STATUS REPORT ON THE REINTRODUCED RIVER OTTER (*Lutra canadensis*) IN THE KAWUNEECHE VALLEY.

By
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Introduction:

In the fall of 1978 the Colorado Division of Wildlife reintroduced 7 river otter (Lutra canadensis) into the Kawuneeche Valley of Rocky Mountain National Park. All seven otter were not released simultaneously due to the difficulty in live-trapping these mammals. One otter was supplied by the State of Washington while the remaining 6 otter came from Wisconsin. The final release was made on 6 October 1978.

Unfortunately, only 4 otter could be positively sexed. Two of these were males and two were female. The age ratio of the released otter was better established. Six were adults and the remaining otter was a young of the year.

In September of 1979, I was employed by the Colorado Division of Wildlife's Non-Game Section to attempt to locate these otter. I was primarily concerned with trying to establish, if possible, how far the otter had traveled since their introduction, how many of the original 7 transplants had successfully over-wintered and if they had reproduced within their first year. Only a very few sightings had been reported to the Division of Wildlife and National Park Service personnel during this first year and it was deemed advisable to attempt to obtain more accurate data as to the otter's present status in order to evaluate the need for further transplants into the area.

Study Area

The area investigated falls wholly within three USGS 7.5' quadrangles: Fall River Pass, Grand Lake, and Shadow Mountain. These are all located within Grand County, Colorado and a major portion of the area is within the boundaries of Rocky Mountain National Park. The northern limit of the study area was the release site on the north fork of the Colorado River (see

this area.

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The area investigated falls wholly within three USGS 7.5' quadrangles; Fall River Pass, Grand Lake and Shadow Mountain. These are all located within Grand County, Colorado. and a major portion of the area is within the boundaries of Rocky Mountain National Park. The northern limit of the study area was the release site on the north fork of the Colorado River (see Fall River Pass Quad.) while the southern limit was ascertained to be Shadow Mountain Dam (see Shadow Mountain Quad.). The Eastern and western boundaries are delineated by the sides of the Kawuneeche Valley which contains the north fork of the Colorado River. All previous sightings had been within these limits, either along the north fork of the Colorado River or in Shadow Mountain Reservoir. Since it appears that there is plenty of adequate habitat to sustain 7 river otter within these boundaries, it was assumed that they have not, at this time, migrated beyond this area.

Methods:

Within the above outlined study area there are, in general, three basic physiographic features which are conducive to or necessary for the survival of the river otter.

These are; the north fork of the Colorado River itself, beaver ponds within the Kawuneeche Valley and Shadow Mountain Reservoir. These features were investigated by walking the shorelines and looking for any sign which might indicate that the otter were or recently had been actively utilizing the area. Obvious sign includes tracks, scat, dens, resting places, scent-marked trails, "rolling places" and slides.

Each physiographic feature (i.e. the river, beaver ponds and the reservoir) necessitated certain variations of technique. The river was investigated by wading the river and walking the banks. During this process all small mud flats were studied for tracks. The banks were inspected for slides, trails, scent-marked pulling-out places, slides and dens. prominent logs, roots and rocks were also inspected for scat. Generally, due to time limitations, both banks were investigated simultaneously by zig-zagging back and forth between opposite banks. Occassionally however, when time allowed and in areas of sign concentrations, one bank was worked moving downstream while the opposite bank was worked on the return trip. I was also fortunate to be periodically assisted by a capable volunteer from the USFS at Shadow Mountain Recreation Area. At these times, one person would investigate each streambank allowing coverage of both banks simultaneously. The beaver ponds were searched in a manner similar to the river. As ponds were encountered during the investigation of the river,

opposite bank was worked on the return trip. I was also fortunate to be periodically assisted by a capable volunteer from the USFS at Shadow Mountain Recreation Area. At these times, one person would investigate each stream bank allowing coverage of both banks simultaneously.

