days photographing.

July 3, 1964 ... Immobilized, marked and instrumented the sow captured in Gardiner. Had some difficulty with sucostrin dose - see notes. ... Took blood and milk sample. ... Took data and color marked her two cubs. This is probably the way they catch. Released all three together. The cubs ran off and when we left the sow had not located them nor made any attempt to locate them.

The signal is good. We suspect this sow No. 170 will return to Gardiner. ... Put an elk-type collar on her. Used yellow rope - red-white-red. Spent three days at the cabin. Worked on National Geographic article.

July, 4, 5, 6 ... Had a nice Fourth with the family.

Phoned Dr. Gould, but he was leaving on a trip.

July 7, 1964 We took out after her in the semi-dark. While I restrained her, immobilized and marked a sow captured by W.P.S. at Fishing Bridge.

Used sernylan and it worked well. See data sheets. Took blood sample and rectal temperature. Rectal temp. was 102° F. Sernylan may raise body temp.

Trout Creek Shot sow on dump. Used 60 mgs. of sucostrin. Loaded her in trap and held overnight.

Took movies. Arranged helicopter flight spot marked elk.

July 8, 1964 Arrived. Garry and Derek, Charlie, and Lance will backpack and spot elk.

Up at 5:00 A.M. Made a 2 hr. 10 min. flight around Yellowstone Lake from west to east. Saw many elk including marked ones. See notes on flight. Observed one bear, believe it was a grizzly, at 9,000 ft. on Two Ocean Plateau. Helicopter time 2 hrs: 10 min. Saw 828 elk of which 22 were marked and identified to area of capture.

Stopped to watch a cow moose at Otter Creek. Grizzly No. 143, a 2-year-old appeared. Bear apparently did not see the moose but got its scent and started toward it, head down, picking up the trail like a fine bird dog. The moose 75 yds. from the bear took off on a run and disappeared into the timber, 200 yds. distant. The bear continued on the trail. This is probably the way they catch a young calf. Had the cow had a calf, the grizzly would have had an opportunity to bring it to bay.

Immobilized and marked sow No. 172. She is suckling 3 yearlings. We took a milk sample; injected Syntocinon to induce free milk flow. Used sernylan for immobilization. Put an elk-type collar on her. Used yellow rope - red-white-red flags (3). Took foot print and blood sample.

At Trout Creek we shot No. 6 with 60 mg. of sucostrin. She ran across the stream and we took out after her in the semi-dark. While I restrained her, as the sucostrin dose had barely put her down, Bob injected penta. The needle bent when she turned and only half the dose got into her. There were several large bears nearby and we were in a vulnerable spot so we retreated to await the effect of the penta. The half dose failed to immobilize or anaesthetize her and she got away. We were all disappointed as this 5-year-old known-age female has a long history and is a valuable bear for us to recapture.

July 9, 1964

Phoned Jim Cole and made arrangements for him to come to Canyon and work on the elk migration study from July 15 to Aug. 15. Gerry Atwell will be here until Jim arrives. Gerry and Derek, Charlie, and Lance will backpack and spot elk. Jim will continue the work with the boys using horses to get into the Thoroughfare country.

Gerry and I made a flight in the helicopter. We started at Lake, flew up Pelican Valley, crossed the Mirror Plateau, down Specimen Ridge, across the Yellowstone River, up the N.E. Ridge of Mt. Washburn, crossed Dunraven Pass to the Washburn range thence southwest to the head of Trout Creek and back to our starting point at Lake. For details see map. Saw 476 elk of which 32 were color marked and identified to area of capture.

Took the portable receiver with us in an attempt to locate No. 170. We lost radio contact from the ground yesterday northwest of Mt. Washburn. Pilot was unfamiliar with the area and mountain flying and we did not get into the country where I suspected 170 to be. As a result we made no radio contact.

Saw about 100 head of elk and many buffalo at the head of Trout Creek.

Helicopter time 1 hour, 39 min.

Hired Kay Holding to take dictation and do typing.

Gerry Howell, Derek Trout Creek headed up Pelican Creek for a four or

five day. Got another chance at No. 6. Shot her on the dump with 270 mg. of sernylan. She dropped in the creek but was not sufficiently immobilized to be in danger of drowning. Had to give her a second shot before we could handle her. Hauled her up the steep bank and put her in trap to hold until morning. Shot a large yearling with sucostrin but failed to get it. Had re-trapped No. 165 last night. Let Bob, Harry and Ralph work on it together for experience while I caught up on paper work and planning. The use of sernylan promises to revolutionize our work schedule. It appears to be a much safer drug than sucostrin and if this proves to be true, I can turn the now routine immobilizing, measuring, and processing over to Bob and the crew. This will be a great relief and allow me to concentrate on other things.

We located No. 170 at Swan Lake apparently well on her way back to Gardiner. See radio-tracking notes. Frank and Derek picked her up with the mobile tracking unit.

July 10, 1964 unmarked bears

Processed No. 6. Took blood sample, dental casts and foot print. We have a very complete growth and development record of this bear which was a known-age cub in 1959.

Instrumented No. 6 - red and white collar. Signal was not good. Received in on the portable at 1 mile while bear was immobilized. No. 6 was in breeding condition. Genitalia (vagina) swollen and pink. This bear should have been bred (although we did not witness it) and she should produce a first litter next spring at 6 years of age.

After lunch Bob Ruff left for Missoula. Bob has done exceptionally well in taking over Maurice's job.

In the nest and one had left. We captured this one, a male, and took it back to the lab. Derek will train it. Bear was in good condition and should be her. Believe this is a situation where a large adult bear was backed down with a female in distress. We have

Gerry Atwell, Derek and Charlie headed up Pelican Creek for a four or five day trip that will bring them out at Crystal Creek on the Lamar River.

July 12, 1964

They should spot a lot of marked elk as the Pelican drainage, Mirror Plateau, Specimen Ridge is a major migration route.

Radio signals showed that No. 6 was in the Sulphur Mt. area. Frank, Lance, Johnny and I started tracking her from Big Horn Overlook about 9:00 A.M.

Jerry McGahan, Bill Staniger and Fred Truslow arrived. Worked out some plans for photographing golden eagles. Not too interested in doing an article on the golden eagle with Truslow, but it has been thrust upon me.

No. 6 was within 4 or 500 yards of us. We moved slowly up the hill above Mammoth. Drove to Mammoth and picked up No. 170's signal on the hill above timber and downfall. I saw a large sleeping grizzly within 100 feet of Mammoth. Drove down the back road checking for the signal from time to time.

Only his back was visible; the rest of his body was in a depression at the base of a large dead tree. I signaled the others and we retreated silently to a southward into the hills soon after we arrived. Did not see her cubs.

small clearing. There Johnny and Lance climbed trees and I disposed of the movie camera and tripod. We left the boys behind and detoured to the east,

Bears at Gardiner Dump:

No. 170

2 - 2-year-olds

1 unmarked sow

2 unmarked boars

1 sow - 2 cubs.

Tracked No. 6 after instrumenting her.

July 11, 1964

Wrote notes, worked on National Geographic article "Radiotracking Grizzly". Our plan was to make a noise and then quickly climb the tree. Suddenly a grizzly irrupted from the downfall between us and the still sleeping bear. It had a radio collar and was probably No. 6. Fortunately she took off at right angles to us. We caught only a glimpse of her. This proved the bear visited 2 golden eagle eyries in the Yellowstone Valley below Tom Minor Basin. and he got up and moved off slowly and deliberately directly away from us. I reviewed some of his data. He's doing a great job.

Jerry, Fred Truslow, Frank, Bill Staniger, Johnny, Lance and I visited 2 golden eagle eyries in the Yellowstone Valley below Tom Minor Basin. and he got up and moved off slowly and deliberately directly away from us. I reviewed some of his data. He's doing a great job.

The second nest was the one Fred Truslow has been photographing with believe the bear was the White-faced bear but could not be absolutely certain. Bill Staniger. Two fledglings were in the nest and one had left. We captured this one, a male, and took it back to the lab. Derek will train it.

No. 6 has been in estrus and should be now. Believe this is a situation where a large dominant bear was bedded down with a female in estrus. We have

Saw a very large rattlesnake and photographed it. Seeing the rattler observed bears and cows paired off at the dump and in the back country but until at close range and climbing the eagle cliff was quite an adventure for Johnny. this time we had never observed them bedded down together although we suspected July 12, 1964

this must be the case and that breeding occurred in these day-time retreats as Radio signals showed that No. 6 was in the Sulphur Mt. area. Frank, well as out on the flats near Trout Creek dump.

Lance, Johnny and I started tracking her from Big Game Overlook about 9:00 A.M.

After the grizzlies ran off we inspected their beds. The one used by Came upon a strutting male blue grouse and I took some movies. Moved on into the large bear was 4'x4'x2' deep. In the near vicinity were a number of other the timber and soon jumped a grizzly. The signal was strong and we suspected beds, some about the same dimensions and some smaller. They were 15 to 20 feet No. 6 was within 4 or 500 yards of us. We moved slowly upwind through heavy apart.

timber and downfall. I saw a large sleeping grizzly within 100 feet of me.

When a bed is dug, the excavated earth is generally piled in one Only his back was visible; the rest of his body was in a depression at the end place. Frequently they are made at the base of a tree, a log or a stump, of a large dead tree. I signaled the others and we retreated silently to a Sometimes there is an overlook, sometimes not. Generally droppings are piled small clearing. There Johnny and Lance climbed trees and I disposed of the close to the bed. Quite frequently beds are dug in cone caches made by red movie camera and tripod. We left the boys behind and detoured to the east, squirrels.

climbed a small ridge and then moved in on the sleeping bear across wind and July 13, 1964

with the advantage of a little elevation. The glimpse I had of the bear told me

Lance and I took off in helicopter at 7:15 A.M. to rendezvous with it was a very large animal probably a boar. We re-located the bear again from Gerry, Derek and Charlie who are somewhere on the Mirror Plateau. Behind of the ridge at about 120 feet. After satisfying ourselves that we could approach elk were in the openings. I had requested the pilot to take the door off on safely we returned to the boys. We left Johnny up in the tree but took Lance my side so I could photograph. Should have gotten some good photos of marked back with us as he wanted to be present when we jumped the bear. The three of elk in the herds.

us selected a large limbed lodgepole about 120 feet and slightly above the

Saw Gerry and the boys at the head of Opal Creek. Many elk were in grizzly. Our plan was to make a noise and then quickly climb the tree. openings to the N.W. of them. Also saw a bear and 2 moose.

Suddenly a grizzly irrupted from the downfall between us and the still sleeping Pilot landed in one of the openings and Lance and I took our packs,

boar. It had a radio collar and was probably No. 6. Fortunately she took off waved the pilot off and hiked down to join the backpacking crew. They had made at right angles to us. We caught only a glimpse of her. This aroused the boar observations of marked elk about sunset and were cooking breakfast when we arrived. and he got up and moved off slowly and deliberately directly away from us. I rived. They had seen over 50 color-marked elk from July 10 to 13 as they believe the boar was the White-faced boar but could not be absolutely certain. progressed up Pelican Valley onto the Mirror Plateau.

It could have been Bruno. No. 6 was bedded down within 40 or 50 feet of the

We broke camp and hiked N.W. until 2 P.M. Waited out an electric boar. No. 6 has been in estrus and should be now. Believe this is a situation storm and then decided to camp on a high overlook east of Amphist Peak. where a large dominant boar was bedded down with a female in estrus. We have

observed boars and sows paired off at the dump and in the back country but until this time we had never observed them bedded down together although we suspected this must be the case and that breeding occurred in these day-time retreats as well as out on the flats near Trout Creek dump.

After the grizzlies ran off we inspected their beds. The one used by the large boar was 4'x4'x2' deep. In the near vicinity were a number of other beds, some about the same dimensions and some smaller. They were 15 to 20 feet apart.

When a bed is dug, the excavated earth is generally piled in one place. Frequently they are made at the base of a tree, a log or a stump. Sometimes there is an overlook, sometimes not. Generally droppings are piled close to the bed. Quite frequently beds are dug in cone caches made by red squirrels.

July 13, 1964

Lance and I took off in helicopter at 7:15 A.M. to rendezvous with Gerry, Derek and Charlie who are somewhere on the Mirror Plateau. Bands of elk were in the openings. I had requested the pilot to take the door off on my side so I could photograph. Should have gotten some good photos of marked elk in the herds.

Saw Gerry and the boys at the head of Opal Creek. Many elk were in openings to the N.W. of them. Also saw a bear and 2 moose.

Pilot landed in one of the openings and Lance and I took our packs, waved the pilot off and hiked down to join the backpacking crew. They had made observations of marked elk about sunset and were cooking breakfast when we arrived. They had seen over 50 color-marked elk from July 10 to 13 as they progressed up Pelican Valley onto the Mirror Plateau.

We broke camp and hiked N.W. until 2 P.M. Waited out an electric storm and then decided to camp on a high overlook east of Amythist Peak.

Scouted the surrounding areas from 2 P.M. until 5 P.M. but saw no elk. All had sought the heavy timber. Saw 2 bunnies.

Portions of this summer range are overgrazed and trampled by elk and buffalo. A light shower came and mucky runoff from the higher grassy slopes.

We made our camp in a stand of fir and spruce. During the afternoon I dug tubs of spring beauty, *Lewisia* and rock-socks of *Lomatium* sp. We boiled these for supper and they were very good. *Lewisia* especially abundant.

The whitebark pines in this area have a fair to light cone crop.

Weathered quite a storm during the night. Vegetation is still lush and green but it is probably quite dry here during August.

We ate Starlight dehydrated dinners - Swiss steak, gravy, pork chops, etc. All were very good.

July 14, 1964

Broke camp east of Amethyst Peak and hiked around the peak and on down Specimen Ridge to Crystal Creek trap. The ranges en route were heavily used. Saw one marked elk. This was the last we saw. Total for entire trip was 54 marked elk seen, 47 identified as individual, 7 to seen only.

H.P.S. brought us a grizzly shot at Canyon. It had injured 2 boys when it broke into their tent. Tent was pitched across game trail. The boys described their attacker as a black bear; the rangers in hunting the attacker came upon a grizzly and killed it. It is a young male and probably was guilty but there was certainly no positive evidence.

Park Service records describe this incident in some detail.

Heavy grass in area and dense lodgepole
H.P.S. brought us a grizzly shot at Canyon in trap. She had been captured in taking off on wilderness trap. We immobilized her and removed radio and all ear tags and color markers.

July 15, 1964

Autopsied the grizzly. It was in good condition but had not an ounce of fat. See autopsy sheet.

Scouted the surrounding areas from 2 P.M. until 5 P.M. but saw no elk. All had sought the heavy timber. Saw 2 buffalo.

Portions of this summer range are overgrazed and trampled by elk and buffalo. A light shower caused murky runoff from the higher grassy slopes.

We made our camp in a snowmat of fir and spruce. During the afternoon I dug bulbs of spring beauty, *Lewisia pygmaea* and rootstocks of *Lomatium* sp. We boiled these for supper and they were very good. *Lewisia* is especially abundant.

The whitebark pines in this area have a fair to light pine crop. Weathered quite a storm during the night. Vegetation is still lush and green but it is probably quite dry here during August.

We ate Starlight dehydrated dinners - Swiss steak, gravy, pork chops, etc. All were very good.

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was 54 marked elk seen, 47 identified to individual, 7 to area only.

N.P.S. brought us a grizzly shot at Canyon. It had injured 2 boys when it broke into their tent. Tent was pitched across a game trail. The boys described their attacker as a black bear; the rangers in hunting the attacker came upon a grizzly and killed it. It is a young male and probably was guilty but there was certainly no positive evidence.

N.B.S. brought No. 170 to Canyon in trap. She had been captured in Gardiner. We immobilized her and removed radio and all ear tags and color markers.

July 15, 1964

Autopsied the grizzly. It was in good condition but had not an ounce of fat. See autopsy sheet.

Jim Groff, Bob Henkel and Ralph Olsen arrived and we made a tape recording on the grizzly work.

Met with Bob Howe and discussed the elk contract and the elk project.

July 18, 1964
Immobilized No. 170 after she had been recaptured at Gardiner. She was recaptured on July 12 or 13 and held for several days at Mammoth. The Superintendent decided to release her once more, this time near Silver Gate and to ship her to a zoo if recaptured again. Took milk sample.

President Johns phoned and asked me to attend and speak at the meeting of the trustees of Montana State University Foundation. Agreed to talk on Wildlife Research.

Have been radiotracking No. 6 regularly. Spending considerable time at Sulphur Mountain.

July 16, 1964

Worked at lab in morning and wrote notes.

July 19, 1964
Jim Cole, Derek and Charlie made a "shake down".

Talked to a National Science Foundation group.

July 17, 1964

Attended a meeting in Mammoth with McLaughlin, Luis Castellum, Bob Howe and Wayne Howe about elk research and the grizzly bear contract.

N.P.S. captured No. 143 near Canyon. This grizzly is losing its fear of humans and becoming quite bold.

We immobilized, weighed and released it at Crystal Creek.

Captured No. 165 at Trout Creek.

July 20, 1964
Jim Cole and boys took another "shake down" ride preparatory to taking off on wilderness trip.

Karen and Margaret here.

Trout Creek

Shot 2 bears on the dump using sernylan. We got one 2-year-old and one escaped. With the use of sernylan and with luck we should be able to

shoot 2 or 3 bears a night. The long-acting effect of the drug enables us to knock one down and leave it while we wait for another and shoot it. This we could not do with the short-acting sucostrin.

July 18, 1964

Bob re-marked No. 143, a two-year-old that has been giving trouble at Canyon. This bear "treed" two of our visitors. They sought escape on top of the privy at Otter Creek and according to them they just climbed to safety in time. We released No. 143 at Crystal Creek. collar.

Jim Cole, Derek and Charlie were ready to look for elk in the Hell Roaring area. Margaret, Karen, Johnny, Lance and I took off with them. We carried back packs for an overnight stay. Had a little trouble packing the big black horse. We made camp at the bridge on Hell Roaring Creek above the ranger cabin. Johnny kept up with us carrying his own pack. Mosquitoes were bad. Caught trout for supper.

July 19, 1964

Charlie and Derek returned from their trip up Hell Roaring. Fished up Hell Roaring for 3 or 4 miles. Caught a nice string of fish and looked over the Hell Roaring Creek country. The stream is beautiful.

Spotted one of our elk collars in the alders across the stream. Tried to find a place to wade river but it was too swift and deep. Stripped and swam across. Water was ice cold and numbing. Retrieved the collar - No. 529. Apparently it had slipped over head of the elk. Returned to lab in late afternoon. Margaret, Karen and Johnny made the hike in good shape but all were tired.

July 20, 1964

Grizzly No. 143 was reported at Pebble Creek Campground. It treed Bryan Harry and his companion. The grizzly advanced toward them on the trail and would not retreat. They dropped their packs and went up trees. Bear rifled their packs and then went on up trail. This bear had been released at Crystal Creek on July 18.

Joel Varney and Hoke Franciscus arrived. Joel will be paid from a grant of \$2,500 supplied by Fish and Wildlife Service. the very edge of the woods. The lodgepole grasses were Trout Creek and lush and a small pond was located 3 Shot No. 10 using sernylan. Shot an unmarked female but needle clogged and she did not get full dose.

Bear Beds Shot an unmarked 2-year-old. Fell across creek and we had to haul him back to trap.

Relative relation of beds

Rook movies of No. 172 showing the "elk type" collar.

Took movies from box using motor.

July 20, 1964

Processed No. 10, a 7-year-old established aged bear captured as a 2-year-old in 1959. nBob, Harry and Ralph worked alone. She got up under the penta, got dental casts but not the foot casts. Vagina swollen and pink. Had been or was coming into estrus.

Jim, Charlie and Derek returned from their trip up Hell Roaring. They saw relatively few elk. Saw about 100 head of buffalo north of the Park. See elk study notes.

Lance and Bill Staniger backpacked up Faun Creek to spot marked elk.

Trout Creek

Size of 1 No. 145 and No. 135 have been play copulating. This appears to be a cut clear/case of homosexuality. No. 135 has consistently played the male role and No. 145 the female role. There has been no reversal of this male-female role.

