

White Paper: River Otter within Rocky Mountain National Park

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Management Concern: Recent river otter (*Lutra Canadensis*) research in the park by Dr. Merav Ben-David 2001-2006 indicates that the population along the Upper Colorado River within Rocky Mountain National Park is experiencing a downward trend.

The History of River Otter in Rocky Mountain National Park

River otter were never very common in Colorado. However, records exist of the species on most major drainages in Colorado (Armstrong, 1987). In Rocky Mountain National Park, otter had been reported from both sides of the Continental Divide. Cary (1911) reported that Henry Lehman knew of otter in the Colorado River near Grand Lake in 1908. Stevens (1975) noted several other river otter sightings up to as late as 1975 in the park, but none were authenticated.

In 1974, Rocky Mountain National Park declared the otter extirpated, and in 1975 the Colorado Wildlife Commission added the otter to its endangered species list. Why otter disappeared from the park is not well understood. Warren (1910) believed the variable flow of mountain streams such as what is found in Kawuneeche Valley, might explain the low population level. The Colorado Division of Wildlife noted the susceptibility of otter to traps set in water for beaver and that the loss of otter may have been incidental to beaver trapping. Poor water quality caused by acid mine waste and siltation from mining activities, may also have contributed to the decline statewide. Siltation from construction of the Grand River Ditch could have affected the otters in the Upper Colorado River within Kawuneeche Valley (Wright et al. 1932). Impacts to the Park from the ditch were in a state of flux from ~ 1890 to 1936 when it became fully operational (Karl Cordova, personnel communication). Since 1936, the flow regime of the Upper Colorado River has remained fairly predictable. Wright et. al. (1932) advised against reintroduction of river otter based on the lack of knowledge about the reasons for the initial scarcity and decline. This question had not been answered satisfactorily, but data gathered by 1974 indicated that nothing short of actually reintroducing the otter and monitoring their survival would do that.

Since the National Park Service policies call for restoration of extirpated species where possible, the decision was made to attempt a reintroduction. This proposal was included in the 1976 Master Plan for the park; an environmental assessment for that plan was prepared in 1975. A program to restore river otter to the park began in 1975 (Stevens, 1975).

Attempts by the park to obtain otter from other parks or Canada were unsuccessful. In September 1976, the Colorado Division of Wildlife agreed to cooperate with the National Park Service on the program and supply otter when they became available through their own restoration program.

In the fall of 1978, seven otter obtained from the States of Washington and Wisconsin was released in the Park on the Upper Colorado River near the Red Mountain Trail Bridge. At least some of the otter survived and remained in the valley as determined by tracks near the Bowen Gulch Road and Timber Creek Campground in 1979 (Stevens, 1980).

After the initial release, 27 additional otter were implanted with radio transmitters to monitor their movements and released between 1979 and 1984. Six of these otters died shortly after release. Between 1978 and 1984, altogether, 41 otter were released (NPS 1998). The 41 otters released in the park included; 17 females, 15 males, and 9 of undetermined sex. Data from the radio transmitters indicated the otter moved an average of 13 kilometers (range 1 to 47 kilometers) to establish home ranges averaging 18 kilometers in the summer and 7 kilometers in the winter (Armstrong 1987). From 1981 to 1984 Curt Mack, Colorado State University, did a study of the otter movements and food habits in the valley, and his results indicated the otter were doing fine (Mack 1985).

Yearly late winter surveys began in 1988 in the Kawuneeche Valley, with six otters counted in 1988, 11 otters in 1989, and 13 otters in 1990 (Stevens, 1990). After 1990, counts shifted to every other year. Surveys conducted every other year, continuing through the 1990's, indicated a sustainable population and young otter were noted at times indicating a reproducing population (RMNP River Otter Surveys, archived at McGraw Ranch). Even though reproductive evidence was always difficult to obtain, river otter surveys and wildlife observation records indicated that otter were using most of the habitat along the main channel of the Upper Colorado River within the Park, and several tributary streams. River otter were noted at times on the east side of the Continental Divide within Forest Canyon, and one otter was observed on the Big Thompson River in Estes Park, but no sustainable or reproducing population east of the divide has been documented within the Park.

River otter counts required surveying the Colorado River drainage and tributary streams within two days. Surveying in just two days reduced the chance of double counting otter that moved from one area to another. Surveying the west side of the park in two days required 15 to 20 people working in teams of two. Both permanent and seasonal employees and volunteers participated in the survey and employees coming from the east side of the park required per diem for the two days. At times there were no funds to cover the per diem, and employees paid for food or lodging on their own.

Recent River Otter Surveys

Dr. Merav Ben-David began a river otter population survey in the Park in 2001. She and her students initiated surveys by monitoring scat deposition as an index of population size, and evaluated latrine use. Dr. Ben-David estimated the river otter population in 2001 to be 18, which was fairly consistent with other year's population estimates since 1990. However in 2002, she began to note a downward trend. In 2002, the fall density of river otter was estimated to be only 43% of 2001, 2003 was 16% and a continued decline through 2006 has been noted (Ben-David 2001-2006). Coincidentally, the state of Colorado and other western states, experienced a severe drought in 2002, with below normal snowpack during the winter of 2001-2002 and little rain during the summer of 2002. Summer water flow in the Upper Colorado River and other rivers in the park were very low. A drought, mild winters and hot summers has been ongoing in the west since 2001. It is speculative that low water flows in the

Kawuneeche Valley caused by below normal snowpack, and the Grand Ditch, led to a reduction in river otter.