The beaver ponds were searched in a manner similar to the river. As ponds were encountered during the investigation of the river, time was taken to search the shores and the myriad of trails and canals associated with the ponds for possible otter sign. In several sections of the valley, the river itself or tributary streams would break up into large areas of marsh, full of beaver ponds and small canals. These areas were investigated in the same manner as the beaver ponds.

The area around Shadow Mountain Reservoir was searched by walking the shoreline. There are 8 small islands at the south end of Shadow Mountain Reservoir. Access to these islands was by boat and they were then searched in the manner described for the rest of Shadow Mountain Reservoir.

When possible otter sign was found, it was mapped on USGS 7.5' quadrangles. Representative scat samples were also collected, tagged, and mapped for further analysis. Photographs were taken at locations of possible otter sign and also of typical habitat found within the study area.

Results

Unfortunately the results of these investigations are rather inconclusive. A bare minimum of possible otter sign was found. It must also be emphasized that all sign found can only be classified as possible otter sign. Due to size discrepancies between the sign (i.e. tracks and scat) found in this study and the sizes of sign published in the literature on otters, none of that found can be definitively attributed to the released

otter. In general, the tracks and scat discovered in this study averaged decidedly smaller than that previously published. Therefore, the sign located in this study oftentimes cannot be postively identified as otter sign and the possibility that it indicates mink (Mustela vison), raccoon (Procyon lotor), weasel (Mustela sp.) or even marten (Martes americana) cannot be ruled out.

Tracks

Tracks of all kinds were quite scarce throughout this study. This is due to the relative lack of good substrate which would make identifiable tracks. For the most part, the stream bottoms were too rocky to allow for tracks to be printed. The shorelines and river bank are so heavily vegetated that the matted grasses were the only indication of trails made by the wildlife. The heavier, hoofed mammals frequently left legible tracks as their sharp hooves cut the grasses and the tracks were sunk appreciably into the ground. Smaller animals generally did not leave tracks. Only in small isolated mud flats were tracks readily found and identified. These tracks were primarily those of canids, skunks, weasels, beaver, and muskrat as well as many birds. At only one location (NW¼; Sec. 25, T5N,R76W, Grand Lake Quad) were possible otter tracks located. These tracks were found in some soft mud in the river bottom. Except for their size, they looked like otter tracks. They averaged 1.25 to 1.5 inches across. This is much smaller than tracks of otter described by Murie (1974). He describes an average otter track as being approximately 3.25 inches across. Nevertheless, it is possible that these tracks were laid by the young otter released or possibly a new young of the year. These tracks were located approximately 0.25 mile downstream from the bridge at the Holzwarth Homestead in Rocky

Table #1. Sample Scat Sizes from the Kawuneeche Valley and Shadow Mountain Reservoir.

ID. #	Size (dia. x length)	Location	Contents
1	1/4" x 1 3/4"	SW1/4; Sec. 24, T5N R76W Fall River Quad.	Fish
2	3/8" x 1 1/2"	SW1/4; Sec. 24, T5N R76W Fall River Quad.	Fish
3*	?	NW1/4 Sec. 25 T5N R76W Grand Lake Quad.	Fish
4	3/8" x 1"	SW1/4, Sec. 1, T4N R76W Grand Lake Quad.	Fish
5	1 1/2" x 4"	SW1/4 Sec. 1, T4N R76W Grand Lake Quad.	varied - mostly rodent. probably an owl pellet
6	1/4" x 1 1/4"	SW1/4; Sec. 1, T4N R76W Grand Lake Quad.	Rodent
7	1/2" x 2"	SE1/4 Sec. 13, T3N R76W Shadow Mtn. Quad.	Crayfish
8	1/4" x 2 1/2" / 1/4" x 1 1/2"	SE1/4; Sec. 13 T3N R76W Shadow Mtn. Quad.	Rodent / Fish
9	3/8" x 1"	SE1/4; Sec. 13 T3N R76W Shadow Mountain Quad	Rodent
10	3/8" x 3 1/2"	SE1/4; Sec. 13, T3N R76W Shadow Mtn. Quad.	Fish and Crayfish
	$\bar{X} \approx 1/2" \times 2"$		

*This scat disintegrated before accurate sizes could be established.