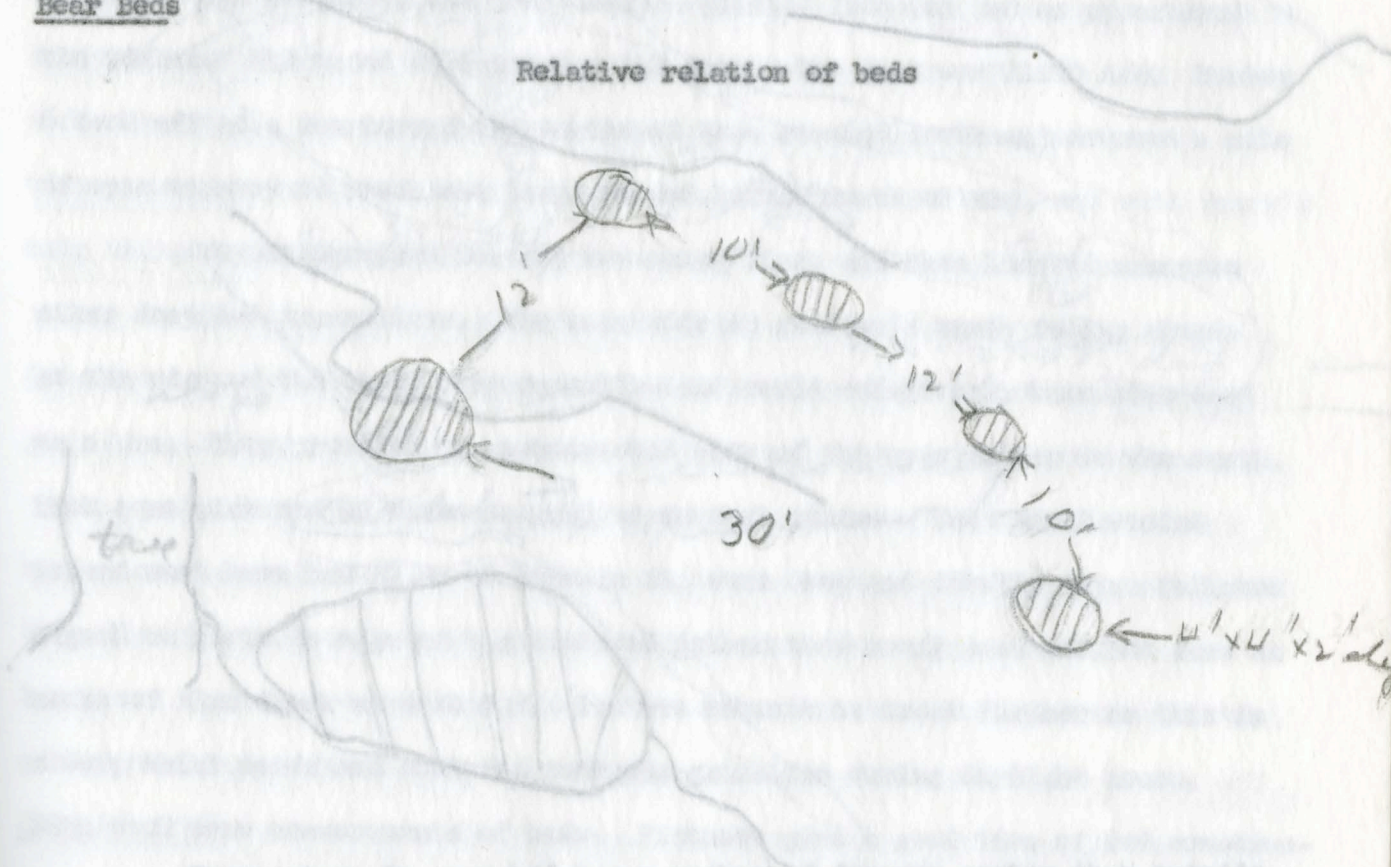
July 22, 1964

Jim Cole, Frank, Joel Varney and I tracked No. 6. We closed in after leaving T.C. dump and heading northward. Jumped her at 11:10 A.M. from a timbered island just west of Sulphur Mountain. See radiotracking notes for this date.

We flushed 3 grizzlies not including No. 6 when we aroused No. 6 from her bed. No. 6's bed was in a lodgepole stand at the very edge of the woods. The lodgepole grasses were very green and lush and a small pond was located 35 feet away. We examined about 2 acres of the wooded area carefully and counted at least 30 beds.

Bear Beds

Relative relation of beds



Size of larger beds

1. $4\frac{1}{2} \times 5 \times 2\frac{1}{2}$
2. $4 \times 4 \times 2$
3. $5 \times 5 \times 2\frac{1}{2}$
4. $3 \times 3\frac{1}{2} \times 1\frac{3}{4}$

feces

feces

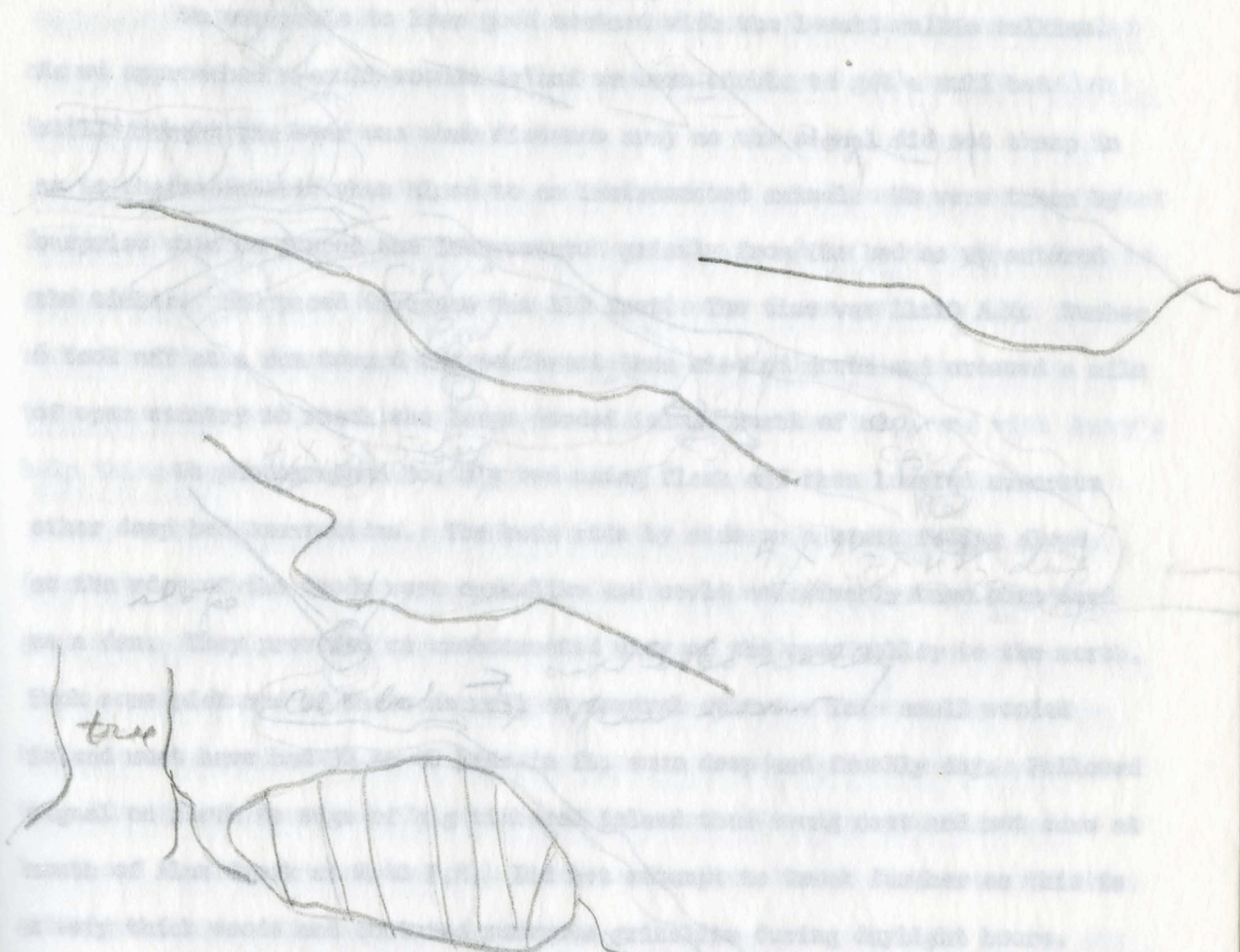


Grizzly No. 6

Located grizzly No. 6 north of Trout Creek Dam in early morning.

Observed a heading from Milling Station at 9:30 A.M. at 35° to 50°. Bears and their hills reached at 11:00 and John, I, Joel Varney and Jim Cole left.

Position on slopes - x section



Temperature in cave bed was a number of degrees cooler than outside air. Ground was covered with a layer of dead oak leaves. Both "cave beds" contained a feces. Cave beds yielded commanding view over surrounding open park land. Would be almost impossible to approach bear using these beds undetected. A little more digging would make these suitable for hibernating dens.

Located grizzly No. 6 north of Trout Creek Dump in early morning.

Obtained a bearing from Hilltop Station at 9:30 A.M. at 355° to 360°. Hoke and Dick Ellis remained at HHS and John, I, Joel Varney and Jim Cole left

the dump area to close in on No. 6.

We were able to keep good contact with the 1-watt walkie talkies. As we approached a small wooded island we were unable to get a null but still thought the bear was some distance away as the signal did not thump in as is characteristic when close to an instrumented animal. We were taken by surprise when we jumped the instrumented grizzly from its bed as we entered to the timber. The paced distance was 110 feet. The time was 11:10 A.M. Number 6 took off at a run toward the southwest then circled north and crossed a mile of open country to reach the large wooded island north of us. and with Harry's help thing We photographed No. 6's bed using flash and then located numerous other deep bed excavations. The beds side by side on a north facing slope at the edge of the woods were cave-like and could conceivably have been used as a den. They provided an unobstructed view of the open valley to the north. Took some pictures of these as well as several others. This small wooded island must have had 30 to 40 beds in it, some deep and freshly dug. Followed signal on north to edge of big timbered island then swung east and met cars at mouth of Alum Creek at 2:40 P.M. Did not attempt to truck further as this is a very thick woods and contains numerous grizzlies during daylight hours. John took some measurements of beds. Pictures give a good idea of bed construction and variation. No. 175 with little difficulty when we used sernylan (See data sheet Number 6 came into dump early in the evening of 22nd and was in a different bed on south side of Hayden Valley on 23rd. ties for the National See August 10, 1964 Gene Peterson is cooperating with us on this venture. The Nation Bed of No. 6 observed while tracking No. 34. Has been dug much deeper. July 22, 1964, continued I have planned the film, prepared a working script and are doing a large share of the photo Trout Creek Peterson is helping with technical Took movies of bears. scene shots which involve crew activity and doing pouring Bears came in late. Shot No. 43 and a large unmarked sow using sernylan. This sow will be No. 175.

July 23, 1964

shooting. We plan to edit the film jointly and Gene will either do himself. We processed No. 34 and instrumented her. Tuned the transmitter but signal was not good. Sow was lactating and we got a good milk sample. Also took blood sample and jaw and foot casts. with the original and make a final

cutting. Bob Ruff, Harry Reynolds, and Ralph Jingu are becoming more proficient in the processing every day. The use of sernylan has been a big help. Hope to gradually turn more of this routine over to them so I can get more time for radio tracking. Breaking Bob into the techniques and handling has been a time consuming task, but he has caught on rapidly, worked hard, and with Harry's help things have gone well. cabin at odd jobs. Drove to Wilson and saw Dr.

Gould. Gave the unmarked sow the number 175. She was a very large female (see data sheets). We had great difficulty in immobilizing her and finally gave it up for the day. Held her in the trap and will work on her tomorrow.

own to Lance and Bill Staniger returned from Faun Pass a vicinity after hiking over a good portion of the high mountain country. In less than 3 days they identified 40 marked elk and classified over 600. They saw 7 grizzlies - 1 sow and 2 cubs, another sow with 2 cubs and a lean boar. They observed the grizzlies digging for tubers and rodents. of Livingston so I could review the

July 24, 1964

study with Jerry McManis. Took some movies of antelope en route. Jerry is Processed No. 175 with little difficulty when we used sernylan (See data sheets). I took movies of the procedure. used in Billings discussing work

to the west. We are doing a 75-minute movie of our activities for the National Geographic Society. Gene Peterson is cooperating with us on this venture. The National Geographic Society is supplying the film, a work print and items in of equipment. Frank and I have planned the film, prepared a working script needed and are doing a large share of the photography. Gene Peterson is helping with technical advice, making the sequence shots which involve crew activity and doing yearling and the other an adult female.

the interior shooting. We plan to edit the film jointly and Gene will either do himself or make arrangements for, final editing, putting on the sound effects and dialogue. Frank and I will write the final script. Gene's responsibility will be to match the work print with the original and make a final cutting and splicing. This cooperative effort promises to be productive. We took 4 or 5,000 feet last fall and expect to take an equal amount of footage or more this summer.

Drove to Moose late in the evening.

July 25, 1964

July 27. Worked around the cabin at odd jobs. Drove to Wilson and saw Dr. Gould. Made arrangements with him to come to the lab for a visit.

Returned to the lab late in the evening. I had given Bob and the crew instructions as to what to do in my absence. They will proceed on their own to capture and process bears. The task has been greatly simplified with the use of sernylan. Harry has become more proficient and I am pleased with his work and attitude. He has especially improved since early June.

Soon after returning to the lab I packed and left for Billings where I will meet Dr. Lee Yeager. Went by way of Livingston so I could review the Golden Eagle study with Jerry McGahan. Took some movies of antelope en route. Jerry is doing a great job. Outlined work for him and drove on to Billings. Met Lee Yeager at the Billings airport. Remained in Billings discussing work to the wee hours.

July 26, 1964

Drove back to the lab with Lee via the Cooke City road. The mountain country was beautiful. Lee enjoyed the scenery. I took some movie shots needed for the grizzly movie. Arrived at lab about noon and briefed Lee on our work.

We shot 2 grizzlies with the Cap-chur gun at Trout Creek. One was a yearling and the other an adult female.

Mr. and Mrs. Denis of Nairobi arrived. Armand Denis, General Delivery, Gallup, New Mexico, B.B.C. "On safari". They have made a name for themselves taking wildlife and adventure movies for T.V. Their shows have had international showings. They were anxious to do a film of our work on the bears but I told them we were making our own film and that we were doing a film for the National Geographic. Trying to fit our research schedule into their shooting schedule would have been completely impossible. It was difficult for them to accept this. They finally accepted this fact gracefully and left.

July 27, 1964 (group) have run together in summer of 1964. The yearlings belong to We processed the yearlings captured last night and gave it No. 177. Had difficulty with the large female No. 176 (see data sheet). We will have to hold her over until tomorrow. Worked with Lee Yeager most of the day. Did a lot of planning for the future. Hope something comes of it but am not too hopeful. The F. & W. Service has not been aggressive in getting research funds and they have not been far sighted in research needs outside of the waterfowl and pesticide fields. No. 176 and a yearling No. 178.

Bob and Harry shot a yearling at Trout Creek. The collared yearlings that have been "hanging out" near Otter Creek finally came into the dump. They have "joined up" with 2 other yearlings one of which is collared and they came in as a group. Two are orphaned cubs of No. 148, the owl-faced cub and 2 are cubs of No. 48. She had 3 cubs, some of which were collared. value. It is

Old Mose arrived at T. Creek for the first time this year. His rear end is thin and emaciated. He walks slowly and with effort. We will probably sacrifice him this year. been coming into Trout Creek very late and the numbers are small.

Enclosed history of the 4 collared yearlings. Worked with Dr. Lee Yeager. Drew up plans for funding projects.

Cleaned the lab and prepared for Dr. Gould's arrival. Made arrangements for the T.P. Co. to take Dr. and Mrs. Gould fishing on the Lake. Attempted

to interest the Public History of Four Collared Yearlings was president of A.A.A.S.

No. 148 the owl-faced sow had 2 cubs with collars in 1963.

No. 48 had 3 cubs in 1963 some of which were collared. couple of weeks. Went

John photographed the cubs of No. 148.

Maurice photographed the cubs of No. 48.

No. 148 was killed when she was struck by the truck. No. 48 adopted one cub of No. 148 and the entire group hibernated. great pleasure to have them and they

Suspect that orphaned cubs of No. 148 survived winter. fixed a fine supper and

No. 48 weaned her 3 cubs in spring of 1964 or she may have died in hibernation.

Four yearlings (group) have run together in summer of 1964. The yearlings

belong to No. 148 and No. 48. both got a dose of drug. Apparently the drug

Have not sighted sow No. 48 during summer of 1964. as she is a known-age

No. 48 was named "Abandon" because she abandoned her cubs. See data sheets.

July 28, 1964 and vehicles on the road and located 2-3, named 2-3

Got up at 4 A.M. and drove Dr. Lee Yeager to Ennis where we met

Gerry Atwell who had driven over from Missoula. and fished off Frank

Island. Bob and crew processed No. 176 and a yearling No. 178.

Tracked No. 34 and Reproduction

No. 176 died from an overdose of drugs. See data sheet. She was a

valuable bear and it is too bad we have lost her. The crew autopsied No. 176,

keeping skeleton, skull, and hide as well as sections of organs. No. 176 was

bred this summer and so her reproductive tract is of special value. It is

frozen and we will later attempt to flush it out and obtain blastocysts. It

could yield valuable data on delayed implantation.

Grizzlies have been coming into Trout Creek very late and the numbers

are declining. 2-year-old, 2 2-year-olds (1 partial collar) & 3- and

July 29, 1964 the large bear that bred No. 164 in early spring, Barlow, and

Cleaned the lab and prepared for Dr. Gould's arrival. Made arrange-

ments for the Y.P. Co. to take Dr. and Mrs. Gould fishing on the Lake. Attempted

to interest the Park Service, explaining that Dr. Gould was president of A.A.A.S. but got no offer of a boat or services.

Worked on notes. Developed plans for the next couple of weeks. Went over the work with Bob.

July 30, 1964 Daniger and Ralph took off for Heart Lake to spot marked elk.

August 2 Dr. and Mrs. Gould arrived. Frank and I showed them around the lab and explained some of the work. It was a great pleasure to have them and they enjoyed meeting all members of the Grizzly Crew. Pat fixed a fine supper and then we drove to Trout Creek.

Tried to get No. 29 and a yearling. We used sernylan on both bears but neither went down although both got a dose of drug. Apparently the drug dosage was too light. Disappointed not to get No. 29 as she is a known-age 5-year-old with a long history.

July 31, 1964 Picked up signal at Alum Creek with portable

vehicles at Big Game Overlook and headed S.W. toward Sulphur Mt. Dr. and Mrs. Gould, Joel Varney, Frank and I went fishing on Yellowstone Lake courtesy of Y.P. Co. Had a cabin cruiser and fished off Frank Island. We all caught a limit and returned about noon.

Tracked No. 34 and No. 6. See notes.

Visited with the Goulds. Everyone has enjoyed their visit. Jerry McGahan arrived bringing his eagle with him. We now have 3 Golden Eagles in the compound - Derek's, Bill's, and Jerry's. Went over Jerry's eagle work with him.

August 1, 1964 From a distance of 40 yards or less we watched some roots and explore some of the old grizzly beds. Followed

then for Worked at lab in morning.

Bob and I made a count at Rabbit Creek. Saw a sow with 3 cubs, Searneck, a collared 2-year-old, 2 2-year-olds (1 partial collar) a 3- and a 4-year-old, the large boar that bred No. 164 in early spring, Earless, and unidentified large boar, sow with 2 cubs, sow with either 2 or 3 yearlings, large boar. For further details see data sheet.

on the way. We did not see 164 or White Fang. These are used in early spring.

Dr. and Mrs. Gould left for Jackson Hole.

Took swimming movies at Firehole River. Have been bedded down among

the grizzlies. Frank and boys left for Moose.