Otter Elsewhere in Colorado

On February 12, 2007, Jeff Connor talked with Michelle Cowardin, District Wildlife Biologist with the Colorado Division of Wildlife in Grand County. Jeff asked the question, how were river otter doing downstream of the park? Michelle stated that river otter are considered common downstream of the park along the Upper Colorado River to its confluence with the main Colorado River and are also doing well along the main stem. Michelle noted five otter in the river near Hot Sulfur Springs just that morning. She mentioned that river otter are now considered common in Middle and North Park and that river otter have crossed the Continental Divide and can be found at Gold Lake near Ward and Jamestown. She mentioned that Tom Beck a research biologist with the Colorado Division of Wildlife, involved with the Park's reintroduction, predicted back in the 1970's that the river otter would not remain in the park due to the Colorado River's variable flow.

Does Stream Flow Influence Park River Otter?

It is possible that stream flow influences the abundance, distribution and availability of fish in the Upper Colorado River in the park, thereby affecting river otter (NPS 1998). The Upper Colorado River is a forth-order, pool-riffle river (Westbrook et al. 2006). Stream flow is markedly seasonal with more than 80% of the annual Upper Colorado River flow occurring during the snowmelt period of May, June and July (Woods and Cooper, 2005). The Grand Ditch also affects the river by diverting 13 high-elevation tributaries off of the basin and reduces the average annual flow in the river by 29% (Westbrook et al. 2006, Woods, 2001). The Grand Ditch reduces both peak flows and summer base flows by up to 50% (Woods and Cooper 2005, Woods 2000). Typically late summer flows are low with an occasional rise during rain events and remain low through the winter. Beaver dams and overbank floods also influence groundwater-surface water interactions and a lack of beaver and associated dams have an influence on fish density and probably river otter.

Other Factors that May Influence River Otter in Rocky Mountain National Park

The population within Colorado is sustainable and doing well. However, river otter within Rocky Mountain National Park are not doing as well. River otter have large home ranges and can be expected to move in and out of the park, but will most likely always remain uncommon within the Park's boundary, due to the variable mountain rivers found in a headwaters park, and probably a combination of the following factors:

- The Grand Ditch is known to impact water flow in the Kawuneeche Valley and during droughts the Colorado River is further reduced than normal or wetter years. Colorado has had at or below normal precipitation since 2001. The river otter may have moved downstream seeking more favorable habitat during the drought in 2002, when Dr. Ben-David noted a reduction in their population.

- Otter are relatively long-lived (up to 14 years in the wild). It is possible that the decline noted by Ben-David represents the loss of older animals that have not replaced themselves due to poor quality habitat.
- Dr. David Cooper has conducted research along the North Fork of the Colorado River and its tributaries for over 20 years, and noted that willow in the Kawuneeche Valley has declined significantly in the last decade (Cooper, personal communication). He attributes this decline to an over abundance of elk and moose. The moose population within Rocky Mountain National Park may be as high as 60 (Stumph 2005). As browsers moose are less adaptive feeders than elk and rely more heavily on willow communities for forage (Stumph 2005). Elk rely heavily on willow during the winter and moose in all seasons. Moose and elk tend to leave the Kawuneeche Valley during the winter when snows are deep, but are common during other times of the year.
- An over abundance of elk and moose likely contribute to a reduction of willow in the Kawuneeche Valley and a low beaver population, negatively impacting river otter habitat. Beaver create dams, pools, and a healthier hydrologic regime favoring fish. Otter use old beaver dens when giving birth. Improving willow would mean more beaver and their dams, and enhanced river otter habitat. The implementation of the Elk and Vegetation Management Plan will hopefully improve habitat on the elk's summer range in Kawuneeche Valley, but the Park needs to develop a Moose Management Plan to determine what should be the moose carrying capacity.
- Climate change may have a long-term impact on snow pack and water flow, thereby negatively impacting river otter.
- A bark beetle outbreak attributed to mild winters and hot summers is presently killing large numbers of conifer trees in the park. It is unknown what impact this will have on river otter habitat, but about 18,000 acres of lodgepole pine have been impacted within and on either side of the Kawuneeche Valley. Perhaps less cover on steep mountain sides may increase siltation in the river for a period of time. Siltation is generally not viewed as benefiting fish, the otters' sole food.

Possible Areas for Further Investigation

The river otter decline in recent years is of interest to park management. Research may be needed to investigate relationships between river otter, beaver, elk, moose and other associated wetlands dominate species. Is there a correlation between fish population dynamics, drought, beaver, and otter? How will management actions from the implementation of the Elk and Vegetation Management Plan improve willow habitat and will an expected increase in beaver compensate for any negative impact in late summer flows from the Grand Ditch? Perhaps most importantly, a moose management plan is needed to protect the Kawuneeche Valley from degradation similar to that seen in east side elk winter range.

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