Mountain National Park. It is of note that a Mr. Gubbins (1979, pers. comm.) reported seeing two otter playing around this same bridge in July of 1979. His size description also indicates that the otter he saw were not fully grown.

Scat

Many scats were found in the course of this investigation. Again, as with the tracks, they were generally too small to be readily attributable to otter. Size alone is not the best criterium, however, with which to judge the origin of a scat. In order to positively identify a scat it is felt by this author that other sign should be found in conjunction with a scat to make a postiive identification. In the case of the otter, scat size can be quite definitive when the specimens fall in the range of those dropped by a healthy, adult individual. The sizes of otter scat do overlap considerably with those of large mink or marten. Unfortunately, no scats of definitive size - that is, 3/4 inches in diameter "...and characteristically in 2, 3, or 4 curved segments each about 1½-3" long..."(Greer, 1955) - were located during this study. The mean scat size per segment located in this study was 1/2 inch diameter by 2 inches length (see Table #1). This average may also be a little large as it includes one specimen measuring 1½x4 inches (#5, Table #1) which is probably an owl pellet. Therefore, the average size of all scats from this study fall easily within the range of overlap between those of otter and those of mink.

Although none of the scats found were associated with other definitive sign, many were recovered from obvious scent posts, resting places, and trails leading to or from the water. Some were also found at den entrances. With this in mind, these scats could have been the result of otter activity. It

is also of note that several of the scats collected came from locations of previously reported otter sightings.

One scat is of special interest (#1, Table #1) because it was found within a small cavity in the river bank. The cavity was well hidden behind several large lodgepole pine roots. Also inside this cavity were the dessicated remains of a caudal fin. This spot seems to have been an ideal resting place for the river otter. The location is within 1.5 miles of the release site and judging from the age of both the scat and the caudal fin, I estimate that this cavity was used probably late in the fall or early winter of 1978.

Although none of the scats collected were fresh enough to indicate presently used activity areas, they did fall into some interesting patterns when mapped. Basically, three areas of "concentration" of scat are delineated (see accompanying maps). All of these areas are also locations of previously reported sightings. The northernmost area falls around the area of the Holzwarth Homestead in Rocky Mountain National Park. The other area is located near the mouth of Bowen Gulch in the Kawuneeche Valley. In this area Bob Haines of the NPS obtained photos of otters tracks in the snow on 3 February 1978 (pers. comm.). Finally, the area on and around the islands in Shadow Mountain Reservoir held concentrations of scat where crayfish had been, at least temporarily, the primary food source. Again, this was a location of an otter sighting by NPS personnel (B. Haines, pers. comm.). This observation will be discussed further in the following section.

Other sign

Other sign which might have indicated the presence of otter was inconclusive. Throughout areas where the beaver ponds were abundant, trails leading between ponds and canals were frequently located. Due to heavy

vegetation however, no other sign besides matted grasses was found. Beaver and muskrat sign was abundant and the trails were used by both of these species.

No slides (a characteristic otter sign) were found due to the nature of the river bank. For the most part, the bank is either too shallow in slope, too rocky, or both to allow an otter to make a slide.

Unless trails, cavities, pulling-out places, etc. were found in association with other otter-like sign, they had to be disregarded for the purposes of this investigation.

Discussion

As previously mentioned, no conclusive evidence was found during the course of this investigation which would indicate the present range of the reintroduced otter in the Kawuneeche Valley. Certainly no direct observation of otter was made.