Bill Staniger and Ralph took off for Heart Lake to spot marked elk.

August 2, 1964 at us at less than 40 yards, got our scent as we climbed the hill and Jim Cole and Derek took horses to the corral on Pelican Creek and took off for a several day trip to spot elk. at 10:40 and they reached the timber 3 minutes later. Bob and I made a count and observations at Trout Creek. time. They ran contin. No. 163 is still at Tower Falls. saw big island of timber along Alum Creek. All around. Radiotracking No. 34

August 3, 1964 10:30 we were sitting on top of Sulphur Mt. and the wind was carrying. Left base at 9:10 A.M. Picked up signal at Alum Creek with portable receiver. Parked vehicles at Big Game overlook and headed S.W. toward Sulphur Mt. Entered lodgepole and within 10 minutes (9:40) we jumped several grizzlies but could not identify them. Signal came in strong from the west; we moved directly through heavy downfall. Found bear beds all around us. At this time we were about 1/2 mile from take-off point. less than 3 minutes.

At 10:06 A.M. we saw 2 2-year-olds ahead of us. Both were digging, sniffing and apparently moving rather aimlessly about. We identified one as No. 173 and the other as her running mate a 2-year-old probably a littermate. Both kept in the heavy downfall. From a distance of 40 yards or less we watched them dig under some roots and explore some of the old grizzly beds. Followed them for several hundred yards through the timber and then lost them.

At 10:20 A.M. minutes after losing sight of the grizzlies we saw a bull elk bedded down on top of a high ridge only 100 yards from where we had been watching the 2-year-olds and about 200 to 300 yards from where they had originally been bedded down. The elk watched us climb an open hillside and did not move until our scent was carried to him. Noticed a number of bear beds

on the open exposed southern slopes. Suspect these are used in early spring.

At 10:35 A.M., 5 cow elk and a spike ran out of the timber below us and crossed the open thermal area. These elk must have been bedded down among the grizzlies.

At 10:40 A.M. the 2 2-year-olds that had not "spooked" when they looked directly at us at less than 40 yards, got our scent as we climbed the hill and ran out of the timber roaring across the open sagebrush flats.

We spotted them running N.W. at 10:40 and they reached the timber 3 minutes later (10:43) having run a little over a mile during that time. They ran continuously from Sulphur Mt. to the first big island of timber along Alum Creek.

About 10:50 we were sitting on top of Sulphur Mt. and the wind was carrying our scent N.E. over the lodgepole slopes below us that we had just negotiated.

No. 42 and her cubs left the timber and they too ran nonstop across the sage flats to the Alum Creek timber soon to be followed by Mae West and her 2 yearlings. Both these sows with their offspring ran $3/4$ to 1 mile with only a short break during this distance in less than 3 minutes.

No. 34 and her yearlings must have moved out before we reached the summit of the hill. The signal came in strong and we got a null in the direction of Timber Island were No. 42 and Mae West disappeared.

At about 11:20 we started back east along the ridge. We jumped 2 nice bull elk both in the velvet.

At 12:00 we jumped another large bull elk in heavy downfall. Saw many bear beds. The signal from No. 34 became weak and we finally lost it as we approached the vehicles at Big Game Overlook. The last signal from the field was received at 12:10 P.M.

During this short walk around Sulphur Mt. we jumped at least 9 elk and 13 grizzlies including No. 34 and yearlings which we never actually saw.

At Alum Creek we picked up the signal from No. 34 on the yagi antenna. No. 34 crossed the Yellowstone River (see radiotracking notes) and it showed that she had moved from Sulphur Mt. to Timber Island as we suspected.

Trout Creek
The last fixes (see tracking notes) placed her almost on the north edge of Shot Old Horse with the dart gun and loaded him into trap.

Alum Creek Valley - a distance of 3 or 4 miles from where we first located and Shot No. 137, a 2-year-old but could not retrieve him. Took off when jumped her.

the drug wore off.

August 3, 1964 continued

Jim Cole and Jack returned from Pelican Creek, returning via Raven Four Musketeers:

Creek. Saw 3 grizzlies and a number of marked elk. Also saw a buffalo fight.

The 2 collared yearlings that we have observed at Otter Creek have Bill Stoniger and Ralph returned from Heart Lake. They saw very few apparently joined forces with another collared yearling and 1 dark brown yearling.

They came into Trout Creek for the first time July 27. They moved as a

August 5, 1964
cohesive group. All stood frequently and were wary and alert. When one re-

Margaret and I left for Helicon to attend the Wilderness Society treated any distance all retreated. When one stood his ground as a 2-year-old Council meetings at the Chief ranch near Homan, Montana.

approached, the other three yearlings joined this one and they faced the "new-comer" as a group. All four appear to be thin and none have shed as yet. Two did complete autopsy.

have full collars and 1 a partial collar. The collar on one is very white and

August 6, 1964
the rest of the body dark. The other fully collared one is straw colored and

Discussed letters at office in Missoula.
the collar light cream. The fourth yearling has no distinguishing markings.

August 7, 1964
It will probably take the rest of the summer to determine just which

belongs to Homan, visited with Council members of Wilderness Society.
sows these yearlings belonged to. We are certain that 2 belonged to No. 148,

Spent night at Chief Ranch.
the Owl-faced Sow which was killed when she ran head on into our truck last

Present were: Bob Cooney and wife
year (see notes). Mr. and Mrs. Harvey Brown (Ann) was escorted by Bob

Marcy Morris
Because these yearlings have formed a very close bond and feed and

Mike Badal
travel constantly together we have named them the Four Musketeers. This is a

John Hall
very interesting relationship. We plan to capture and mark all four and to

Bob Staler
take weights and measurements periodically.

August 4, 1964 off on Wilderness Trip. Over 20 head of horses. Camped at Elk

lake. Am turning more of the shooting and immobilizing work over to Bob and

Harry. Hope to eventually be relieved of much of this routine as it takes a

lot of my time.

August 9, 1964

No. 34 crossed the Yellowstone River (see radiotracking notes).

Trout Creek

Griffith made a leisurely climb toward the top of Mt. Harding. The climbing at the top was hazardous without ropes so only Ed Slusher and I went on to the summit. Took numerous photos. Had nice visit on route with Harvey and Dr. Griffith.

Shot Old Mose with the dart gun and loaded him into trap. Shot No. 137, a 2-year-old but could not retrieve him. Took off when the drug wore off.

Jim Cole and Derek returned from Pelican Creek, returning via Raven

August 10, 1964

Creek. Saw 3 grizzlies and a number of marked elk. Also saw a buffalo fight.

Back to Cheff ranch. Was a long day and trail was rough.

Bill Staniger and Ralph returned from Heart Lake. They saw very few Lots of huckleberries. marked elk.

August 11, 1964

August 5, 1964

Worked in office. Met with Cynthia Chapman and discussed Wild River Margaret and I left for Missoula to attend the Wilderness Society

Film. Film is going well. Council meetings at the Cheff ranch near Ronan, Montana.

Spent night at Helena.

Bob and crew sacrificed "Old Mose" No. 179. Took blood samples and

August 12, 1964

did complete autopsy.

August 6, 1964

Drove from Helena to Gallatin Gate. Frank and Ed and Margaret and I

attended a luncheon in honor of Mrs. Nichols. It was her 80th birthday although

we did not know this until we arrived. Met Y.P. Co. Board members - Goff,

August 7, 1964

Hibbard, Powers.

Drove to Ronan, visited with Council members of Wilderness Society.

Dr. Abbott and Dr. Balle arrived late in the afternoon.

Spent night at Cheff Ranch.

Bob and crew did well while I was gone and several more grizzlies were

Present were: Bob Cooney and wife

added to the list of marked grizzlies. Notes recorded by Bob

Mr. and Mrs. Harvey Broome (Ann)

Mardy Murie

Mr. and Mrs. Griffith

Mike Nadel

George Marshall

John Hall)

Ed Slusher(Forest Service

Herb Staler)

August 13, 1964

Radiotracked No. 34. Traveling on a bridge. Day spent

August 8, 1964

Abbott, his son, Curtis, and Arnold Balle spent the day with us.

Took off on Wilderness Trip. Over 20 head of horses. Camped at Elk

Lake. Traveled thru some beautiful mountain scenery. Trail was rough for horses.

August 9, 1964

Margaret, Bob Cooney, John Hall, Ed Slusher, Harry Broome and Dr. Griffith made a leisurely climb toward the top of Mt. Harding. The climbing at the top was hazardous without ropes so only Ed Slusher and I went on to the summit. Took numerous photos. Had nice visit en route with Harvey and Dr. Griffith.

August 10, 1964

Rode back to Cheff ranch. Was a long day and trail was rough. Lots of huckleberries.

August 11, 1964

Worked in office. Met with Cynthia Chapman and discussed Wild River Film. Film is going well.

Spent night at Helena.

August 12, 1964

Drove from Helena to Gallatin Gate. Frank and Es and Margaret and I attended a luncheon in honor of Mrs. Nichols. It was her 80th birthday although we did not know this until we arrived. Met Y.P. Co. Board members - Goff, Hibbard, Powers.

Dr. Abbott and Dr. Bolle arrived late in the afternoon.

Bob and crew did well while I was gone and several more grizzlies were added to the list of marked animals. (See chronological notes recorded by Bob Ruff)

August 13, 1964

Radiotracked No. 150.

Frank Abbott, his son, Curtis, and Arnold Bolle spent the day with us.

Captured No. 135 and 137 at Trout Creek. Used the Cap&chur gun and both bears were nicely drugged. Everything went smoothly.

August 14, 1964 It appeared this year. It is strange since last fall she went into hibernation. Processed No. 135 and 137. Abbott and Bolle were present. Left for Missoula in afternoon.

Mrs. Nichols and her Board of Trustees arrived. We showed them around the lab, stopped at Big Game Overlook and let them listen to instrumented bear and then drove to T.C. dump. After looking at grizzlies we all had a marvelous supper at Canyon Village. Mr. Lowe, chairman of the Board, is Mrs. Nichols' son-in-law.

Frank's and mine birthday but we hardly had time to celebrate.

August 15, 1964 Saw many day beds but got no signal.

Paper work at lab. Went over work and plans with Bob. Reviewed Jerry's work with Golden Eagles.

Late in afternoon Karen and I packed our sleeping bags and hiked down to Three Mile. Arrived at river about dark, made camp. It was a beautiful night. Got up early, cooked breakfast and fished. Derek, Charlie, Lance and Bill Staniger arrived about noon. We left soon after lunch, but Bill remained and fished through afternoon. Fishing was fair. Although Photographer Sanders arrived.

August 16, 1964 Karen, Lance and Charlie left for Moose. Their summer work is over. Left Canyon about noon and returned to lab. Dave Phillips and Roger Pope arrived. Trout Creek - Behavior

Four Musketeers present and still traveling as a group. They gang together when one is challenged by a larger bear or when a bluff is necessary to obtain a choice feeding spot. The four move almost in unison. This bond is apparently very effective. It appears to satisfy a psychological need as well as being physically effective. It is no doubt an instinctive adaptive behavior for survival since at least 2 were orphaned and the other two were either orphaned as early yearlings or weaned. No. 48 the mother of 2 of these

yearlings has not appeared this year. It is strange since last fall she went into hibernation with her own 3 and 1 adopted from the Owl-Faced Sow litter when this sow No. 148 was killed by ramming our truck. ~~It will be interesting to see how long this bond lasts and if the~~ ~~four yearlings hibernate together.~~ back and putting her in trap for the night.

August 17, 1964 had a large crew including McFadden and his son (old Salomon's acquaintance) No. 150 is instrumented but we have not received her signal for some time. (See radiotracking notes) Attempted to locate her. Bot Patton of National Geographic, Dick Ellis, Joel, Bob Ruff, and I hiked for five hours up Alum Creek. Saw many day beds but got no signal.

Processed No. 173 and 185. No. 173 was trapped last evening at Trout Creek. No. 185 was shot with drugs on dump. It is a yearling of No. 172. for 30 minutes.

Frank has been working on notes and papers at cabin (Moose). ~~at last~~ Trout Creek to shoot her but she wouldn't come near.

Shot the yearling of No. 96 at dump.

August 19 Signal from No. 34 is still strong. No signal at dump from No. 150 although she was present and collar is on. Apparently batteries have run down.

~~History of~~ Derek, Karen, Lance and Charlie left for Moose. Their summer work is over. All have done a good job. The boys did a particularly good job spotting elk. They got over a lot of beautiful wilderness country. My only regret is that I was kept too busy to accompany them on any of the long treks.

~~History of~~ Karen worked faithfully on her Owl Book. Johnny explored everything around the lab and at the Visitors Center. ~~lost the one put on last fall and~~

August 18, 1964 ~~one put on this summer.~~

August 20 Processed No. 186, a yearling of No. 96. See data sheets. Bob Patton took photos. ~~cabin at Moose early and drove to lab. Packed and left~~ for meetings with Pres. Robert Johns and trustees of the MSU Foundation.

Trout Creek

Shot sow No. 39. She is a rough tough customer with 3 aggressive yearlings. Saw and photographed her in May at Mud Volcano. Suspect she hibernates somewhere near there. No. 39 dropped across Trout Creek. It was pitch dark and we had a time hauling her back and putting her in trap for the night. Fortunately we had a large crew including McFadden and his son (old falconer acquaintance of ours from Washington, D.C.).

It took the combined strength of 6 or 7 of us to haul No. 39 back across the stream (200 yds) and up the hill in the dark. Bob Patton took photos. This time of year they apparently seek the timber. The vegetation in the low Director Hartzog of National Park Service, Lon Garrison, and Supt. John McLaughlin arrived at T. Creek just before dark. We discussed bears with them for 20 minutes. cross at this time because there is relatively little water in No. 7 came in and she still has the radio collar placed on her last year. Tried to shoot her but she wouldn't come near. to speak. The cows are more aware. No. 29 was also present; also No. 12. yikes. There is "unrest" and August 19, 1964 the behavior patterns.

Processed No. 39 (See data sheets). We have a long and interesting history on this bear and her offspring. Lings (Four Musketeers) at the dump.

Now have Drove to Moose and spent evening with the family.

Behavior Frank, Bob, and crew shot No. 7 and No. 29 with sucostrin but failed to get either of them. We are about out of sernylan. It has proved to be a highly effective drug for this work. nylon a fairly large bear went over,

sniffed No. 150 has lost her collar. She lost the one put on last fall and now has lost the one put on this summer. As this occurred No. 178, a large sow

August 20, 1964 backer and drove him off. The bear retreated but returned minutes later.

Left the cabin at Moose early and drove to lab. Packed and left for meetings with Pres. Robert Johns and trustees of the MSU Foundation.

August 21-22, 1964

Meetings with Trustees. Was very impressed with Bob Johns' handling of the meeting and his vision for the future of MSU.

August 23, 1964

August 25, 1964
Returned to Canyon.

Bob and Harry got one of Mae West's yearlings at Trout Creek.

August 24, 1964

Made early morning helicopter flight to look for marked elk. Was a routine fire flight so cost us nothing. Elk are in the timber now and we saw very few. This time of year they apparently seek the timber. The vegetation in the lodgepoles is still very green and they may prefer this habitat now because succulent food is available. It is also very probable that they descend to the timbered areas at this time because there is relatively little water in the high country. Margaret Altman suspects it is partly due to herd behavior at this time. The spikes are "cast off" so to speak. The cows are more aware of the bulls. The bulls chase the spikes. There is "unrest" and "upheaval" in the behavior patterns.

Bob and Harry processed No. 191, probably one of Mae West's yearlings.

I shot 2 of the collared yearlings (Four Musketeers) at the dump. Now have captured all four of them. All are males.

Behavior

Response to immobilized member. When one of the collared yearlings went down under the influence of sernylan a fairly large boar went over, sniffed him, then deliberately grabbed him by the neck and shook him fiercely lifting him completely off the ground. As this occurred No. 172, a large sow attacked the attacker and drove him off. The boar retreated but returned minutes later and grabbed the immobilized yearling again. Afraid for the life of the yearling we intervened and shooed the boar away.

Normally other grizzlies pay no attention to an immobilized member feeding around and even over him. Sows sometimes attempt to defend an im-

mobilized cub or yearling but generally they are indifferent to one of their own litter members feeding around him after he has become immobilized.

August 25, 1964

Processed No. 192 and No. 193. No. 192 is the dark yearling with the very white full collar. No. 193 is a grizzled colored yearling with cream-colored full collar.

Both are members of the Four Musketeers. We now have captured and marked all four and all are males. Their weights and measurements when compared with yearlings that have not been weaned or orphaned should prove informative.

Have instructed Bob to make a comparison with our other yearlings. It appears that these have shown a slow growth and development as compared to males re-

maining with their mothers.

The dark male No. 192 reacted atypically to the sernylan. His reaction the night before was also atypical. Both times he was seized with convulsions. Muscle contraction was severe and prolonged. Pupils of the eye

were contracted until almost invisible. The eyes bulged, blood vessels of eye

were dilated and the eyes had a vacant yet frantic stare. Bear might have been having hallucinations. This is apparently common with this drug. The cornea became desiccated from profuse flow of lachrymal ducts. Cornea contracted and it appeared as though there was a deep rough scratch on the eye. This occurred on both eyes and we have observed it on other bears under influence of sernylan.

Salivation was profuse. Feet contracted. Jaws were tightly closed - almost in a state of tetanus.

Took movies of the 2 yearlings coming out from under the effects of the drug. Got some good shots of bear chasing crew members.

Frank Goodyear reported that one of our marked grizzlies was seen in upper Tin Miner Basin in spring of 1964.

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Behavior

The dark yearling No. 192 came out of the sernylan first having of the been processed first. No. 193 was still under the influence. No. 192 would not leave No. 193. He would wander off 100 to 200 yds then return and sniff of his runnigg mate. Not until No. 193 was up and about (3/4 of an hour later) did No. 192 and 193 depart. This, I believe, is an indication of the strong bond between these two and also the other 2 of the 4 Musketeers. Each is dependent on the other, but each supports and defends the other.

The entire crew had supper at Canyon as guests of the Y.P. management. It was the traditional "Christmas Supper". Karen, Derek, Charlie and Lance came up for the occasion. Supper was superb.

August 26, 1964

Worked in the lab writing notes and correspondence. Made fixes on instrumented bears.

I drove to Moose to spend evening with family. Bob attempted to shoot bears at dump but had no success.

August 27, 1964

Up at 5 A.M. and drove back to lab. Took movies of black bears and moose en route. Packed and drove to Frank Goodyear's to spend the night and confab with him on use of his land for elk winter range. Goodyear is considering renting his land to the Montana State Fish and Game Dept. Discussed the possibility of trapping and transplanting some elk from either the Gallatin or Northern Yellowstone herd and releasing them at Goodyear's after instrumenting them. We could trace their movements during winter and back to summer range. Might be feasible to re-establish a migration to Goodyear's winter range. Would use calves and pregnant cows. Newborn calves should imprint on the calving grounds and return the following fall.

Frank Goodyear reported that one of our marked grizzlies was seen in upper Tim Minor Basin in spring of 1964.

August 28, 1964

Met with Goodyear, Bob Cooney and Joe Gaab to discuss possibility of the State renting the land for winter game range.

I proposed a research project to try and determine the feasibility of re-establishing a migration of elk to their winter range. Would use instrumented animals.

Cooney and Gaab not enthusiastic. They were interested in building up the small local herd some miles down the valley and using the Goodyear ranch as winter range for these elk. This would not help solve the Northern Yellowstone Herd problem, but only create another range problem. F. Goodyear and I were not overly enthusiastic about adding to the elk management problem by building up another herd. This is where the conference ended and the matter was left hanging.

Much could be learned about the movement of elk by transporting elk from:

- a. The Gallatin
- b. Stevens Creek
- c. Hell Roaring

and releasing them on Goodyear's land and tracking them to summer range with radios.

Trout Creek Returning from Goodyear's I photographed two bull elk sparring.

Trout Creek Shot the white-faced bear with 300 mg. of sustrin. He dropped at the top of the mountain.