Unfortunately, due to time limitations, I was not able to work the entire length of the Kawuneeche Valley or the entire periphery of Shadow Mountain Reservoir. Because of this, areas near the release site and areas around the most recently reported - and most reliable - sightings were emphasized. The entire valley from the release site to approximately 1.5 miles below the mouth of Bowen Gulch was worked. Efforts were then concentrated around the islands in Shadow Mountain Reservoir as this was the location of a seemingly reliable sighting and it also yielded a quantity of sign (scat) indicating heavy, seasonal predation on the crayfish population. Then, as time became more limited, lower sections of the north fork river valley were investigated. This was done on the assumption that the prey base was different from that of the upper reaches of the drainage. It was

assumed that there was a greater percentage of rough fish, from the reservoir, in this lower section. It was further assumed that the released otter may be utilizing this change in prey base as several authors (Erlinge, 1969, Greer, 1955, Hamilton 1966, Knudsen and Hale, 1968; Lagler and Ostenson, 1942, and Toweill, 1974) have indicated that fish predation by otters is inversely proportional to the swimming ability of the fish. Thus slower moving, rough fish are selectively preyed upon over the faster game fish. Because in the course of my investigation I observed only brook trout (Salvelinus fontinalis) in the upper sections of the river, it was thought that if there was a greater proportion of rough fish in the lower sections perhaps the otter were utilizing this source. Unfortunately, no direct data concerning this phenomenon were available to me. Relatively no sign, otter or otherwise, was found in this lower section of the river. This, I feel, was due to the increased human activity. Private homes, guest ranches, and gravel pits commonly altered the nature of the river. Canids, skunk, beaver, and muskrat were the only species observed to be using this stretch of the valley. Tracks were the primary source of identification of these species.

The upper reaches of the drainage investigated, from the release site (NE¼; Sec. 12, T5N, R76W, Fall River Pass Quad) to just below the mouth of Bowen Gulch (NW¼; Sec. 12, T4N, R76W, Grand Lake Quad) did yield data indicating possible otter activity. As previously mentioned, one area was around the Holzwarth Homestead in Rocky Mountain National Park. Several scats were found here as well as the only set of possible otter tracks found in the study. The other area, near the mouth of Bowen Gulch, yielded two scat samples (#s 4 and 6 from Table #1). It was also in this area that Bob Haines of the NPS obtained photos of otter tracks during the winter of

1978-79. He also found a ptarmigan kill, possibly by otter (pers. comm.).

The islands at the southern end of Shadow Mountain Reservoir produced considerable amounts of possible otter sign. Most of the scat piles had crayfish remains and it appears that this has been used, seasonally, as a food source. The majority of the sign was found on the westernmost islands. The islands further to the east were in deeper water with less aquatic vegetation and consequently smaller to non-existent crayfish populations. Much of this scat was found in association with 1) old beaver lodges and 2) burrow holes generally beneath vegetation. Many of the burrow holes were too small (2" in diameter) for otter. Individual scats were located at trails where they entered the water. The water depth and channel widths between these islands would make access fairly easy for a predator with aquatic tendencies such as the otter. However, mink and raccoon predation cannot be ruled out. This area was again the site of a reported otter sighting (30 July 1979) by NPS personnel.

In summary, three areas of possible otter activity were located during the course of this investigation. These areas are: 1) around the Holzwarth Homestead in Rocky Mountain National Park; 2) the area of the Kawuneeche Valley near the mouth of Bowen Gulch; and 3) the island system at the southern end of Shadow Mountain Reservoir. Although the evidence collected thus far is by no means conclusive, I feel confident that some, if not all, of the 7 released otter are actively inhabiting the valley of the north fork of the Colorado river. In regard to the question of their reproductive success in this, their first year of relocation, no definitive data have been found. However, since 6 of the 7 otter were adults, and at the very least, 2 of these 6 were female, it is entirely possible that one or more of these females was pregnant

at the time of the transplant. This hypothesis is drawn from the fact that the reproductive cycle of the river otter revolves around the delayed implantation phenomenon. Since this spring (April-May 1979) would have been the first breeding season for the otter in the new homeland, there has not been enough time for a new generation, entirely bred and raised in the Kawuneeche Valley,to be established. This generation would appear, at the earliest, in the spring of 1980. Due to the phenomenon of delayed implantation, parturition is followed very closely by the breeding season in the genus Lutra. Therefore it is possible that one or more of the females transplanted was "pregnant" at the time of transplantation,having been bred the spring prior to capture. In light of this it is very possible that there are new young of the year in the present population. This is providing, of course, that the "pregnant" female(s) successfully overwintered. This hypothesis is supported to a degree by the fact that the sole set of otter tracks located in the study are too small to be those of an adult individual.