Bob and Harry thought they saw Cut-Lip at the T.C. dump the other night. Went out this evening to check. Saw No. 6 and No. 7 but no Cut-lip. I am quite certain Cut-lip is dead, but what grizzly they could have seen I don't know.

N.P. Service rangers brought us a black bear that they killed because it had been molesting campers. Frank, Harry, Jingo and others did likewise. Bob ended up on the hood of the pickup. Fortunately the bear collapsed before he got to a vehicle and rolled down the steep embankment.

August 29, 1964

N.P.S. brought us a grizzly captured at Bridge Bay. It was No. 171. We processed it and released it at Trout Creek. Used sernylan and demonstrated the use of this drug to Dr. Stolicker of Parke Davis & Co. Dr. Stolicker has been furnishing us the drug on an experimental basis. Told him how the drug had been working out for us, effect on the bears, and problems we had encountered. The biggest problem is the large dosage required at 100 /cc. mg concentration. It takes 9 to 10 cc's to immobilize a large bear and we have no darts large enough. Stolicker gave us information on the use of the drug on sheep, monkeys, and humans. Apparently it causes hallucinations in many cases, not in others.

Autopsied black bear.

Trout Creek

Shot Inge No. 12 on the dump at night but 700 mg. of sernylan failed to put him down.

Quite a few of the large boars were present - the white-faced boar,

Bruno No. 14 as well as Inge.

August 30, 1964

The family left for Missoula. All hated to go back to school.

Trout Creek

Shot Bruno No. 14 with 900 mgs. sernylan. Purchased some new darts that will hold 10 cc's of 1,000 mg. When the drug took effect, Bruno rolled the top of the dump and was well-immobilized. Tried to move him to a trap but the entire crew of us could not budge him. The cargo net was not large enough to go around him. He started to come around and I injected $4\frac{1}{2}$ cc's of penta. Used a 5 inch needle but still could not hit the lung. Attempted a second injection but the huge bear suddenly lunged to his feet. All of us scattered. I dove in an open door of one of the vehicles. Frank, Harry, Jingu and others did likewise. Bob ended up on the hood of the pickup. Fortunately the bear collapsed before he got to a vehicle and rolled down the steep embankment.

It had been a real scramble and a close call. I estimate his weight at 1,000 lbs. Made a second lunge from the bottom of the pit. This sent us all scurrying through the dark and into the shaft of headlights groping for a door. All got in safely. Decided we had better take no further risks. Left the White-faced bear to recuperate which he did quickly and took off across the sage flats. He is probably one of the heaviest bears at the T.C. dump.

August 31, 1964

Wrote notes and outlined the grizzly movie in some detail.

Bob Ruff has been feeling under the weather. Nurse gave him a shot of demarol. It was too heavy a dose and really knocked him out. Was O.K. by morning.

Worked with Jerry McGahan on the eagle project. Data is working up nicely.

Working with Gene Peterson on the grizzly bear movie.

Sept. 1, 1964

Continued writing narration and scenics for grizzly bear movie. Now have taken about 5-6,000 feet.

Trout Creek

Shot Bruno No. 14 with 900 mgs. sernylan. Purchased some new darts that will hold 10 cc's or 1,000 mg. When the drug took effect, Bruno rolled to the bottom of the Trout Creek dump. We couldn't budge Bruno and had to give up trying to instrument him. I judge he will weigh close to 900 lbs. Seven of us couldn't budge him. The circumference of his neck was 40", total length 80 1/4". For fuller details see data sheets.

Shot another large bear with 900 mgs. of sucostrin. He fell across Trout Creek. Judge he weighed about 700 lbs. Gave him the No. 195. Took blood sample and measurements. Some incisors missing.

Dr. and Mrs. Gould sent us prints of photos they took while visiting us.

Sept. 2, 1964

Drove to Gardiner and observed sow No. 170 at the Gardiner Dump. Apparently she left Trout Creek after remaining there for several weeks and moved on back to Gardiner. No sign of her cubs which we marked and released at Trout Creek.

Harry and Ralph set traps at T.C. dump.

Sept. 2, 1964

Captured 2 yearlings in the traps. They were two of the "Four Musketeers", No. 181 and No. 193. We weighed and processed them. Took blood samples.

Photographed No. 193 with movie and still camera. Got some excellent shots of 193 coming out of the effects of sernylan.

Trout Creek

Shot Marion No. 40 with 400 mgs. of sernylan. Put her in the trap and held overnight.

Sept. 4, 1964

Processed No. 40. Took blood, milk and dental and foot casts. Instrumented her and took movies.

Frank and Dick and Charlie visited den of No. 164. She had apparently not been back since leaving den in early spring.

Sept. 8, 1964

Bob, I and crew had difficulty with Marion. When she came out of the effects of the drug she could not move her hind quarters. After 12 hours she apparently could not see well if at all and could not get to her feet. Her hind quarters may have been partially paralyzed. After dark she was still in area where we instrumented her.

Trout Creek

Tried to shoot Bruno again for instrumenting but missed.

Sept. 5, 1964

Marion No. 40 apparently O.K. She was not where we had left her last evening and her signal was coming in loud and clear.

Took movies of swimming in Firehole River. Was about 4 to 5 feet back 6 or 7 feet.

Sept. 6, 1964

Worked in lab during morning.

Trout Creek

Shot Bruno on dump. Took fast cast and blood sample and weighed. Weighed 860 lbs. Put on radio collar. Frank took flash photos.

Sept. 7, 1964

Edited grizzly film with Gene Peterson. Requested him to bring up moviola for this purpose. Turned one of the cabins into an editing room. Had hoped Gene Peterson could do most of this but he was unfamiliar with much of the footage. I had taken and this necessitated our working together on the editing. This is pushing me as I have a lot of other work to get done. Bob can carry on but needs direction.

Sept. 9, 1964 Checked signal of No. 40 and No. 14.

NPS captured a black bear and we experimented with it using sernylan. Bear weighed 145 lbs. Gave it 100 mgs. of sernylan and followed this with 5 cc's of penta. For details see data sheets.

Sept. 8, 1964

Art Altman arrived with Sam Johnson. Had an interesting discussion with them.

Edited film with Gene Peterson.

Frank and fellows tracked No. 40 to area where she was digging what appeared to be the start of a hibernating den. She had dug between the roots. From the information we have gathered to date on dens it appears that in this country the grizzlies must dig at the base of trees where the root system holds the soil from caving in when the cave is dug and also during the winter when it is used.

Several hundred yards from the place where No. 40 was digging Frank located an old den. It was the largest we have yet found. (See Frank's notes for dimensions) The entrance was between two large roots. The cave extended back 6 or 7 feet and had a raised sleeping platform. Was about 4 to 5 feet high.

Frank and I returned to lab. Bill remained at Lucky's camp to get horses and get meat out in the morning.

Sept. 11, 1964

Tracked No. 40. *Sleeping*
Bob and Jerry *shot* elk at first ridge on Trout Creek. We hope this will hold No. 40 in the area and also allow us to get some photos. Hauled it to the T.C. dump. Set up the sun guns and took movies of the grizzlies on the elk carcass. Had trouble with Gene's camera and mine. The lights lost their brilliance rapidly and the beams speckled when we turned them on. Will be fortunate if we get some usable footage.

Made arrangements to shoot elk. Wyoming season opens tomorrow.

Sept. 9, 1964

Four musketeers are still present and traveling together. They came into Photographed Great Gray Owl.

Tracked No. 40.

Bob and Dick looked for Bruno using direction finder.

Sept. 12 Margaret Altman arrived with Ken Johnson. Had an interesting discussion with her. Schaeffer and wife arrived at noon. Vince has run the Apache

Left for South Gate to hunt elk. Climbed Huckleberry Ridge in dark after wading Snake River. Made camp on top of ridge. as we are having Bob keep.

Sept. 10, 1964

Got up before daybreak and hunted elk. Frank and Harry Reynolds had licenses. Charlie Ridenour, Bill Staniger and I went along to help bring in the meat.

I saw a number of cows, one of which had a neck marker.

Sept. 13, 1964

Frank shot a spike and he and Bill dressed it. A black bear nearly ran over Charlie and I. Had some worthwhile discussions with Vince Schaeffer. Took him fishing in canyon in afternoon. Fishing just fair.

Broke camp late in the afternoon. Harry remained to hunt and spent the night.

Vince and wife left.

Frank and I returned to lab. Bill remained at Lucky's camp to get horses and get meat out in the morning.

Sept. 11, 1964

Tracked No. 40. It was perched on a log and had two dead Microtus - one in the talons and one on the log. It did not appear hungry. While photographing it, the adult flew in with another mouse and left it with the owl. We hope this will hold No. 40 in the area and also allow us to get some photos.

Bob and Jerry Mernin shot a bull elk at first ridge on Trout Creek. Hauled it to the T.C. dump. Set up the sun guns and took movies of the grizzlies on the elk carcass. Had trouble with Gene's camera and mine. The lights lost their brilliance rapidly and the beams spooked when we turned them on.

Will be fortunate if we get some usable footage. Arrived at den at 4:35 P.M. after a brisk hike. No evidence of further digging.

Frank and Bill finally located Bruno No. 14. They got his signal at Trout Creek.

The four musketeers are still present and traveling together. They came into the elk carcass.

Spent most of the day with Gene Peterson shooting movies.

Bill and Harry packed elk that Frank shot on horses and returned to lab. Will enjoy the fresh meat.

Sept. 12, 1964

Staniger left for Fern Pass to check elk hills made by N.P.S. Vince Schaeffer and wife arrived at noon. Vince has run the Atmospheric Science project at Old Faithful.

Wrote notes and checked the records and notes we are having Bob keep. Bob and Jerry Hamwood tried to shoot an elk up Pelican Creek but failed.

Did some more planning on the movie. Some of the crew tried to locate Bruno but no signal yet.

Sept. 16, 1964

Had yearling grizzly that had been captured at Lake for more photos. Took movies in A.M.

Sept. 13, 1964

Had some worthwhile discussions with Vince Schaeffer. Took him fish-
ing in canyon in afternoon. Fishing just fair.

Sept. 14, 1964

Vince and wife left.

Photographed Great Grey Owl. Adult still feeding 3 young. Have seen

Sept. 17, 1964

only one adult. Birds hunting mice within a few feet of us. I moved to within
7 feet of one young bird. It was perched on a log and had two dead Microtus -
one in the talons and one on the log. It did not appear hungry. While photo-
graphing it, the adult flew in with another mouse and left it with the owlet.
Owlet ate one mouse. All this occurred when I was plainly visible and only 7
to 10 feet away.

Sept. 18, 1964

Took off at 3:20 P.M. to check the den No. 40 had been digging.
Arrived at den at 4:35 P.M. after a brisk hike. No evidence of further digging.

Frank and Bill finally located Bruno No. 14. They got his signal at
Upper Pelican Creek and got a fix on him.

Sept. 15, 1964

Spent most of the day with Gene Peterson shooting movies.

N.P.S. rangers from Lake brought us a grizzly captured at Thumb. It
was a yearling and we immobilized it and took movies.

Bill Staniger left for Faun Pass to check elk kills made by N.P.S.
personnel for their biological studies. Will look for marked grizzlies and
marked elk. Took two horses.

Bob and Jerry Hammond tried to shoot an elk up Pelican Creek but
failed.

Sept. 16, 1964

Held yearling grizzly that had been captured at Lake for more photos.

Took movies in A.M.

Sept. 20. Bob and Jerry Mernin shot buffalo and elk up Trout Creek. We transported part of the buffalo to the dump to lure bears in for night movies. Staked quarter so bears could not haul it away.

Waited at the "kill" until 12 A.M., but grizzlies were spooked by the lights and would not come into the lure. No. 40 and cub were present, the 4 Musketeers, also No. 39 and her 3 yearlings, but none would approach.

Sept. 17, 1964 and I discussed long-range plans for implementing the AEC project. Immobilized a bear and placed in a den and shot some night shots to simulate a hibernating bear. This is essential for the story sequence of the movie and it is unlikely we will obtain actual photos of a hibernating bear this fall although we expect to track one or more to dens.

Bought trailer from Ivan Ellis for \$600.00

Sept. 18, 1964 notes. If we find out the grizzlies are still in the area, we will try to get them out of the area.

Edited film with Gene Peterson. It has been a big job and we will not be able to complete it before Gene leaves.

Bob, Bill, and Harry tried to track No. 40 without success. Had trouble using the directional finders, as usual.

Frank and Charlie went to West for food. McLaughlin (Supt.), Bob Howe,

Sept. 19, 1964 Hink, and Ken Ashley. Originally the money was from the A.E.C. project.

Bill and Harry tracked No. 14. Got a fix from the top of Pelican Cone. to automotive travel and planned to close the Trout Creek road also. We had been Jerry Hammond shot a bull elk at the head of Pelican Valley, to settle the problem. Bob, Frank, Charlie and I tracked No. 40. Had problem locating her with the directional finder. Finally jumped her and cub at a distance of 100 feet on a north slope of a steep hill. Noted several day beds and much bear scratching of trees - bark peeled off. (See tracking notes). Got word from Vince Schultz that the A.E.C. project for radiotracking elk had been approved. Flagrantly example of bureaucracy in action. Apparently the decision had been made without consulting others or even attempting to

Sept. 20, 1964 and some of such action as major activities in the Park. If the decision was laid out work plans for Bob and crew and then left for the cabin at Moose. own the line, but there was no help for it.

Clara Smith was there and had been doing water colors. Had some nice ones. ing of elk. The Supt. was interested in our plans and proposal. We agreed

Sept. 21, 1964 memorandum of Understanding stating the degree of help and cooperation we were to receive. Frank and I discussed long-range plans for implementing the AEC project. Discussed the Grizzly Bear Contract which has not yet been drawn up to our satisfaction. Worked around the cabin. Drove to Jackson. over the work as a project

Sept. 22, 1964 Park Service. We stated we would not sign a contract that set a deadline. Phoned Gerald Wiley of National Geographic. by the Service and represented. Phoned Slater on radio-tracking paper. specifying that the Service could publish. Wrote notes. if we did not do so within five years (originally was set at 10). Returned to lab at 10:30 P.M. sympathetic, but it seems evident that

Sept. 23, 1964 in favor of any research in the Park that cannot be completely controlled. Bob and Charlie tracked No. 40 and got very close before she "jumped". Bear was in heavy timber and downfall as usual.

Frank and I had a conference with John McLaughlin (Supt.), Bob Howe, Wayne Howe, Martinek, and Ken Ashley. contract and no funds. Originally the money was furnished. Junior members of the Yellowstone staff had closed the Pelican Creek Road to automotive travel and planned to close the Trout Creek road also. We had been denied the use of the Pelican Creek Road and had been unable to settle the problem at the local level. We explained to the Supt. that the former Supt. (Garrison) had agreed to give us access on all fire and admin. roads in the Park and that to deny us this now would greatly hamper the study. It was apparent that the decision to close the Pelican Creek Road had been made without his knowledge or consent. He appeared to be sympathetic to our problem and somewhat annoyed at this rather flagrant example of beaureaucracy in action. Apparently the decision had been made without consulting others or even attempting to

evaluate the pros and cons of such action on major activities in the Park. If the decision goes in our favor and I think it will, we will have made some enemies down the line, but there was no help for it.

Discussed the Atomic Energy Commission contract to do some radio-tracking of elk. The Supt. was interested in our plans and proposal. We agreed to draw up a Memorandum of Understanding stating the degree of help and cooperation we would need from the Park Service in order to carry out the project.

Discussed the Grizzly Bear Contract which has not yet been drawn up to our satisfaction. The contract attempts to "take over" the work as a project of the National Park Service. We stated we would not sign a contract that set a deadline on publication, required approval of results by the Service and represented the entire study as a Service project, specifying that the Service could publish results if we did not do so within five years (originally was set at three years). The group seemed sympathetic, but it seems evident that Bob Howe is not in favor of any research in the Park that cannot be completely controlled by the Service. It is difficult to know whether he is representing his own views or those of higher authority.

The contract is for \$6,700 to pay Bob Ruff's salary. We have worked three months now and still have no contract and no funds. Originally the money was furnished as a grant with no strings attached. Such are the ways of the bureaucrats.

Phoned Lon Garrison (Omaha) to try and get some action on the grizzly bear contract.

Sept. 25, 1964

Worked at lab.

Sept. 25, 1964

Located Bruno No. 14 at the head of Pelican Valley near the mouth of Raven Creek. Got a good fix using the quad antenna.

Checked the elk kill, but no bears have located it yet.

looking. There is an abundance of Yampa (*periditeria gairdeneri*) along Pelican Creek. Had some for lunch. ~~is clothes and equipment across and he was chilled~~

Sept. 26, 1964 ~~we were all tired and chilled when we reached camp about 8 P.M. We~~

~~had moved~~ Packed and drove to the head of Pelican Valley. Assembled the quad antenna but could not get a fix on Bruno No. 14. Decided to climb a ridge south of Mist Creek Pass and attempt to get a bearing from there. We made camp about 10:30 A.M., then Bob, Charlie, Frank and I crossed Pelican Valley heading for the high ridges to the south. We entered the timber about 2:30 P.M. and ran into heavy windfall. We struck the Mint Creek Pass trail and followed it to the pass. Set up the quad but got no signal. It was then 5 P.M. and we were ~~one~~ five miles from camp but we decided to climb the timbered ridge to the south of the pass. In order to make time we jettisoned our packs, guns, and cameras taking only the quad and directional receiver with us. The climb was steep and the downfall heavy; the map showed a climb of over 1,000 feet but it was considerably less. Pushed forward as rapidly as we could as the sun was close to setting and the terrain rough. Made the summit in a little over 30 minutes. Contoured the west face until we found an opening among the whitebark pines on the Southwest exposure. We got Bruno's signal on the portable loud and clear and thus there was no need to put up the quad. ~~Raven creek and entered~~

~~the timber~~ Got a good bearing and it placed him about where he had been yesterday. Judged No. 14 was not over a mile or two away as the raven flies. Tarried a few moments to collect some specimens of petrified wood and to watch some blue grouse going to roost. The sun was setting when we started to retrace our steps. We retrieved our packs on the trail and then did double time to get out of the timber before dark. Elk were bugling and buffalo bellowing. We approached one buffalo very closely in the timber and he fortunately took off, breaking brush and terrain as he ran. When we entered the open valley it was so dark we had difficulty finding crossings in Raven and Pelican Creeks. Bob, Charlie and I managed to finally hit our earlier crossing on Raven Creek. Frank went east

looking for a fordable spot and finally had to strip and wade waist deep. It took two crossings to get his clothes and equipment across and he was chilled to the bone. We were all tired and chilled when we reached camp about 8 P.M. We had moved at a fast clip all day. Charlie had a bad fall in the dark but fortunately was unhurt. The shotgun was the worse for wear.

Before leaving in the A.M. we had dug a pit and made a rock oven and put in potatoes and an elk roast. Supper was done to perfection and we had only to dig it out of the pit. Elk bugled and coyotes howled around us all night.

We probably traveled 11 miles in 5 to 5½ hours - half of this distance after dark. It was rough going and we all hit the sack tired.

Sept. 27, 1964

A cow elk barked close by during the night. There were many elk around. Arose at 6:30 A.M. and prepared to move in on Bruno again - this time taking full packs for a several day trek. For details of tracking Bruno see tracking notes for grizzly No. 14.

Before leaving we put up the quad antenna and checked for Bruno's signal. It came in loud and clear and the directional receiver showed Bruno to be in about the same general area where we located him last evening.

Left camp at 10 A.M., crossed Pelican and Raven creeks and entered the timber. About 11:30 we heard two elk bugling. Sat on the trail and bugled several times. A bull answered and moved in to within 30 yards of us. Frank took some pictures and the sound of the shutter caused the bull to wheel and run off. Bruno's signal with the directional receiver. During the night he

had moved. About 20 minutes later we heard another bull as we crossed a small meadow surrounded by timber. We concealed ourselves beneath some Engleman spruce and bugled twice. The bull came on the run and entered the opening. Will A cow and calf accompanied him. Frank got a chipmunk with the slingshot.

We moved slowly through very heavy timber and downfall the rest of the morning. Ate lunch on a high ridge below the small peak we had considered

climbing yesterday. It lies to the southwest of the peak we climbed (Petrified Peak). No name for these on the contour maps. Have called first peak Petrified Peak and the second one Ridge Peak. On the ridge where we ate lunch we got Bruno's signal loud and clear and it placed him in the wooded valley to the east of us. Decided to climb Ridge peak before moving in on Bruno. Left our packs and climbed to the top. Started down at 4 P.M., retrieved our packs and took a bearing on Bruno again. The signal was now coming in very weak and farther to south. Suspected Bruno might be circling our peak moving westward. Decided we could keep track of him best from present position on the ridge so prepared to make a dry camp. While Frank and Charlie continued to monitor Bruno Bob and I descended the eastern slope and carried back water. Had potato soup for supper. A cow elk barked close by during the night. There were many elk around us all day but we actually observed only 2 bulls, 1 cow and 1 calf.

Sept. 28, 1964

We all slept well on our ridge-top camp where we could view the valley below and look up at Mt. Chittenden and Cathedral peaks. Breakfast was meager - coffee, potato soup (1 cup), a slice of bread and a fresh perch. Elk still bugling.

Frank checked for Bruno's signal several times during the night but received no signal. No signal from camp this morning. Hiked to south end of ridge but got no signal there either. Returned to camp. Frank and Charlie hiked to top of peak (Ridge peak) while Bob and I remained at camp. From the top they got Bruno's signal with the directional receiver. During the night he

The dog was located in the white-bark pine-alpine fir association at about 9,000 feet.

had moved around our ridge to the north and apparently is now somewhere close to the top of Petrified Peak which we climbed yesterday. Rations are low and

Made a dry camp on top of Petrified Peak (9,390'). Had a cup of tea and soda crackers for supper.

we will have to decide whether to keep on his trail or return to base camp. Will clobber some grouse if we see them. Frank got a chipmunk with the slingshot.

Got Bruno's signal until 8:00 P.M.

Broke camp on the ridge and contoured along the west side of Ridge Peak through extremely heavy downfall and large timber. Got a faint signal

Sept. 23, 1964
indicating that Bruno had kept moving and was probably near the top or back of Petrified Peak. Decided to re-climb this peak although it was late afternoon and we were tired and hungry. Filled up a plastic container with water and placed him in line with Pelican Creek somewhere in the valley below on moved upward. Elk sign all around. Located an old bear den (not certain whether grizzly or black) on the southwest slope of Petrified Peak. The den overlooked Pelican Valley and Yellowstone Lake. The den was at the base of a white bark pine. Dirt and rocks piled out in front. Apparently had not been used for some time. The bear had chewed and torn away the roots in order to make the opening large enough to enter. Opening was 18"x24". The den extended back about 5 feet and was approximately 5 feet wide and nearly circular. Opening faced the prevailing winds. Den dipped down about a foot and was located on a rather gentle slope.

has been able to travel faster over the rough terrain than we have. At least we managed to keep track of his wanderings and have gotten some good travel notes, rate of travel, and the type of country he is generally traveling in. Suspect this to be his fall range and that he den nearby. Bruno did not rest much during the day, moving generally on the move. There are lots of elk, still some huckleberries on the bushes and pine nuts are scarce. It appears as though Bruno has completed a foraging loop in about five to six days. See radiotracking notes and maps.

Returned to lab at 7:00 P.M.

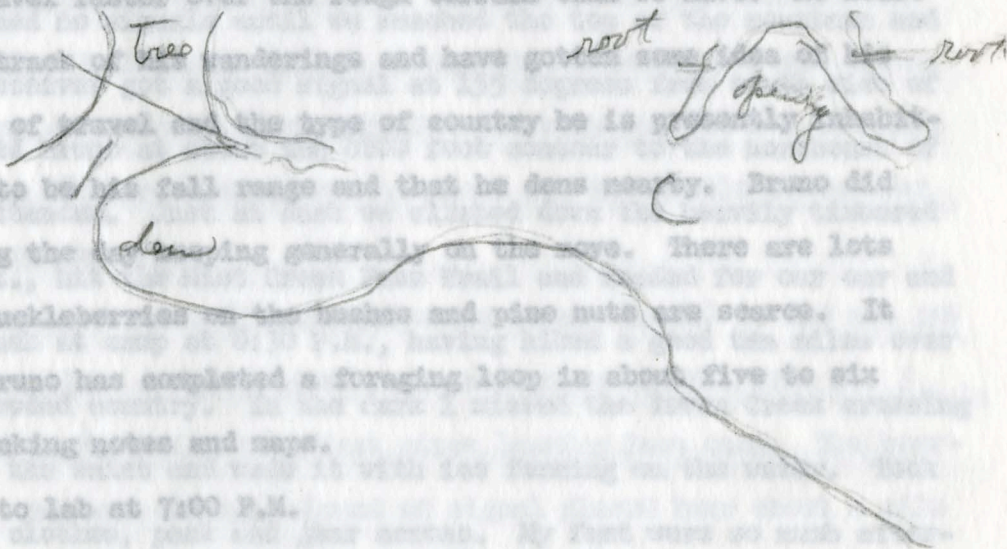
Grizzly No. 14 - 1964

Sept. 25. Got a fix on Bruno from the end of Pelican Creek Road. Fix placed

The den was located in the white-bark pine alpine fir association at about 9,000 feet. Three miles away on about 8000' level. Suspect he may have

Made a dry camp on top of Petrified Peak (9,390'). Had a cup of tea and soda crackers for supper.

Got Bruno's signal until 8:00 P.M.



Sept. 29, 1964

... and readied gear so we could take off and track Bruno for several days on foot.

Arose before sunrise, built a fire and warmed the receiver so we

could try for a signal. Got a good signal from Bruno at about 320° which

10:10 A.M. Made camp at end of road. Parked car.

placed him in line with Pelican Cone somewhere in the valley below or pos-

10:30 A.M. Hill Station 1 mile from end of road got several weak beeps with

sibly on the south slope of the Cone itself.

quad at approximately 110 degrees.

Remained on top for about two hours checking the signal. Last

11:20 A.M. Hill Station at end of road, no signal.

bearing placed Bruno at 285° to 295°. Started down at 11:30 A.M. Returned

1:30-1:45 P.M. Weak signal at 110 to 130 with quad. All signals very poor but

to base camp, arriving at 2:00 P.M. Took signal recordings en route. Split

decided Bruno was in about same position as on previous day so prepared to track a candy bar four ways for lunch. All of us tired and hungry.

him.

Prepared and ate a good meal and then put up the quad and got

2:30 P.M. John, Bob Barr, Charlie Richmond and I left camp with packs, quad,

Bruno's signal. This gave us a good fix and indicated he was still travel-

algorithms, shotgun, and portable direction finder. We headed for heavily tim-

ing northward. We were disappointed we had been unable to close in on him. He

lived Hill or Mt. (elev. 9350).

has been able to travel faster over the rough terrain than we have. At least

3:35 P.M. We obtained no signals until we reached the top of the mountain and

we managed to keep track of his wanderings and have gotten some idea of his

with the portable receiver got a good signal at 155 degrees from south side of

travel routes, rate of travel and the type of country he is presently inhabit-

mountain. Fix placed Bruno at about the 8000 foot contour to the northeast of

ing. Suspect this to be his fall range and that he dens nearby. Bruno did

and beneath Mt. Chittenden. Just at dark we climbed down the heavily timbered

not rest much during the day keeping generally on the move. There are lots

north face of the Mt., hit the Mist Creek Pass Trail and headed for our car and

of elk, still some huckleberries on the bushes and pine nuts are scarce. It

camp. We arrived back at camp at 8:30 P.M., having hiked a good ten miles over

appears as though Bruno has completed a foraging loop in about five to six

rough and heavily wooded country. In the dark I missed the Raven Creek crossing

days. See radiotracking notes and maps.

and had to strip to the waist and wade it with ice fanning on the water. Took

Returned to lab at 7:00 P.M.

two trips to get my clothes, pack and gear across. My feet were so numb after-

Grizzly No. 14 - 1964

ward that I could do no more than just shuffle along for the next quarter mile

Sept. 25. Got a fix on Bruno from the end of Pelican Creek Road. Fix placed

at base. Bruno was behind a mountain from our end of the road station and was

him across valley and in stream bottom a short distance back in timber. He

entered by mountains until we reached the top of Petrified Mt. Peak. (This

was between 2½ and three miles away on about 8000' level. Suspect he may have

is our own name for this Mt. as we located several petrified tree trunks here).

been a bit further back in timber judging from sound of beep.

Fix for this day was 120 degrees from camp station at end of road and 135 from

south side of mountain a 100 or so feet below top. We were all pretty tired

by the time we got back to camp so cooked supper and went right to bed. Elk

bugled and coyotes howled throughout the night.

Sept. 26 Packed and readied gear so we could take off and track Bruno for several days on foot.

10:30 A.M. Made camp at end of road. Parked car.

10:50 A.M. Hill Station 1 mile from end of road got several weak beeps with quad at approximately 110 degrees.

11:20 A.M. Hill Station at end of road, no signal.

1:30-1:45 P.M. Weak signal at 110 to 130 with quad. All signals very poor but decided Bruno was in about same position as on previous day so prepared to track him.

2:30 P.M. John, Bob Ruff, Charlie Ridenour and I left camp with packs, quad, sidearms, shotgun, and portable direction finder. We headed for heavily timbered hill or Mt. (elev. 9390).

5:35 P.M. We obtained no signals until we reached the top of the mountain and with the portable receiver got a good signal at 155 degrees from south side of mountain. Fix placed Bruno at about the 8800 foot contour to the northeast of and beneath Mt. Chittenden. Just at dark we climbed down the heavily timbered north face of the Mt., hit the Mist Creek Pass Trail and headed for our car and camp. We arrived back at camp at 8:30 P.M., having hiked a good ten miles over rough and heavily wooded country. In the dark I missed the Raven Creek crossing and had to strip to the waist and wade it with ice forming on the water. Took two trips to get my clothes, pack and gear across. My feet were so numb afterward that I could do no more than just stumble along for the next quarter mile or more. Bruno was behind a mountain from our end of the road station and was shielded by mountains until we reached the top of Petrified Mt. Peak. (This is our own name for this Mt. as we located several petrified tree trunks here). Fix for this day was 120 degrees from camp station at end of road and 155 from south side of mountain a 100 or so feet below top. We were all pretty tired by the time we got back to camp so cooked supper and went right to bed. Elk bugled and coyotes howled throughout the night.

Sept. 27. 9:30 A.M. From the camp station we again got 110 and 130 degree bearings with quad for an average of about 120. Signal ranged from good to faint and disappeared from time to time indicating bear was moving. It is difficult to get a single good bearing when signal strength keeps varying. No signal with portable from this point.

10:30 A.M. Left camp with packs, tracking gear, but not quad, and food for several days.

For three days, through the 29th, we followed Bruno on foot with packs on our backs and guns and receiver in our hands. He led us quite a chase over rough and heavily timbered country littered with windfall. We slept where darkness overtook us and followed his movements as well as we could from our camp locations. It was impossible for us to move at night in the treacherous windfall made even more hazardous by the complete darkness under the timber. We traveled approximately 25 miles in all but climbed three mountains, one twice. We planned on getting grouse with slingshots if necessary but did not see any. By the evening of the 28th we were on short rations and had little to eat for breakfast and lunch on the 29th.

10:45 A.M. At Stations 1, 2 and 3 (the latter where we ate lunch) we did not get any signals with portable. A few hundred yards and on up the Mt. from No. 3 we obtained a signal at 3:00 P.M. the first since leaving Base camp. The bearing was 220 degrees and bear moving. Sound of signal placed bear about a mile away on this bearing, about where it intercepted a 130 degree bearing from Base. With bear fairly well located and not enough daylight left to move in close we decided to climb mountain and look for grouse - no luck.

5:00 P.M. Returned area where we ate lunch and made camp.

5:03 P.M. Faint signal from Bruno at 225 degrees.

5:20 P.M. Fair signal from camp at 220 degrees. Bear moving westward.

6:35 P.M. Weak, intermittent signal from camp.

8:10 P.M. Camp, no signal. Bear had moved around mountain to west of us and

this shielded signal. Due to darkness and dense timber and windfall we were not able to move to a point where we could continue to track. rough with down 12:00, 1:30, 3:00, 4:30 A.M. Checked for signal with no luck.

12:30 P.M. Before going to bed took a number of flash pictures of camp. We had a dry camp on the mountain slope and threw for the line to see who would hike down into valley for water. John and Bob lost. Charlie and I made camp. Cow elk barked close to camp during night and several bulls bugled. Rationed food for supper and breakfast. Had potato soup for both meals. Had crackers with soup for supper and one piece of bread, soup and coffee for breakfast. of Mt. Rationed sugar to one teaspoonful for cup of coffee.

Sept. 28.

Located bear den at base of white bark pine tree near top of mountain.

Tried for signal several times in morning with no luck. Receiver cold and not working efficiently. tree like spikes formed a solid wood roof above.

7:30 A.M. Had breakfast and warmed receiver near fire. den used. There had poor

8:40 A.M. Finished packing and were ready to look for Bruno. with and rock pile

8:55/9:20 A.M. No signal from opening on hillside near camp. Decided to climb Mt. and try to get signal. mountain and the highest den we have yet located. It

10:45 A.M. Reached top of Mt. 9177 and got a very strong signal at 360 degrees. Did not get anything until we got right on top. Bear was on far side of mountain from us and moving. The bearing was in direct line with Mt. 9390 (petrified Tree Peak). and moved around to the north side.

11:20 P.M. During night Bruno circled around base of mountain where we were camped and moved up the valley to the north of us. Signal from top indicated bear was fairly close, probably less than a mile away. If further he would have been on far side of mountain and we would not have gotten a signal or at least a good one. This was strongest signal we have yet obtained on this trip with portable. Bear was below us and probably not over 1/2 mile away. On way down Mt. got a chipmunk with slingshot. John and Bob remained at camp.

11:55 P.M. Camp - Signal 270 degrees, good but fainter as though bear is moving steadily east.

- 11:30-12:15. Rejoined John and Bob for lunch and a short rest.
- 12:15 P.M. Contoured hill on the track of Bruno. Going still rough with down timber. Hit one opening that helped.
- 1:30 P.M. Station No. 7. No signal.
- 1:37 P.M. Saddle - Possible faint signal at 60 degrees. Station No. 8.
- 1:55 P.M. Possible faint signal at 125 degrees. Station No. 9. Bearings with very faint signals and occasional beeps are usually not reliable as to direction.
- 2:40 P.M. Started to climb hill 9390 as it appeared that Bruno had contoured around this mountain and was now on the far side. Open slope at bottom of Mt. south side. Station No. 10 no signal.
- 3:15 P.M. Located bear den at base of white bark pine tree near top of mountain. It was on a SW exposure and den was 3' high by 5' wide and $4\frac{1}{2}$ ' long. The roots overhead that came out of the tree like spokes formed a solid wood roof above. There was no lining inside den and no indication of recent use. There had possibly been some lining as there was lining material in the earth and rock pile outside the den. Took pictures outside and inside den. The den was about 300 feet from the top of the mountain and the highest den we have yet located. It was about the 9000' level.
- 3:45 P.M. Climbed until we got a view to north. Got a good signal at 325 degrees. This was Station No. 11. Bruno had apparently contoured west side of mountain and moved around to the north side.
- 4:20 P.M. Station 12. Good but intermittent signal at 320 to 300 degrees. Number 12 became our camp for the night.
- 4:35 P.M. Station No. 13, top of Mt. Same bearings as from No. 12.
- 5:15-5:30 P.M. Camp, very loud signal at 285 degrees and 275. Sounded like bear was coming into camp.
- 5:45-6:00 P.M. Camp 275 to 280 degrees. Signal fainter but good. Bear moving.
- 6:45 P.M. Camp. Good signal at 270.
- 7:15 P.M. Camp - Signal 270 degrees, good but fainter as though bear is moving steadily west.

7:35 P.M. Camp - Good signal at 270. was delicious. Roasted crackers in grease

8:15 P.M. Camp - Faint signal 270.

8:30 P.M. Camp - No signal. Bear at a distance, perhaps out of range of portable or shielded. Believe he just got out of range, probably out in open valley or clear across it to west.

Foraging. Took flash pictures of camp, went to bed. Had supper of a few saltines, tea and a chipmunk. Chipmunk cooked in foil, excellent. Bear either coming

ward us In evening and up until dark we hiked several times around top of mountain looking for grouse but did not see any. Our camp was located on north side of Mt. about 100 feet below top.

8:05-10:15 Around 5:00 P.M. the signal was very loud as though Bruno was close and approaching. He was below us and probably not over a half mile away. After this and on until after dark the signal got fainter and fainter as he moved away. He apparently went out into Pelican Valley and on across it. He must have been at least 4 to 5 miles away or more when we lost his signal for the night.

Pelican We had a dry camp and rationed water as well as food. Had one teaspoonful of sugar for a cup of coffee or tea. Had 8 to 10 saltines apiece for meal.

Found it difficult to keep up with Bruno because he was moving day and night and we were limited by darkness, terrain and dense timber to diurnal movements.

Huckleberries numerous throughout this area, particularly on north slopes. Berries fast disappearing. Believe Bruno is feeding on these as well as caches of squirrels. We supplemented a meagre diet with berries when available as we hiked. Bob and Charlie cooked and ate their strip of bacon. John and I saved ours for morning.

Sept. 29. Broke camp and took off down hill to north.

6:00 A.M. Camp - No signal. yards down mountain we obtained a good signal at 285 and 295. Breakfast 9 soda crackers, cup of coffee with several teaspoonsful of

Mist Creek Trail.

sugar. Strip of bacon cooked in foil was delicious. Soaked crackers in grease and relished this too.

7:00 A.M. Warm receiver batteries over fire. Obtained a fair signal at 220 degrees but experienced difficulty in getting a null. Signal intermittent, bear moving. Evidently Bruno moved back into this area toward morning from his night foraging. Lack of signal at 6:00 was due to cold receiver.

7:15 A.M. Camp, good signal and good null at 290 degrees. Bear either coming toward us or moving higher though at a distance. Suspect the latter.

7:30 A.M. Top of Mt. Good signal no null. Signal obtained through a 360 degree arc.

8:05-10:30 A.M. Remained on top taking signal readings from camp and from top of Mt. These varied from 285 to 335 with good signal and good null at times and no null at other times. A 320 bearing was in line with Pelican Cone. Bruno definitely appeared to be moving eastward and as we suspected and later verified it was in the area of the Pelican Cone Trail and across the southern slopes of Pelican Cone. Some of the apparent discrepancies in bearings last night and this morning are due to several causes:

1. Bear at a distance and accompanying human error in judging direction of best null as well as direction of strongest signal. Null tends to be spread over a fairly wide arc from Mt. top vantage point.

2. Bear fairly close in at base of hill and moving or contouring.

A short distance moved would vary bearing considerably as bear would be moving in a relatively small circular path beneath hilltop. Hilltop is hub of circle.

11:15 A.M. Camp - good signal and null at 290 degrees. Bear definitely to west.

11:30 A.M. Broke camp and took off downhill to north.

11:30 A.M. Several hundred yards down mountain we obtained a good signal at 285 and 295 degrees. We got a signal for a little over half the distance down to the Mist Creek Trail.

12:05 P.M. Mist Creek Trail - no signal.
12:15 P.M. Station No. 14. Faint to possible signal at 280 degrees.
12:45 P.M. Hit open country of Pelican Creek Valley. First drink of water since yesterday afternoon. Filled plastic bottle of water day before for camp use.
12:50 P.M. Station No. 15. Very faint signal at 320 degrees. Lunch - one quarter Babe Ruth and some sugar water (2 teaspoonsful). Last of food.
1:30 P.M. Station No. 16. Faint signal at 325 degrees.
2:00 P.M. Returned to camp at car and cooked up meal of spam, beans and eggs.
3:25 P.M. Hill at end of road - quad, no signal.
4:20 P.M. Hilltop - Possible signal at 60 degrees.
4:45 P.M. Hilltop - Signal at 30 degrees interrupted signal but best yet.
5:40 P.M. Hilltop - Signal at about 30 degrees.