Although this author feels confident that there is still an active population of relocated otters in the Kawuneeche Valley, I feel that more study should be initiated to bear this out. Only after conclusive proof has been found that the otter have successfully relocated should an effort be made to transfer additional individuals.

Recommendations

In light of the fact that no conclusive evidence was found as to the success of the otter reintroduction program in the Kawuneeche Valley, I would like to put forth two suggestions which might facilitate aquiring more accurate data in this regard.

1) Primarily, I feel that the snow-less months of the year

are not the ideal times to be gathering the necessary data. Since the river otter (Lutra canadensis) is active during the winter months when the waterways are frozen over to a large degree and snow blankets the ground, the tracks, trails, and slides of these mammals are much more readily observed and identified. Also at this time of year, the population is more concentrated around areas of open water as this appears to be a primary factor limiting their over-wintering success. Therefore, I suggest that efforts to monitor the activities and numbers of the reintroduced otter be concentrated during the snowbound months. If aerial reconnaisance could be used to locate and map open water and sign concentrations, this would greatly facilitate the follow-up ground reconnaisance. A combination of ground and aerial surveys throughout the winter would, I believe, greatly enhance the success of monitoring efforts.

2) I would also like to suggest that the public be periodically informed or reminded of an on-going reintroduction program in their area. To encourage them to inform the local WCO or regional non-game biologist of any sightings would further enhance the success possibilities of any effort to monitor the activities of a reintroduced population.

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APPENDIX II

Summary of River Otter Movements,

Rocky Mountain National Park, Colorado, 1980

10-7-80 River Otter

Ear Tag:	1 CDOW
Transmitter Frequency:	148.010 MHz
Weight:	16 lbs. (7.26 kg)
Sex:	Male
Source:	Wisconsin, captured October 3, 1980
Shipped:	October 6, 1980
Condition:	Poor (dehydrated)
Surgery:	October 7, 1980 - AM
Released:	October 7, 1980 - PM

Animal was released at Timber Lake Campground at 1630 hours. It crossed river and seemed to bed down. Left it alone. At same location 2030 hours.

10-8-80 Signal coming from about 100 meters upstream from release site. Checked at 0900 and 1400 hours. Second animal received.

River Otter

Ear Tag:	2 CDOW
Transmitter Frequency:	148.020 MHz
Weight:	16 lbs. (7.26 kg)
Sex:	Male
Source:	Wisconsin, captured October 7, 1980
Shipped:	October 8, 1980
Condition:	Feisty, good
Surgery:	October 8, 1980 - PM
Released:	October 9, 1980 - AM

Otter #1 still at same location at 2130 hours.

10-9-80 Released #2 at same site as #1 (0930 hours). #1 still at same location upstream of release site. Suspect he's dead. 1630 hours #1 still not moved, #2 still very near release site.

10-10-80 0830 hours #1 still at same site, can get no signal from #2. Searched for #2 up valley, north as far as Phantom Valley parking lot, then south to Grand Lake entrance. At 1230 picked up #2 signal with aid from George Bear and a different receiver. #2 located north of Phantom Valley parking lot. Hiked up Lulu City Trail and located #2 one mile up.

10-11-80 Otter #1 not moved at 0830. Hiked Lulu City Trail looking for #2. No signal. Picked up fresh scat at Shipler Park. Located #2 at picnic area north of Timber Creek Campground. At 1730 hours #2 was still at this location. #1 had not moved.