Returned to lab.

From the evening of the 27th to the afternoon of the 29th Bruno traveled approximately 14 miles as we were able to plot his movements. He traveled both day and night but stopped to rest. His nocturnal wanderings which we were unable to keep track of may have increased this distance somewhat. He stayed in the dense timber in the daytime but moved out into the open country on at least one night and probably two. Although we kept on Bruno's trail we were able to monitor his movements primarily from two mountain tops. The greatest distance that Bruno moved away from us on our Mt. tops was about four miles or west across Pelican Valley. Because he was constantly moving we were never able to close in on him for visual observation as we have done with so many other bears.

Sept. 30, 1964

Park rangers at Canyon shot a large male black bear that has been breaking into trailers. Probably the one that broke into ours.

and did chores around the lab. Phoned the Unit office, President Johns, Hugh Galusha, and Supt. John McLaughlin. Mrs. Arkright died and the president of the University has asked me to attend in his place. No suitable clothes here. on us. Had Bob make dental casts of the dead black bear and also casts of the fore and hind feet. They will illustrate the difference between the foot of a grizzly and a black. ~~watched her for some time. The sow did not appear interested in mousing but the cub moved~~ Radiotracking in several places, finally caught one mouse and Got a good fix on Marion in the morning from base and field station that placed her in the open country of Hayden Valley. This is the first time we have gotten her signal in open country this fall. Charlie and I moved in, starting from the field station at 4:00 P.M. A fix from the station - a small island of timber west of the field station about 1 1/4 miles. The signal indicated that we had pinpointed her in heavy timber downfall about 4:25 P.M. The signal strength indicated she was probably less than 100 yds. from us and we could get no null. We were reluctant to explore further. A very heavy wind was blowing and some trees were snapping. I climbed a sturdy one and carefully glassed the immediate terrain. No sign of No. 40 and her cub. We decided to move into the wind so our scent would be carried across the downfall. Soon after we moved, I spotted No. 40 and her cub both unaware of our presence at 4:45. Believe she had just gotten out of her bed to start foraging. ~~watched to~~ the ~~sow~~ Marion and the cub moved slowly through the timber. We watched them at a distance of about 150 feet. Charlie had the receiver and I carried a gun. The sow moved out of sight over a small rise of heavy timber. I moved in to keep contact while Charlie remained behind. The bear had made a small loop and was headed back toward me. I saw her rather suddenly not 75 feet away. She was snubbing along unaware of my close presence. I moved a few feet to a lodgepole with some low dead branches, lay down the gun and pulled myself up about 10 feet. The sow turned when about 50 feet away. Fortunately she was upwind

and did not scent me. Strangely, she did not see me and she and the cub passed by. Charlie had seen her turn back toward me, but was afraid to warn me for fear of attracting the bear and at such close distance she would have been right on us. Sow and cub moved out of the timber at a leisurely gait, sniffing the air and stopping to turn over logs. It was then 5:30. She remained in the open meadows and we watched her for some time. The sow did not appear interested in mousing but the cub moved around and dug in several places, finally caught one mouse and ate it. The cub would wander off 50 to 200 feet. When he got beyond this the sow would "woof" and he would move in, generally on the run.

The sow and cub moved one-third of a mile in half an hour. The cub would forage and the sow would sit and wait, then give him a call and move on again 50 to 100 yards. The cub would run to catch up and the sow would move off.

Kept the bears in view until almost dark. They moved over a hill at about 6:15 P.M. We moved over looked in all directions but could see nothing. The signal, however, was very strong and indicated the sow was near. The light had failed at about 6:25 and we suspected the sow and cub were bedded down close by in the sage so we returned to the safety of the timber. A very strong wind still blowing. Hiked back to our vehicle at the field station in the dark. Ran into a large bison herd of 120 animals we had seen on our way out. Could just barely make out individual forms at 200 to 300 feet. Retreated to the stream bank and detoured around the herd. Arrived at car at 7:00 P.M.

We had maintained visual contact with No. 40 and cub for 1 hour and 20 minutes. We kept downwind all afternoon and I feel certain she never knew we were nearby. Darkness finally forced us to break contact. Maintained radio contact with her until we reached our vehicle.

Oct. 1, 1964

Bob returned a day earlier and had located No. 40 and No. 14. Signals good. Wrote letters and notes. Have asked Bob to rough out some material for the Quarterly Report.

Oct. 1, 1964 Tracked No. 40 in the afternoon. Moved in to within 150 feet. She was bedded down in dense clutter of down timber. Yelled to scare her before venturing into the downfall. She took off but we did not see her. (of 15th).

Took movies of tracking.

Went to West for food. discussed plans for MFL.

Behavior Put carcass of black bear near field station.

Oct. 2, 1964 Bear Marketers are still at Trout Creek and still traveling together. Charlie and I arose early and checked bear carcass. Nothing had touched it.

Took a bearing on No. 40. Frank and Charlie tracked Marion. Joined

Took movies of an otter family at Otter Creek. Bruce. He was probably

Did odd jobs around lab. Went over Bob's notes.

Oct. 10, Margaret arrived from Missoula.

Oct. 3, 1964 This hiked to den at 10. Bear had not returned. Saw many bison.

Frank, Charlie, and Bob checked the bear carcass. Nothing present.

Bob, Charlie, Frank, Margaret and I left for Moose.

Packed up milk samples to send to Dr. Jenness. One dropped on

a mouse 15 feet from me. Sent the following samples:

Bison moving No. 172 - Sow with yearlings

No. 42 - Sow with cubs

Many elk at No. 34 - Sow with yearlings

No. 170A - Sow with cubs

Many elk frequent No. 170B - Sow after cubs were abandoned and avoiding

No. 39 - Sow with yearlings

No. 40 (Marion) - Sow with cubs - Not sent.

Oct. 4-7, 1964

Worked at cabin. Rafted Snake River and took movies.

Arrived back at lab late evening of 7th.

Bob returned a day earlier and had located No. 40 and No. 14. Signals

good.

Caught up on note writing.

Oct. 8, 1964

Margaret left for Missoula. No. 39. Other trap sprung but no bear.

Bob left for Missoula for week's leave. (Returned evening of 15th).

buffalo: Busy at paper work.

Goodyear arrived and we discussed plans for ERI.

Behavior

1 at Field station - a young bull.

The Four Musketeers are still at Trout Creek and still traveling together. Jerry Hammond reported shooting 2 elk at head of Pelican Creek.

Oct. 9, 1964 a fix on No. 40.

Answered correspondence. Frank and Charlie tracked Marion. Jammed

on foot. Spent night at head of Pelican Creek. Located Bruno. He was probably less than 1/4 mile from our camp. gained 100 lbs. since captured on June 22.

Oct. 10, 1964 shot bear and took blood sample. See data sheets.

Charlie hiked to den of 164. Bear had not returned. Saw many bison. No new digging at den.

Set both traps for the Four Musketeers at Trout Creek.

Great Gray Owl family still together. Hunting mice. One dropped on a mouse 15 feet from me. Using deer meat as bait.

Bison moving down Trout Creek Valley to Yellowstone River. to the den of No. 39. Many elk at head of Pelican Creek. Bulls bugling and tending harems.

Many elk frequenting the open meadows in early morning and evening and during night. we should learn if we can track No. 158 to hibernation.

Got a fix on No. 40. working on our directional receiver. Has

practically Arranged with Jerry Hammond at Lake to take an elk at mouth of Raven Creek in order to attract and hold Bruno.

Arranged with Jerry Mernin at Canyon to take an elk at Trout Creek.

Will accompany him tomorrow. Corral near Otter Creek Chittenden Bridge. She

was in our area. Caught up on note writing. we have right records of her in this area. She was very tame. probably lost her wildness in this general area in previous years. Suspect she hibernates somewhere in this

area possibly in the vicinity of Ribbon Lake or Sour Creek.

Oct. 11, 1964

Captured No. 158, yearling of No. 39. Other trap sprung but no bear.

Jerry Mernin, Charlie and I drove up Trout Creek. Mernon shot 2

buffalo:

1 at Gravel pit - a large bull

1 at Field station - a young bull.

Counted 125 bison in herd - 16 were calves.

Jerry Hammond reported shooting 2 elk at head of Pelican Creek.

Got a fix on No. 49.

Processed and instrumented yearling No. 158. Had a beer can jammed

on foot. Foot badly cut and infected. Removed can and cleaned and disinfected wound. Bear weighed 217 lbs. Had gained 100 lbs. since captured on June 22, 1964. Instrumented bear and took blood sample. See data sheets.

Getting good growth and development data on this bear.

Cut up buffalo at gravel pit and placed two quarters in trap for future

use. Got pickup stuck and had time getting it out. Took two hours of digging the source of noise. The eyes have a vacant fixed stare and the pupils are

Set one trap at dump using deer meat as bait.

Received a very good signal from No. 158. He could lead us to the den

of No. 39. It will be very interesting to learn if No. 39 hibernates with her three large yearlings; if not whether the yearlings hibernate in the vicinity

of the sow. This we should learn if we can track No. 158 to hibernation.

Joel Varney has been working on our directional receiver. Has

practically rebuilt one that was not functioning well.

Hibernation

Jack Hughes reported that No. 65 (one leg missing) and her three cubs

were seen today at the Horse Corral near Otter Creek Chittenden Bridge. She

was in this area early last spring and we have sight records of her in this general area in previous years. Suspect she hibernates somewhere in this

area possibly in the vicinity of Ribbon Lake or Sour Creek.

Oct. 12, 1964

Checked trap at Trout Creek. Recaptured No. 157, another one of No. 39's yearlings.

Processed No. 157 a male weighing 245 lbs. His June weight of this year was 125 lbs. See data sheets. Took blood sample.

No. 157. Under Effect of Sernylan

When No. 157 was coming out of the effect of sernylan, he could hold his head up but could not regain feet. Swung his head rather rapidly from side to side. This is very characteristic and we have noted it in most bears treated. Generally the head swaying starts while they are still prone and unable to get up. It becomes more pronounced once they have gained the use of the hind legs and can stand. Some bears move in figure eights, others turn and move first to the left and then to the right or vice versa. Gradually they become able to orient and move in one direction though the movement is rambling and circuitous. The next stage the bear responds acutely to sound and will move directly toward the source of noise. The eyes have a vacant fixed stare and the pupils are still contracted. The rate of recovery and the degree to which they exhibit the above described behavior varies greatly with individual bears.

Checked both buffalo kills. Grizzlies, ravens and coyotes had been on the large bull at gravel pit.

Grizzlies and most certainly No. 40 and cub had fed on the bull at the Field station. Tracks of No. 40 and cub were evident. No glimpse of bears.

Two coyotes visited the kill during an hour and one-half period that we kept watch just after sunrise. Got some excellent movies of the coyotes.

Food Feces at the carcass at Field Station consisted almost entirely of Melica spectabilis.

Signals Got good signal readings from the Field Station for both No. 40 and No. 158. No. 40 was very close, probably less than one-half mile. (See radiotracking notes).

Set trap at Trout Creek dump.

Oct. 13, 1964

Arose at 5:30 A.M. and checked trap at dump. No luck.

Checked both buffalo kills. Grizzlies had fed on both. Number 40's signal came in very strong. She was in timber very close to kill but we did not see her. Made no attempt to track her. Got fixes on both No. 40 and No. 158.

Observations at Kills

Have, as in the past, noted a considerable number of bear feces near the carcasses. The feces contain large amounts of undigested food. It may be that when grizzlies find large quantities of meat they are able to eliminate food already ingested in order to consume protein which seems to be a favorite food.

When grizzlies feed on meat their stools are very loose. When the meat is ripe it frequently acts as a physic.

Drove to West Yellowstone to get repairs on car and purchase food.

Met Ed Reed and wife, Nancy, and Hirsh Conally. Frank knew them from Las Vegas days. Invited them to visit lab.

Oct. 14, 1964

Arose at 6 A.M. and checked the buffalo kills. Grizzlies had been at both. Coyotes were present and I took movies.

Took bearings on No. 40 and 158. Took tracking movies in morning.

Captured a yearling, No. 194, in culvert trap at Trout Creek dump. This is one of the Four Musketeers. We were anxious to capture and instrument one of these to learn if the four inseparable male yearlings will hibernate together, close together or otherwise. Especially interested to learn if they maintain their "togetherness" into the period of hibernation. Finally got a tight fit. Stormed all day.

Oct. 14 Processed yearling No. 194. Weighed 175 lbs.; his weight on Aug. 22 of this year was 135 lbs. Took blood sample. Bear was heavily infected with round worms. Several dozen were in the feces.

Frank moved in on No. 40 and No. 158 and got fixes.

Oct. 14 Drove to the head of Pelican Valley. Got a fix on Bruno. He is apparently remaining in the same localized area which constitutes his fall foraging area and may be the one in which he will hibernate.

One of the Great Gray Owls (young) was killed by a car in front of the lab. Took it for specimen.

Oct. 15, 1964

Spent the night up Pelican Creek. Got another reading on Bruno, No. 14, which placed him somewhere near the mouth of Raven Creek as it comes out of the upper valley to join Pelican Creek.

Checked the two elk shot by Jerry Hammond at head of Pelican Creek. Both were completely consumed. Evidence of coyotes and ravens. Suspect grizzlies also fed but no tracks or signs were evident.

Saw 14 bull elk in the valley.

Held yearling No. 194 in trap over night so we could get a transmitter collar prepared for instrumenting this bear.

Storm coming in, barometer dropping.

Oct. 16, 1964

Was snowing heavily when we awoke. Took tracking movies in morning.

Oct. 19 Ed Reed and wife and Hirsh Conally arrived. Ed won Pulitzer prize for his report on the Mafia and wrote "The Green Felt Jungle" which is proving to be a best seller (two million paper bound copies in three weeks). Exposes corruption and gang activities in Las Vegas.

Oct. 19 Instrumented No. 194 in six inches of snow. Immobilizing was slow and we had difficulty fitting the collar. Head and neck of bear were small. Finally got a tight fit. Stormed all day.

Oct. 17, 1964

Ed and wife with Charlie and Frank, Bob, Hirsh and I moved on. Drove to Mammoth to get movie film, prestone and chains. Ed Reed and wife, Nancy, accompanied me.

Observed and photographed a bull elk with harem in snow. Was herding cows around and bugling. Was quite a sight. Frank and Charlie tracked.

Oct. 18, 1964

Took off early to track instrumented bears. Temperature ranging between 10° F. to 0° F. Possibility bears may go into hibernation.

Picked up signals of three instrumented bears No. 158, No. 40, and No. 194. Closed in on No. 40 at the head of Trout Creek after a long hike through 10 to 12" of snow. Frank, Bob, Charlie and I carried packs and movie equipment. Took tracking movies. Jumped No. 40 at an old den site which may be hers. Timber was dense and we did not see her. She moved off to the SW. Took movies of the den then moved on after No. 40. Followed her until about 4 P.M. Turned back as we were at the head of Trout Creek and four to six miles from our vehicle. Never did see No. 40. Arrived at vehicle at 6:15 P.M. All of us very tired from bucking snow and climbing over downfall. Ed Reed and wife had supper waiting and it was most welcome. Bears could go into hibernation at any time if temperature remains low. Will monitor off and on during night.

Oct. 19, 1964

Phoned National Geographic for more movie film. Phoned Gerry at Unit. Left the Gravel pit up Trout Creek about 12:45 P.M. and tracked No. 158. Signal indicated bear was 1 to 1½ miles away, due east of T.C. road. Ed Reed, wife and Hirsh accompanied the four of us. When within 1/4 mile of

the bear we left Ed and wife with Charlie and Frank, Bob, Hirsh and I moved on. Decided it was too risky to take them closer. Ed was bushed and we could not adequately protect such a group. Moved slowly and cautiously to within 100 feet of the instrumented bear. Suspected "Mommy" No. 39 and her other two yearlings would also be there. They make a highly formidable troupe and we had no desire to tangle with them. If they charged as a group there would be no possibility of stopping them. No. 39 is an extremely aggressive sow. She charged me in April but I was close to car and the charge was abortive but it raised the hair on the back of my neck. Snow was 6 to 7 inches deep and we encountered tracks when within several hundred yards of the bears. I approached a dense stand of lodgepole cautiously while the receiver boomed out the signal even with the sensitivity and volume turned clear down. Peering through the dense growth I saw two grizzlies - one sleeping (probably the sow) and the other alerted and with his ears erect but still lying in his day bed. Could see no collar. From the nearby tracks we knew one was an adult No. 39 and that there were two or more yearlings, one of which had to be No. 158. After spotting the bears I retraced my steps to where Frank and the others were waiting gun and sidearms in hand. We then retreated about 200 feet and began to talk aloud. Sought out a climbable tree apiece and then shouted to scare the grizzlies. The sow roared and the sound was frightening. There was considerable commotion and for several tense seconds we couldn't tell whether she was coming or going. To play safe we took to the trees. Bob was carrying the gun and he laid it down and shinnied up a lodgepole devoid of limbs. Hirsh was having trouble so I boosted him to the first limb and he got up 15 feet. Frank and I then stood by realizing she would already have been upon us if she was coming our way. We suspected the sow would retreat and so she did as the signal became less audible. Bob was clinging to the

lodgepole like a cub bear and finally had to descend with his arms scraped and cramped and a little wiser. Doubt if he will select a limbless tree again. When the directional receiver indicated the bear family was out of the neighborhood, we moved in on their vacated daytime retreat.

From the tracks and the number of day beds we learned that sow No. 39 and her three yearlings had all been bedded down together and all had left en masse, hundred yards beyond the gravel pit we struck No. 40's trail and her cub. This area is apparently a major daytime retreat of No. 39 and family. There were numerous (10-12) day beds in the immediate vicinity. Throughout the summer No. 39 and her yearlings have approached the Trout Creek dump from this general area and direction. The retreat was a mass of downfall and dog-tail lodgepole. visited her den site. If so, her tracks would lead us to it.

Rejoined Ed Reed and wife and Charlie Ridenour. Judged the weather had been bad here since last night or very early this morning. Set one trap at Trout Creek. to check at the field station.

10:23 A.M. Following tracks across sage generally southward.

10:25 A.M. Deposition in snow where sow sat. Cub beside her.

10:30 A.M. Observed where cub had urinated in snow. Cub following in tracks of sow.

10:38 A.M. Sow moved 25 feet to east side of her trail and bedded down.

10:38 A.M. Tracks led to a shallow grass day bed on slope of hill at edge of timber. Both sow and cub used this for some time. Tracks in snow leaving the bed were dirty.

10:40 P.M. Cub departed. Tracks of both sow and cub were of a dirty clay

Got a good signal from top of hill showing No. 40 was somewhat east of our course. However, we continued following the trail.

10:50 P.M. Traveled for about five minutes through extremely heavy overtimber.

10:50 A.M. Sow and cub visited an old day bed at base of lodgepole pine. Signal indicated bear was only 100 yards or so ahead of us. Would not have overlooked valley. They did lie down but continued on.

Cub still following in trail of sow. No side excursions. Right and strength. It told us at all times about how far ahead the bear was and to ten inches of snow.

then we changed course. The tracks in snow were so fresh they gave us the

Radiotracking Notes

11:00 A.M. Observed where sow defecated in an open glade. Sow and cub have
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now circled back to the east. Got good signal on the receiver which indicated
Took readings at 3:00 A.M. and at 7:00 A.M. Received good signals
ed tracks were now heading directly toward signal source,
from both No. 40 and No. 158. Had stopped snowing with between 10 to 12 inches
11:00 A.M. Signal coming in strong as we descended S.E. slope of hill
of snow. Temperature above freezing; snow soft and wet.

11:33 A.M. Bear has entered heavy down timber. In every instance both sow

10:00 A.M. Took a reading at the gravel pit and got a good signal from No.
and cub climbed over downfall rather than go under logs. Sow urinated.

40. Two hundred yards beyond the gravel pit we struck No. 40's trail and

11:45 A.M. Observed where cub had defecated.
her cub.