10-12-80 0830 both in same places

1730 both in same places

10-13-80 1200 hours located #1 signal at beaver pond 100 m. north of release site about 30 m. west of river channel. Picked up scat sample. Located #2 north of Timber Creek Campground but south of picnic area. At 1630 Otter #1 had not moved. Otter #2 at picnic area.

10-14-80 Another animal arrived at Granby at 1600. Another male, decision made not to implant. Weight was 19 lbs. (8.6 lbs.). Ear tagged with 3 CDOW, released. 1800 hours #1 same location, #2 north of picnic area.

10-15-80 Light snow on ground. At 1000 looked for tracks in snow from #3, found none. No signal from #2. At 1445 #1 in same spot. Searched Phantom Valley to Bower Gulch for #2; no signal.

10-16-80 Lots of snow. 1045 #1 at same location, #2 at Timber Creek Campground. 1600 hours, located site of #1. Examined ponds west of the river - found excellent sign; tracks, slides from location of #1 south to 1/4 mile below

release site. 1830 #2 near Holzwarth Meadow.

10-17-80 0800 looked for sign of #2 around Holzwarth's - found none. 0930 examined Dick Bridge area - no sign. 1600 otter #4 arrived - poor condition, surgery postponed. 1730 #1 at same location, couldn't locate #2.

10-18-80 Surgery begun at 0900

River Otter

Ear Tag:	5 CDOW (#4 destroyed)
Transmitter Frequency:	148.030 MHz
Weight:	19 lbs. (8.6 kg)
Sex:	Male
Source:	Wisconsin
Shipped:	October 17, 1980
Condition:	Poor
Surgery:	October 18, 1980 9:00 AM
Released:	October 18, 1980 3:30 PM

Animal was released at 1530 hours at big picnic area south of Timber Lake trailhead. Slushy ice on surface of beaver pond. Otter poked head up through several times while crossing pond and then disappeared down a side channel. #1 at same location, #2 at Holzwarth Meadow.

10-19-80 #1 Same

#2 Holzwarth Meadow

#5 Couldn't locate

Identified lots of track and slides south of release site. Some blood in trace, single drops, suspect cut or abrasion on pad. 1600 hours #2 Timber Creek Campground. No location of #5.

10-20-80 0930 - #1 Same

#2 Timber Creek Campground

#5 About 150 meters south of release site

10-21-80 Sunny, snow gone -1110 hours #2 north of Holzwarth Meadow. #5 at release area but has moved west. Weak signal. 1700 recovered carcass of #1. 1740 couldn't locate #2 or #5.

10-22-80 0930 carcass of #1 too bad to mecropsy. Recovered transmitter and preserved skull.

10-22-80 through 10-27-80 Receiver broken down.

10-28-80 0830 #2 at Holzwarth Meadow, #5 also. Same at 1700.

10-29-80 1000 hours #2 at Timber Creek Campground. #5 between Holzwarth Meadow and Timber Creek Campground.

10-30-80 1100 hours #2 same location, #5 south of yesterday's location.

10-31-80 1030 #2 between Timber Creek Campground and Holzwarth Meadow. #5 at picnic area north of Timber Creek Campground.

11-3-80 1000 hours #2 and #5 near Holzwarth Meadow. 1700 hours both in same general area.

11-4-80 0730 #2 very close to Timber Creek Campground. #5 west of picnic area. At 1600 hours #2 at Timber Creek Campground. #5 north of picnic area. Also found holes in ice at site of release of #5.

11-5-80 1000 hours followed #5 north of beaver ponds picnic area. #2 in a beaver lodge southwest of Timber Creek Campground.

11-6-80 At 0900 hours #2 still in beaver lodge from yesterday. #5 east of river, north of picnic area beaver ponds. At 1500 #2 still in beaver lodge, #5 just north of beaver ponds picnic area.

11-7-80 At 0900 hours #2 north of beaver lodge.. #5 south of beaver ponds picnic area. No location on #5 at 1600, #2 back at beaver lodge.

11-8-80 0830 #2 at beaver pond picnic area. #5 north of beaver pond picnic area. At 1600 #2 at Timber Creek Campground, #5 not located.

11-9-80 1000 hours #2 in beaver lodge at Timber Creek Campground. #5 at Timber Lake Trailhead. At 1630, #2 due west of Timber Creek Campground, #5 not located.

11-11-80 0630 #2 north of Holzwarth Ranch. #5 not located. At 0900 #2 west of Timber Creek Campground. #5 not located.

11-12-80 0845 #2 southwest of Timber Creek Campground. #5 not located. 1430 hours, #2 south of Timber Creek Campground. #5 not located. 1700 hours #2 same place, #5 not located.

11-15-80 1300 hours #2 south of Timber Creek Campground, #5 located in beaver ponds picnic area.

11-16-80 1100 #5 southwest of beaver ponds picnic area, #2 south of Timber Creek Campground.

11-17-80 1010 hours, #5 south of beaver ponds picnic area, #2 south of Timber Creek Campground.

11-18-80 1000 hours #5 south of beaver ponds picnic area, #2 north of Holzwarth Homestead parking lot.

11-19-80 1100 hours #5 northwest of beaver ponds picnic area, #2 northwest of homestead parking lot.

11-21-80 1415 hours #2 north of homestead parking lot, #5 northwest of beaver ponds picnic area.

11-22-80 At 0830 #2 south of Timber Creek Campground, #5 northwest of beaver ponds picnic area.

11-23-80 0830 #5 west of beaver ponds picnic area, #2 southwest of Timber Creek Campground.

11-24-80 0830 #5 west of beaver creek crossing. #2 south of south end of Timber Creek Campground.

11-26-80 1130 #2 southwest of Timber Creek campground. #5 west of beaver pond picnic area.

11-27-80 0830 #5 west of beaver pond picnic area. #2 south of Timber Creek campground.

11-28-80 1030 #5 southwest of beaver pond picnic area. #2 south of Timber Creek Campground.

11-29-80 0830 #2 south of Timber Creek Campground;#5 west of beaver pond picnic area.

12-1-80 0800 hours #5 between beaver pond picnic area and beaver creek crossing. #2 southwest of Timber Creek Campground.

12-4-80 0900 #5 southwest of beaver creek crossing, #2 not located.

12-5-80 0900 #5 northwest of Timber Creek Campground, #2 west of Timber Creek campground.

12-6-80 0900 both south of Timber Creek Campground.

12-7-80 0900 neither located

12-8-80 0845 both south of Timber Creek Campground.

12-9-80 1000 hours both south of Timber Creek Campground.

12-10-80 0800 #2 west of Timber Creek Campground, #5 south of Timber Creek Campground. At 1300 - #2 in large beaver pond south of Timber Creek Campground, appeared to be in bank burrow on north shore. #5 in same beaver pond, but appeared to be in beaver lodge on south shore.

12-11-80 0930 both animals in beaver lodge in large pond south end of Timber Creek Campground. At 1230 #2 moving in beaver pond. #5 west of beaver pond.

12-12-80 1300 hours #2 southwest of Timber Creek Campground. #5 south of Timber Creek Campground.

12-13-80 0815 Both animals south of Timber Creek Campground.

12-14-80 0815 Both animals southwest of Timber Creek Campground.

12-18-80 0830 Both animals south of Timber Creek Campground.

12-19-80 0815 #5 south of Timber Creek Campground. #2 west of Timber Creek Campground.

12-20-80 0830 Both animals south of Timber Creek Campground.

12-21-80 0810 Both animals south of Timber Creek Campground.

12-22-80 0830 Both animals south of Timber Creek Campground.

12-23-80 0830 Both animals south of Timber Creek Campground.

12-24-80 0830 Both animals south of Timber Creek Campground.

12-26-80 0835 #5 southwest of Timber Creek Campground, #2 south of Timber Creek Campground.

12-28-80 1630 Both south of Timber Creek Campground.

12-30-80 Both south of Timber Creek Campground.

12-31-80 Both south of Timber Creek Campground.