11:45 A.M. Signal very strong.

10:20 A.M. Charlie and I took off following Marion's trail in the snow. Car-

Located fresh warm day bed of No. 40 and cub on top of ridge in
ried one receiver with us. We hoped that the inclement weather might have
lodgpole stand. Ridge was fairly open but the approach used by bear was
aroused the instinct to hibernate and that last night or this morning she
dense. Fresh warm scent of sow at edge of bed. Very fresh tracks leading
might have visited her den site. If so, her tracks would lead us to it.
away. Suspecting sow would be on ridge from strength of signal, we talked as
Judged the tracks we followed had been made late last night or very early this
we progressed. Sow must have left when we were about 200 feet away. Did not
morning. Frank and Bob drove on up road to check at the field station.
see either bear.

10:23 A.M. Following tracks across sage generally southward.

11:49 A.M. Signal somewhat weaker indicating bear was moving away. Decided

10:25 A.M. Impression in snow where sow sat. Cub beside her.

to follow the fresh tracks. Sow and cub moved south then circled back and

10:30 A.M. Observed where cub had urinated in snow. Cub following in tracks
headed generally northwest,
of sow.

11:55 A.M. Sow moved 25 feet to one side of her trail and defecated and then

10:38 A.M. Tracks led to a shallow grass day bed on slope of hill at edge
retraced her steps and continued on. This occurred about 300 yards from where
of timber. Both sow and cub used this for some time. Tracks in snow leaving
we jumped her.

the bed were dirty.

12:04 P.M. Cub defecated. Stools of both sow and cub were of a cheesy clay

Got a good signal from top of hill showing No. 40 was somewhat east
consistency. No recognizable food items.

of our course. However, we continued following the trail.

12:05 P.M. Traveled for about five minutes through extremely heavy down timber.

10:50 A.M. Sow and cub visited an old day bed at base of lodgpole pine.

Signal indicated bear was only 100 yards or so ahead of us. Would not have
It overlooked valley. They did lie down but continued on.

risked going into the downfall in the heavy snow had we not had faith in sig-

6:00 P.M. Cub still following in trail of sow. No side excursions. Eight
nal strength. It told us at all times about how far ahead the bear was and
to ten inches of snow.

when she changed course. The tracks in snow were so fresh they gave no clue

with 12 to 18 inches of snow on ground and very little wind.

at any time we had our packs ready to go on in the timberland.

as to how far away she might be or whether she might be back-tracking or lying
11:00 A.M. Observed where sow defecated in an open glade. Sow and cub have
in wait. The grisly selected the densest part of the downfall and as pre-
now circled back to the east. Got good signal on the receiver which indicat-
viously walked on and over the logs. She apparently deliberately selected
ed tracks were now heading directly toward signal source.

11:00 A.M. Signal coming in strong as we descended S.G. slope of hill.

12:15 P.M. Decided we would learn little by forcing the grisly to move. Left

11:33 A.M. Bear has entered heavy down timber. In every instance both sow
the trail and headed back toward vehicle. Signal still strong indicated bear
and cub climbed over downfall rather than go under logs. Sow urinated.
was not over several hundred yards away.

11:45 A.M. Observed where cub had defecated.

12:45 P.M. Ate lunch at edge of timber.

11:47 A.M. Signal very strong.

1:25 P.M. Reached vehicle.

Located fresh warm day bed of No. 40 and cub on top of ridge in
lodgepole stand. Ridge was fairly open but the approach used by bear was
dense. Fresh warm scat of sow at edge of bed. Very fresh tracks leading
high ridges for their daytime retreats. For this reason No. 40's signal gen-
away. Suspecting sow would be on ridge from strength of signal, we talked as
we progressed. Sow must have left when we were about 200 feet away. Did not
see either bear.

Placed on No. 40 for yesterday (Oct. 30) during the snowstorm put
11:49 A.M. Signal somewhat weaker indicating bear was moving away. Decided
to follow the fresh tracks. Sow and cub moved south then circled back and
headed generally northwest.

11:55 A.M. Sow moved 25 feet to one side of her trail and defecated and then
retraced her steps and continued on. This occurred about 300 yards from where
we jumped her.

12:04 P.M. Cub defecated. Stools of both sow and cub were of a cheesy clay
consistency. No recognizable food items.

12:05 P.M. Traveled for about five minutes through extremely heavy downtimber.
Signal indicated bear was only 100 yards or so ahead of us. Would not have
risked going into the downfall in the heavy snow had we not had faith in sig-
nal strength. It told us at all times about how far ahead the bear was and

when she changed course. The tracks in snow were so fresh they gave no clue
at any time we had our packs ready to move in on the instrumented animals and

as to how far away she might be or whether she might be back-tracking or lying in wait. The grizzly selected the densest part of the downfall and as previously walked on and over the logs. She apparently deliberately selected the heavy downfall and cover to travel through.

12:15 P.M. Decided we would learn little by forcing the grizzly to move. Left the trail and headed back toward vehicle. Signal still strong indicated bear was not over several hundred yards away.

12:45 P.M. Ate lunch at edge of timber.

1:25 P.M. Reached vehicle.

12:00 (No.) No signal from car.

3:55 P.M. Sow No. 40 and cub seem to quite definitely prefer the tops of the high ridges for their daytime retreats. For this reason No. 40's signal generally comes in loud and clear at the base and is easily picked up at the field station and on the portables.

Fixes on No. 40 for yesterday (Oct. 30) during the snowstorm put her in just about the same vicinity we found her in today. We found no indication of any pre-hibernation activity. If No. 40 uses one of several dens we have located, then she was not close to any of these the past two days.

Her behavior pattern apparently remained unchanged with the storm bringing 12 inches of snow. Past observations and the present ones indicate that the triggering of hibernation is not gradual but very sudden. Just how close No. 40 may be to her den site we do not know. She could be within less than one mile, or several miles or 8 to 10 miles. It seems quite evident that deep snow alone is not the triggering mechanism. It may be a combination of snow and low temperatures. This has appeared to be the mechanism in the past.

6:00 P.M. Cloudy - warm - snow melting rapidly.

Nov. 2, 1964:

With 12 to 24 inches of snow on ground and possibility of a storm at any time we had our packs ready to move in on the instrumented animals and

track them to their dens. The temperature was about freezing, the barometer down and it was snowing. We obtained signals from both No. 40 and No. 158. Both were in heavy timber generally south of the Field Station.

10:25 A.M. From the hilltop above Trout Creek Bridge we obtained a faint signal from No. 40 at 165 d. This was too poor a signal for a good bearing. No signal from No. 158.

10:45 A.M. Obtained a very loud signal from No. 40 at 180 to 195 d., no signal No. 158. Signal from No. 40 appeared and disappeared - a sign of bear moving or perhaps going in and out of a den.

12:00 (Noon) Hilltop above bridge, no signal.

3:55 P.M. Hilltop Station, good signal from No. 40 at 195 to 200 d. Also No. 158. got a good signal though fainter from No. 158 at 150 to 155 d. On Oct. 31 obtained a good signal from Hilltop Station from No. 158 at 165 d. This grizzly appeared to be staying in the general area indicated by these bearings. No signals from Hilltop with portable. Decided that both bears were too far off to move in on them today. In the deep snow with packs we would probably be unable to get a signal on portable by dark. If bears moved during night we would lose them or have to retrace our steps to field station. Rather than move in we decided to camp near Field Station and keep track of grizzlies from here until we were sure that it was time to move. We camped in snow in a small grove of lodgepole below the station and beside a frozen tributary to Trout Creek. Ice frozen to bottom of creek but managed to break a small opening along bank for water. Domed this with snow blocks to keep it from freezing. Checked for signal from HT Station after dark but obtained no signals. Temperature dropped to 10 d. F. at camp. Temperature was 82 d/ inside sleeping bag. Took some flash photographs of camp. Had been able to drive pickup with chains to base of Hilltop Station. John, Charlie Ridenour, Bob Ruff, and myself camped here. Were awaiting developments to see whether

bears would continue to move and to see whether we would move in on No. 40, No. 158 or both. John had to be back at base on 3rd to meet Dr. Hugh Lamprey. During night I kept extra batteries and phone jack for plugging into receivers warm in sleeping bag. The receivers remained outside in cold. Charlie checked in morning from HT Station but was unable to get a signal. The receivers were too cold to work. The warm battery pack did not do the trick. Evidently we will have to warm the receivers themselves if they are to work well in winter. We had thought that warming the battery pack alone might do.

November 3 Station. Followed this bearing through thick timber and deep snow.

6:00 A.M. HT Station, no signal.

8:35 A.M. HT Station. Good signal from No. 40 at 205 d. No signal from No. 158.

10:50 A.M. Hilltop Station. Good signal from No. 40 at 205-210 d. Still no signal from No. 158. *Very good site. Signal was at 195 d. and came and went.*

The camp Just prior to this we had broken camp, packed our gear and decided that we would all take off if we got a good bearing. Bob and I planned to continue on overnight if necessary and the rest of the party would return to Base. In a foot or more of snow we started hiking up toward Mary Mt. following old road most of way. Tried to get signal from high points along way - no luck except a weak signal from No. 40 at timber bend in road. The best signal seemed to be at 225 to 230 d. Charlie heard signal, I didn't. Signal was too poor for any kind of an accurate bearing. We decided to hike on to bridge over seep where we take off to go into den of No. 164. *Steady enough*

12:45 P.M. Ate lunch in sun at this take-off spot. Prior to this took photo of weasel and coyote tracks. Cut across to Alum Creek. No signal from rim overlooking valley. *Grizzly must be fairly close. Later found that her den*

2:45 P.M. John and Charlie climbed to top of tall tree overlooking Alum Creek valley. Got a faint signal but not sufficient for a bearing. At this point, Bob and I took extra food from John and Charlie and parted company.

3:15 P.M. Camp. Good signal at 187 d. Obtained signal over a wide area.

We continued on toward high timbered ridge across valley and they retraced steps to pickup and on to Base. We decided to try to run down No. 40. Decided to try to get out at Trout Creek Bridge by next night but would remain over if necessary and come out the next day.

4:15 P.M. Hiked up the south side of Alum Creek in timber and deep snow but still no signal.

4:40 P.M. From high wooded hill close to the 210 d. bearing (from Hilltop) we picked up Marion's signal. It was faint and intermittent and at 175 to 180 d. from our position. Followed this bearing through thick timber and deep snow checking as we went.

5:15 P.M. Got the best signal so far from a point overlooking a small wooded valley. I was looking for a campsite when I got it so decided to camp on the spot as it was a fairly good site. Signal was at 195 d. and came and went. The complete disappearance for extended periods of time indicated a possible den.

8:00 A.M. Gathered bough and made bough beds, collected supply of firewood and cooked supper. Continued to check periodically for signal. Decided to try to keep track of bear off and on during night and if we still had it by morning move in. Had supper of a package of potato soup with dried beef, crackers and tea.

6:40 P.M. Good signal, but quickly disappeared. Same direction as former one.

7:20 P.M. From camp, good signal and continued long enough and steady enough to use sense antenna. Bearing was 185 d.

7:50 P.M. Good signal at 150 d. Suspect bear is moving. If signal change is due to movement, grizzly must be fairly close. Later found that her den was less than an airline mile away. It is very difficult to pinpoint one's position on map as the area is heavily timbered and no landmarks are available. Topography alone is often insufficient.

8:15 P.M. Camp. Good signal at 180 d. Obtained signal over a wide arc.

8:40 P.M. Camp. Good null, strong signal, sense antenna bearing at 210 d. Signal good but not real loud. Bear moving. Suspect bear is fairly near and her movements account for changes in signal direction. The temperature 75 feet from camp at this time was 18 d. F., the night clear. Four and one-half to five feet from campfire the temperature was 30 d. (air).

10:45 P.M. Went to bed about 9:00 P.M. and took receiver in sleeping bag with me to keep it warm. Had trouble getting a good night's sleep with receiver in bed. Kept rolling over on it and it always felt cold.

3:30 A.M. Camp. Good signal at 210 d. with receiver only a foot above ground. (loop only). This was by far the loudest signal, as though bear had approached camp.

November 4, 1964

3:30 A.M. See above.

7:45 A.M. Camp. Fair signal 210-215 d. Built a fire and started breakfast.

Temp. 13 d. F.

8:00 A.M. Fair signal 210-215 d. Although Marion may have moved about during night it was evident she had not moved far and was still in same general area in morning. Pulse rate 81/82 per minute.

8:55 A.M. Camp. Bearing 195 d. bear moving. Day bright, sunny and clear.

As Marion proved to be less than an airline mile from camp I believe the variation in bearings can largely be explained by slight movement on her part. However, we did not run into her tracks until we got right to den. Her movements, therefore, must have been to south and west of camp.

9:30 A.M. Broke camp after breakfast of potato soup, half a pack each of dried beef, crackers and coffee with sugar. Dried socks night before. Started off on a bearing of 200 to 210 d. and followed signal nulls. Followed ridge circling somewhat toward sun.

10:30 A.M. Dropped into a valley and still got a good signal even with an abruptly rising slope right in front of us. Knew then that Marion was not too

closer I saw old twigs and branches in the debris pile that looked like the far off. Began to move slowly, carefully checking bearing and watching for remnants of an old bed. A dark earth path led out from the den for about 15 tracks and other signs.

to 30 feet and was about 4 to 5 feet wide. The bears had apparently been 10:40 A.M. Climbed out of valley to ridge after looking for den in vicinity moving back and forth on this and some of it was fresh earth removed from the of huge rock on hillside. Signal louder on top and indications grizzly was den. Off the far side of this tracks led away. It did not appear to be a close. Obtained signal with sensitivity clear down and volume down some. Using heavily used trail, however. I was not able to get close enough to examine new receiver C-1. Timber heavy but not thicket. Lodgepole and alpine fir. it for use. During the last two days we had seen no bear tracks, the first Signal direction changed a bit from time to time, apparently due to bounce being those of Marion and cub right at den site. Believe Marion and cub had in timber. Had to keep sensitivity well down to get a good null. Snow still spent most of their time in dirty area in front of den or inside it. Marion up to our knees and scattered windfall.

was no doubt inside at times when we lost signal. Den was located on the 8200 11:15 A.M. Knew we were very close and kept peering ahead for den or bear. foot contour at the head of a tributary drainage into Alum Creek. It is only Heard cub ahead and below us but could not see anything. Sound appeared to an airline mile from the den of No. 164 and on the same contour. When we lo- come from several hundred feet away. Contoured hillside in deep snow, keep- ing above area where sound had come from. Located a daytime den-like bed or fourth mile). After following the drainage down a short distance (one-eighth a false den.

to one-fourth mile) we hit a small opening which we were able to identify and 11:23 A.M. Still contouring around very slowly with sensitivity and volume locate on map. The den went back in under the hillside much as did that of clear down. Was trying to get in a position where sun would not be in our No. 164. The setting was a very pretty one for a den. Both Bob and I took eyes. Stopped every 10 to 15 feet to look and to check signal. Signal pictures of the den from a distance and took shots of one another near the thumping in with sensitivity down.

den. The 205 and 210 degree bearings obtained from the Field Station the 11:30 A.M. We located dark earth area of den from a distance of 130 feet and morning we took off were plotted on our map. The den was located right between then saw opening at base of large fir tree. Den was located at head of ravine

that became a small valley and drainage leading into Alum Creek. Aspect of 12:15 P.M. Put on our packs and started down drainage so we could locate slope and den opening was 10 degrees. Took first pictures from 100 feet and ourselves and return to den. Got oriented when we hit opening already mentioned. then moved in to within about 30 feet. During this time I thought signal Stopped at north end of opening in sunny dry spot under tree to eat lunch. Had was coming from within den as it was weaker and muffled. Later found that trail rations (peanuts and raisins) and candy bar. Took a short rest and Marion had not entered den but had moved off just as we appeared on a slight dried sleeping mat in sun. Marion as indicated by signal was off to south rise and could be seen from den. At this point I caught a glimpse of some- of us a few hundred yards or so. She remained here until after we left. Got thing black moving out of the corner of my eye. It may well have been the signal with sensitivity clear down. Air temperature in shade at 1:45 P.M. was cub. The den looked as though it had been used in previous years. The en- trance through the tree roots was worn and weathered. When I approached

closer I saw old twigs and branches in the debris pile that looked like the remnants of an old bed. A dark earth path led out from the den for about 15 to 20 feet and was about 4 to 5 feet wide. The bears had apparently been moving back and forth on this and some of it was fresh earth removed from the den. Off the far side of this tracks led away. It did not appear to be a heavily used trail, however. I was not able to get close enough to examine it for use. During the last two days we had seen no bear tracks, the first being those of Marion and cub right at den site. Believe Marion and cub had spent most of their time in dirty area in front of den or inside it. Marion was no doubt inside at times when we lost signal. Den was located on the 8200 foot contour at the head of a tributary drainage into Alum Creek. It is only an airline mile from the den of No. 164 and on the same contour. When we located the den we were not exactly sure of our position (within one-half to one-fourth mile). After following the drainage down a short distance (one-eighth to one-fourth mile) we hit a small opening which we were able to identify and locate on map. The den went back in under the hillside much as did that of No. 164. The setting was a very pretty one for a den. Both Bob and I took pictures of the den from a distance and took shots of one another near the den. The 205 and 210 degree bearings obtained from the Field Station the morning we took off were plotted on our map. The den was located right between them. ~~not returned all summer. Our disturbing her and returning periodically~~
12:15 P.M. Put on our packs and started down drainage so we could locate ourselves and return to den. Got oriented when we hit opening already mentioned. Stopped at north end of opening in sunny dry spot under tree to eat lunch. Had trail rations (peanuts and raisins) and candy bar. Took a short rest and dried sleeping mat in sun. Marion as indicated by signal was off to south of us a few hundred yards or so. She remained here until after we left. Got signal with sensitivity clear down. Air temperature in shade at 1:45 P.M. was 40 d. F. and 48 in sun. The snow was wet and melting in sun. Trousers were

soaked and wet above the knees. *ark that we could cover the Trout Creek drainage*

2:00 P.M. Marion still close by. She did not return to den. Took off east down drainage and hit deep snow, windfall and tough going in stream bottom. Moved up on slope with southern exposure and going was much easier. Crossed Marion's tracks about one-eighth mile from opening. These may have been her tracks in to den but appeared to be a reconnaissance trip, perhaps made last night. *it is quite possible that he was in this area at the time the signals*

2:35 P.M. Still getting signal No. 40. *site. 15 ft. high*

2:43 P.M. Reached confluence with Alum Creek. Still getting good signal from Marion. Took the top out of a lodgepole tree standing by itself in opening where drainage runs into Alum Creek. (On Nov. 5 John, Charlie and Hugh Lamprey hiked into this point and saw our tree. They did not get a signal from Marion). If we came out where I expected we would, I planned to cut back to the den of No. 164 and see if she was using it.

3:10 P.M. Started following blazes leading to den of No. 164. *get signal from*

3:30 P.M. Photographed and observed den of No. 164. There was no indication that bear had been to den or was inside - no tracks at den entrance or around den. Did not look inside but moved in to within 15 feet of den opening. I again photographed the old end just above this one. It is possible that No. 164 will yet come to her den but as far as we have been able to determine she has not returned all summer. Our disturbing her and returning periodically to den may have discouraged her from using it. Bear could have been inside if she had entered prior to last snow but this seems quite unlikely. I would have had to stick my head inside den entrance to make sure it was used or empty and this would probably have meant killing the bear if she was present and charged. *exp. Signal from No. 40 seen bearing 280 d.*

3:45 P.M. Returned to where we had left our packs at the beginning of the blazed trail. Started up Alum Creek with the hope that we could get high

Throughout the day we did not see any bear tracks other than Marion's in the vicinity of the den. There was 2 to 4" of powder snow on top of a

enough and far enough before dark that we could cover the Trout Creek drainage with receiver for No. 158. The bearings from Hilltop Station Oct. 31 was 165 d. and the afternoon of Nov. 2 it was 155 d. No signal the morning of the 3rd. The signals were fair to faint and an extension of the bearings placed No. 158 in the very upper reaches of Trout Creek or beyond in the vicinity of Dryad Lake. These were to the east of the point where we later jumped No. 158 but it is quite possible that he was in this area at the time the signals were received and moving westward to den site.

Hit buffalo trail going up Alum Creek that made hiking easier. Finally left this and headed to east. Climbed steep bank of Alum Creek (South exposure and free of snow) and topped out on a spur-like ridge with commanding view, only an inch or two of snow, and firewood. At 4:00 P.M. we were still getting signal from Marion and it also came in well from this ridge at 4:30 P.M.

4:30 P.M. Decided to make camp here even though we could not get signal from No. 158. Thought we might get something if bear moved during night.

5:30 P.M. Camp completed, bough beds of lodgepole, firewood and tea water heating.

5:35 P.M. Strong signal from No. 40 at 255 degrees. This was south of her den and the signal no doubt off rather than the bear having moved.

6:35 P.M. Camp. No signals. Possibly an indication that No. 40 was in her den.

7:00 P.M. Camp. Air temperature 28 degrees F.

7:05 P.M. Camp. Good signal and null from No. 40 at 280 degrees. This bearing when plotted ran directly through the den site.

8:00 P.M. Camp. Signal from No. 40 same bearing 280 d.

9:00 P.M. Camp. Dried socks, trousers, underwear and sleeping bags. The deep wet snow had soaked us above knees. Hit the sack.

Throughout the day we did not see any bear tracks other than Marion's in the vicinity of the den. There was 2 to 4" of powder snow on top of a

crust. While hiking we would break through crust and go down 18", sometimes 2 feet or more in valleys. On exposed slopes and ridges the snow was in places only a few inches deep. For supper we had one package of pea soup, tea and crackers, also a few gum drops. Night clear, slept well. Did not bother to put receiver in sleeping bag as there was no need to check during night.

November 5, 1964

7:30 A.M. Started fire and breakfast, air temp. 19 d. F. Began warming receiver over fire so we could check for signals. Breakfast one package of potato soup, crackers and coffee. Bob tired of soup so ate very little.

8:30 A.M. Loud signal from No. 40 at 280 d. Apparently she is still at den site. Marion is apparently out of her den but probably just outside and not moving off. Apparently when the weather is good she does not like to go into den and remain there as grizzlies have done in the past when they enter dens during snow storms. Today is bright, sunny and relatively warm. It turned out to be one of the warmest days for some time and melted considerable snow around Canyon. Air temp. remained at about freezing even after dark.

9:25 A.M. Camp. Strong signal from No. 40 at 280 d. About ready to take off. Took pictures of camp and also took some flash shots last night. Headed east on ridge we were camped on.

10:00 A.M. From ridge where Alum Creek opens up a bit and makes a sharp bend to south and west - strong signal No. 40, no signal No. 158.

10:15 A.M. Still higher on ridge or upward sloping land paralleling Trout Creek. Good signal from No. 40, no signal No. 158. Our course is southeast keeping to the rising land. Station A.

10:30 A.M. Still on same course, Station B highest land yet, good signal No. 40 but signal irregular as though she is moving in and out of den. No signal No. 158.

10:55 A.M. Same course, Station C. Good signal No. 40 275-280 d.

11:15 A.M. Highest point reached yet, no signals. Should get Marion. Suspect she is in den.

11:25 A.M. About same altitude, no signals. Marion's den $2\frac{1}{2}$ airline miles away. Took picture of my shadow with receiver and martin tracks in snow.

11:30 A.M. Moved on a short distance and perhaps up a few feet. Came to a point where we overlooked the small valley of a branch of Trout Creek running about north and south. Valley was several hundred feet wide and forty to fifty feet deep. Here for the first time we got a signal from No. 158. The signal was good but not loud and at a bearing of 195 to 200 d. from our position at Station D. Sense antenna indicated bear was generally to south of us rather than to north, or in other words still farther away. The plan for the day had been to cut southeastward paralleling Trout Creek and keeping high so as to cover the ground to the north and also that to the south. If the bear was to the north we could then move in on it as we headed home. We expected that John and Charlie would be coming up Trout Creek trying to get a signal from No. 158. We had anticipated meeting them in P.M. or at least getting out to vehicle at Trout Creek bridge by late afternoon. I knew they would begin to worry if we did not get out before dark as this was as late as we planned to stay. Now that we had a signal from No. 158 I decided we should try to follow up and locate the bear. If we gave up and went out and a storm came we would never get back again. The bear could be $2\frac{1}{2}$ or more miles in the indicated direction but it could also be closer and the signal shielded. The country was relatively level, however, so I figured we had at least a mile and a half to go. We should have gotten signal from No. 158 from camp and during morning. Can't figure why we didn't unless he was in den or deep day bed.

11:40 A.M. Started after No. 158 following bearing of 195 d. as nearly as we could. Continued to check signal and bearing and altered course from time to time as indicated by receiver. Pulse rate was 52-54 per minute.

12:00 P.M. Ate some trail ration and candy. Obtained signal from No. 40 as well as No. 158 but signal of No. 40 was weak. Distance from her den was about $2\frac{1}{2}$ miles and the elevation probably a 100 feet higher.

12:45 P.M. Signal now came in at an angle to our direction of travel indicating we may have passed the bear to one side. The signal bearing was now 65 to 70 d. using null and sense antenna. The signal was still not much louder than when we had picked it up but we were about a mile closer.

1:00 P.M. Ate lunch at this spot while waiting to see if there would be a signal change. Ate trail rations and a few biscuits. Took a few pictures.

1:25 P.M. Signal and bearing still the same. Started off in new direction. Could only guess our general position because of sameness of terrain and vegetation.

1:30 P.M. Hit a small pond and then knew we were in the area of five ponds but not sure which one we had come to.

1:50 P.M. Got Marion's signal near this opening or pond. Having considerable trouble following the signal of No. 158 as the signal strength would vary and direction as indicated by nulls and sense antenna would change radically within a few hundred feet. Signal at times quite strong indicating bear close by and then again completely disappearing.

2:30 P.M. Hit another pond generally east of the other one. The frequent changes we had made in direction made it difficult to determine just what general course we had taken. Having trouble, particularly in heavy timber with signal direction. Must be getting some bounce as on several occasions sense antenna would indicate a 180 d. change in bearing after moving only a

Suspected a den was close by due to the signal appearing and disappearing prior to jumping bear. Figured it would take another hour to move in cautiously and search for den. We had nearly a six mile airline trek ahead

few hundred yards. Suddenly got a very strong signal at 125 d. from what we thought was the edge of the easternmost pond but which was probably the middle one. The signal came in with the sensitivity almost clear down. Now knew that we were relatively close to grizzly No. 158 and no doubt close to the entire family - sow No. 39 and two other yearlings. Sow is mean tempered and the yearlings weigh 300 lbs. apiece. Followed this bearing cautiously. Came to a thicket of dog-hair pine and circumvented it. Area looked more like a place for a day bed rather than den. Climbed over windfall and then saw a small valley and drainage to our left and a slightly rising slope ahead. Had more windfall ahead and scattered dog-hair timber (lodgepole). Larger trees were straight, tall and limbless. Moved very cautiously and then stopped as signal thumping in indicated grizzly could not be more than a few hundred yards off and perhaps nearer. Bob had shotgun and I had 38 revolver. 3:10 P.M. Signal suddenly got even stronger with sensitivity clear down as though bear were moving directly toward us. Visibility ahead was almost nill. It was evident the grizzly was moving and apparently toward us. If a yearling was headed toward us the only explanation was that he was coming with his mother and perhaps littermates. Decided we had better play safe and go up a tree. I started up a small one with a branch about 12 feet above the ground and asked Bob to hand up the receiver so I could keep track of bear. Told Bob to follow me but he started walking off. Decided he wanted a bigger tree so pointed out another with branches. Bob got to first limb and then continued on up. He climbed up 25 to 30 feet and got quite tired. Had trouble holding on. Signal continued very strong, but could not glimpse bear. Hooted and shouted to scare grizzlies. Signal finally indicated that they had moved off a bit but not far. Waited a little and then got down from tree. Took picture of Bob in tree. we had covered 1/4 mi. Backtracked and finally found it. Added Suspected a den was close by due to the signal appearing and disappearing prior to jumping bear. Figured it would take another hour to move in cautiously and search for den. We had nearly a six mile airline trek ahead

of us through deep snow and windfall. The distance was probably at least eight the way we would have to travel. If we were in windfall at nightfall and did not get to the open country of upper Trout Creek we could not get back to base tonight. Knew John would be worried and might even start out to search. Gave up looking for den and took a bearing east of north that would permit us to hit upper Trout Creek valley.

3:35 P.M. Started back. Hit pond where we got good signal and bearing at

2:30 P.M. and later hit another pond probably the easternmost of the group.

We hit the ridge of the tributary running into Trout Creek and followed it north to Trout Creek. Crossed to north rim of Trout Creek valley. Had a choice here of following rim around until we hit open country of valley or of cutting across through timber and hitting open valley further down. The latter was the shorter in terms of miles but was afraid of getting into bad windfall. However, took a chance on the latter as we had little time before dark. Took off on a course of 340 d. to hit Trout Creek below bend where it turns northeast. Soon got into thick windfall and deep snow. Terrain very

irregular and ridges petered out as fingers where new drainages entered. Did quite a bit of climbing up and down. Finally came out into open valley below what we call Marion's Ravine. It was 6:00 P.M. and just about dark. Managed to see fresh footprints and knew that one or more people had come up valley today and returned.

6:10 P.M. Made a fire under a tree and boiled tea and ate some crackers

before going on. Snow was still soft and we wanted to give it time to harden. Also wanted some nourishment and a slight rest.

7:10 P.M. Took off for Trout Creek Bridge and vehicle. Stopped to shed heavy parka as night was warm (32 d. F.). Put down camera in dark and did not notice I had forgotten it until we had covered 3/4 mi. Backtracked and finally found it. Added an extra mile and a half to our trip.

We left the laboratory at 10:00 A.M.

9:20 P.M. Arrived at pickup. As I hoisted pack into truck bed a flash behind me lit up pickup and reflected off cab. Believe it must have been a shooting star. Jack Hughes and Jerry Mernin also saw it on way to Norris. Road was a couple of muddy ruts. Drove to highway and took off frozen chains, a tough cold job. Had heavy packs as we planned to spend two nights and we went

10:00 P.M. Arrived back at lab. and found that John became concerned when we didn't show up before dark and alerted Park people and Helicopter for search in morning. John and party had hiked up Trout Creek and over to Alum. They saw our tracks leading off toward probable position of No. 158 and sow. Decided that if we had gotten into trouble they had better get there by morning. Park ranger arrived with horses soon after we got back. They spent the night with us. John called off helicopter flight. Hiked well over ten miles this last day with packs and in deep snow. Legs were not the least tired but felt somewhat generally tired. Met Hugh Lamprey and had a nice visit with him.

November 8, 1964

2:30 P.M. Have not received a signal from No. 40 since Nov. 4 and from No. 158 since Nov. 6 but got one early this morning. All evidence indicates these bears are remaining in close proximity to their dens, spending part of each 24 hours actually in the dens, hence no signal. Frank and Bob located the den of No. 40 on Nov. 4 and got a close approximation of the den of No. 158 and sow No. 39 and offspring on Nov. 5.

Bob, Charlie and I took off to make one final attempt to locate the den of No. 158 and family group. Number 158 has been a member of a family group all summer and fall. We are particularly anxious to learn if these bears (four) hibernate together or if the yearlings dig separate dens or if only part of the family hibernate together. The yearlings now weigh approximately 250 lbs. apiece (see data sheets).

We left the laboratory at 10:00 A.M.

3:15 P.M. Got 15 feet of movie but it was poor. Could have approached

Left vehicle near first bridge on Trout Creek at 10:30.

closer but decided not to disturb the family. We back tracked and I doubt

The day was bright and clear and the snow melting slowly on the

if the bears ever knew we had been present.

south exposures but still 8 to 10" deep in the woods and on the flats.

12:20 P.M. Arrived at the head of Alum Creek.

Den is in a hollow of lodgepole, fir and spruce. Ground is dense

and little light filters through. Den is at base of trees on a slight slope.

Had heavy packs as we planned to spend two nights and we went

For details see notes of Nov. 4. At 4:00 P.M. we made camp at the head of

heavily armed in case the sow and three yearlings should make a concerted

Alum Creek 3/4 of a mile from the den of No. 40.

attack. I carried the movie camera, film and tripod, hoping to get a shot

November 9, 1964.

of a grizzly at its den.

Ate lunch at head of Alum Creek. No signal at this point from

from either No. 40 or 158.

either grizzly although we knew No. 40 was 3/4 of a mile away up a draw to

8:40 A.M. Broke camp but left cooking and sleeping gear behind.

the West and No. 158 was probably about 2 airline miles to the southeast.

9:40 A.M. Crossed Alum Creek and moved up the timbered drainage to the East,

At 12:53 after traveling about 1/4 mile west and attaining the

moving generally southeast. No signal.

crest of a low ridge we got the signal from No. 40. Pulse rate has now

10:10 A.M. Received signal of No. 158 at the exact same spot where Frank and

dropped to 72 per minute indicating a battery life of only a few days to a

Bob first got it on Nov. 5. The signal bearing was 1-3 d. and the signal good.

week.

Moved off on this heading.

2:30 P.M. Arrived in vicinity of den and spotted No. 40 and her cub at the

10:45 A.M. Signal strong indicating the bear was close. Prior to this we

entrance to her den. We were approximately 175 feet from the grizzlies at

had been moving slowly in snow to the den. Woods opened up and I decided

this time. Timber was heavy so we had difficulty observing and no opportunity

to climb a tree and look ahead. Signal indicated the bear to be within 50

to photograph. The wind was in our favor and No. 40 and cub were not alerted

yards or closer.

and I suspect had no inkling that we were close by.

Remained in trees until 11:30 and then spotted sow and three year-

2:35 P.M. Both sow and cub moved 20 or 30 feet from the den entrance and

lings at about 200 yards. Got only a glimpse as they moved from behind a rise

bedded down. Signal strength was turned completely down but signal came in

into heavy timber. The wind was in her favor and she held her nose in the

strong.

air for a brief second and I was certain she had gotten my scent. Bob and

I partially circled the den and found no tracks leading in except

Charlie were below us and the directional receiver indicated the family had

a trail from the East. It was evident that these bears have not moved more

moved only a very short distance.

than a few hundred feet from the den since Nov. 4 or longer.

11:40 A.M. Moved cautiously toward the bears and crossed their trail. Back-

tracked 150 yards and found the den at 12:00 noon. The den was in an open

area with some small trees and shrubs. The den was in an open

3:15 P.M. Got 15 feet of movies but it was poor. Could have approached closer but decided not to disturb the family. We back tracked and I doubt if the bears ever knew we had been present.

Den is in a hollow of lodgepole, fir and spruce. Overstory is dense and little light filters through. Den is at base of tree on a slight slope. For details see notes of Nov. 4. At 4:00 P.M. we made camp at the head of Alum Creek $3/4$ of a mile from the den of No. 40.

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Arose at 7 A.M. and tried the directional finder. Got no signal from either No. 40 or 158.

8:40 A.M. Broke camp but left cooking and sleeping gear behind.

9:40 A.M. Crossed Alum Creek and moved up the timbered drainage to the East, moving generally southeast. No signal.

10:10 A.M. Received signal of No. 158 at the exact same spot where Frank and Bob first got it on Nov. 5. The signal bearing was 125 d. and the signal good. Moved off on this heading.

10:45 A.M. Signal strong indicating the bear was close. Prior to this we had been moving slowly in snow 12 to 14" deep. Woods opened up and I decided to climb a tree and look ahead. Signal indicated the bear to be within 300 yards or closer.

Remained in tree until 11:30 and then spotted sow and three yearlings at about 200 yards. Got only a glimpse as they moved from behind a rise into heavy timber. The wind was in her favor and she held her nose in the air for a brief second and I was certain she had gotten my scent. Bob and Charlie were below me and the directional receiver indicated the family had moved only a very short distance.

11:40 A.M. Moved cautiously toward the bears and crossed their trail. Backtracked 150 yards and found the den at 12:00 noon. The den was in an open

timber stand and fresh digging was conspicuous on the snow. The den was on a moderate slope amid downtimber and was not located at the base of a tree. The den opening faced due north (360 d. by the compass). The opening was about $3\frac{1}{2}$ ' high by $2\frac{1}{2}$ ' wide. There were no large roots evident at the entrance or in the den proper. The den itself sloped sharply down and was 5' high by 8' deep by about 5 feet wide. There was some root debris and a few sticks at the base of the den but no lining.

The ground was dug and torn up for 20 or 30 feet around on a well-worn path with several shallow day beds. Small lodgepoles were chewed and the larger trees bore claw marks. The den was dug in very solid earth with a layer of compact gravel. I judged the den was new this year and probably dug this summer. The latest digging which was very superficial occurred after the last snow which occurred on Nov. 1. Snow around the den was 12" deep. Appears as though the sow and 3 yearlings will be very crowded. Took movies at den site. Signal from No. 158 was weak indicating the family had moved off $1/2$ to $3/4$ of a mile. Pulse rate still 52.

12:55 P.M. Left den and headed back. Circled den and found no tracks except the ones we had followed in. Evidently these bears have kept close to the den and have not departed since about Nov. 1 or 2. Marked den site with

blazes. Ate lunch. Field work for the season is now over and we leave as soon as possible. This may be the storm

that triggered move into dens. A heavy snow storm and drop in temperature. Bob has been tired and moody although he has been carrying much less than Charlie and I. Has spoken little the past two days except when

Blazed trail back to head of Alum Creek. To reach the den one moves generally south then from a well blazed area, proceed on a bearing of 125 d. to the den. Blazes about every 50 to 75 feet for 2 miles or more. There are some small ponds encountered en route. The den lies beyond the third pond.

In some species of hibernation no environmental triggering is

spoken to and has not volunteered to break trail, carry equipment or do any of the many tasks that must be done on a trip of this kind. Have been disappointed because the past two days have been the culmination of six years of effort and an experience of a lifetime. Charlie helpful, cheerful and enjoying it all immensely. Bob is excellent on the paper work and data recording but does not enjoy hard physical field work.

4:00 P.M. Reached the head of Alum Creek. Decided we should recheck the den of No. 164 and recheck No. 40 in the morning if possible. Charlie and I elected to stay and Bob was anxious to get out so we sent him back with a light pack.

4:15 P.M. Checked den of No. 164. No sign of bear.

4:30 P.M. Arrived back at camp. Bob had left.

Charlie and I made camp. Had tea, vegetable soup and crackers for supper. Dried wet clothes around fire. At 8:00 P.M. I climbed 40 feet up a lodgepole and hung transmitter so Frank, at base, could test for signal. Plan to use some such device in future to notify base if field men get in trouble or are delayed in getting out. Day bright and clear.

November 9, 1964

Up at 6:00 A.M. Overcast and snowing. Broke camp at 7:30. Met Frank and Bob at vehicles. Field work for the season is now over and we will close the lab and leave as soon as possible. This may be the storm that triggers the hibernation.

Received the signal from 158 at base this morning. Snow was so deep on roads we made it out the West gate with difficulty.

November 10, 1964

Storm triggered move into dens. A heavy snow storm and drop in temperature appears to be environmental triggering that operates in conjunction with biological clock.

In some species of hibernation no environmental triggering is

necessary (see literature). Internal characteristics related to metabolic rate act as a biological clock. This enables the organism to relate an internal condition to an external time. It would appear that in late October or early November the grizzly bear is experiencing internal changes, lowering of protein bound iodine level, etc.; the result is a lowered metabolic rate. As winter approaches the chances, of course, are higher that weather conditions will coincide with internal physiological changes and appear to trigger the move to dens; whereas there may be no need for an external stimulus. Observations made over the past five years are so closely related to snow depth, temperature, and lowering of barometric pressure than an environmental triggering appears to be a factor. Although the external stimulus may not be necessary for a grizzly to go into a condition of hypothermic and deep sleep it may nevertheless be the stimulus that sends the bears moving about en masse to their dens.