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**Otter Conservation –
An Example for a Sustainable Use of
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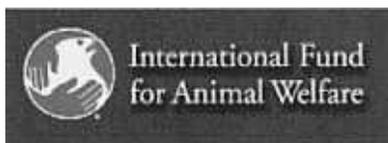
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THE DIET OF *Lutra canadensis* IN THE UPPER COLORADO RIVER SYSTEM

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Abstract: The North American river otter was reintroduced into the headwaters of the Colorado River in Rocky Mountain National Park between 1978 and 1984, after it was extirpated from the Park and declared a Colorado state endangered species. Estimates from biannual winter otter surveys since 1992 indicate that 15 to 17 individuals inhabit this portion of the river system. This population became the concentration for the current project, which began in 1992 and continued for five years. Its purpose was to collect and analyze scats (faeces) to determine the species' diet. Thirty-six percent of the diet consisted of prey from the Catostomidae, 23% from the Salmonidae, 34% crayfish and 7% other fish families and invertebrates. Seasonal trends showed crayfish dominated in the diet during the summer months and the non-game Catostomidae was evenly distributed throughout the seasons.

INTRODUCTION

The food habits of the North American river otter (*Lutra canadensis*) have been studied in a number of locations throughout North America. They were summarized by TOWEILL and TABOR (1982) and later by MELQUIST and DRONKERT (1987), with more recent studies having been conducted by SERFASS et al. (1990) and MACK (1994). The current project will add additional information about the otter's diet for a different segment of the continent.

STUDY AREA

The study area comprised a 26 km stretch of the headwaters of the Colorado River, its tributaries and major drainages in Rocky Mountain National Park, and waterways in adjacent sections of the Arapaho National Forest in the state of Colorado, west-central part of the United States (40° 30' N; 106° W). The terrain was mountainous with valley habitat ranging in elevations from 2530 to 2750m. The riparian vegetation along this portion of the Colorado River is classified as shrub/grass with the main shrub being willow (*Salix* spp.) and lesser amounts of alder (*Alnus tenuifolia*) and dog birch (*Betula glandulosa*) plus many associated grasses (MACK, 1985). There were stretches in the study area of lodgepole pine (*Pinus contorta*) with either sparse or dense understory components. The temperatures during trekking ranged from -25 to +25° C.

The most abundant fish found in the upper Colorado River and its drainages are represented by four families: Salmonidae - five species; Catostomidae - two species; Cyprinidae - one species; and Cottidae - one species (MACK, 1985). There are various other vertebrates and invertebrates, including crayfish, which are found in at least the southern portion of the study site.

MATERIALS AND METHODS

The study was conducted by walking the study site throughout the seasons. Telemetry was not used. A total of 1652 field hours were spent in the study area. Scats (faeces) were collected where found during the survey from April into December for 1993 through 1996. Scats were rarely found during the winter months (21 December - 20 March) due to snow conditions, so this season was under-represented and is therefore not included in the results. The three seasons when scats were collected and analyzed were: spring (21 March - 20 June), summer (21 June - 20 September) and autumn (21 September - 20 December). There were two portions of the study area where scats were found most often, one in the main river system, the other an adjacent system of Monarch Lake and Arapaho Creek. When collecting, each scat was bagged individually and labeled with date, location, condition of scat, terrain, weather, and substrate where found. The contents were air-dried, then cleaned with a solution of water and dental cleaner, washed through a sieve and placed in individual containers. Fish were classified by family using vertebra, jaws, pharyngeal arch, and scales, which followed information from CONROY et al. (1993) and the author's fish collection. Crayfish exoskeletons and the general category of insects were easily identified. When there was evidence of more than one category of prey in an individual scat, all items from each prey were separated. Then the relative frequency of each prey category (i.e. the total number of occurrences of all prey items) was compared to the total number of items for all prey categories. The percentages totalled 100%.

RESULTS

Ninety-eight scats collected from eight different locations over the four year period were analyzed (26 were collected during the spring, 42 during the summer and 30 during the autumn). Fifty-one percent of the scats came from the Colorado River system and 49% from the adjacent system. Fifty percent were found on boulders, either in the water or on the shoreline; 41% were found on the ground up to 9m inland; and nine percent were found on logs or log-jams jutting out into the water. Otter trails led to those found inland.

Species from two families of fish dominated the river otters' diet, Catostomidae and Salmonidae. Thirty-six percent of the prey items were from Catostomidae, 23% from Salmonidae, 7% from the other fish families and insects, and 34% from crayfish. There were no bird, mammal or amphibian bones found in the collected scat (Fig. 1).

Seasonal trends of prey in the otter's diet were: spring - Catostomidae 11%, Salmonidae 13%, Other 3%; summer - Catostomidae 11%, Salmonidae 4%, Crayfish 26%, Other 2%; and autumn - Catostomidae 14%, Salmonidae 6%, Crayfish 8%, and Other 2% (Fig. 2). (The percentages for each season and prey item are based on the total number of analyzed scats.)

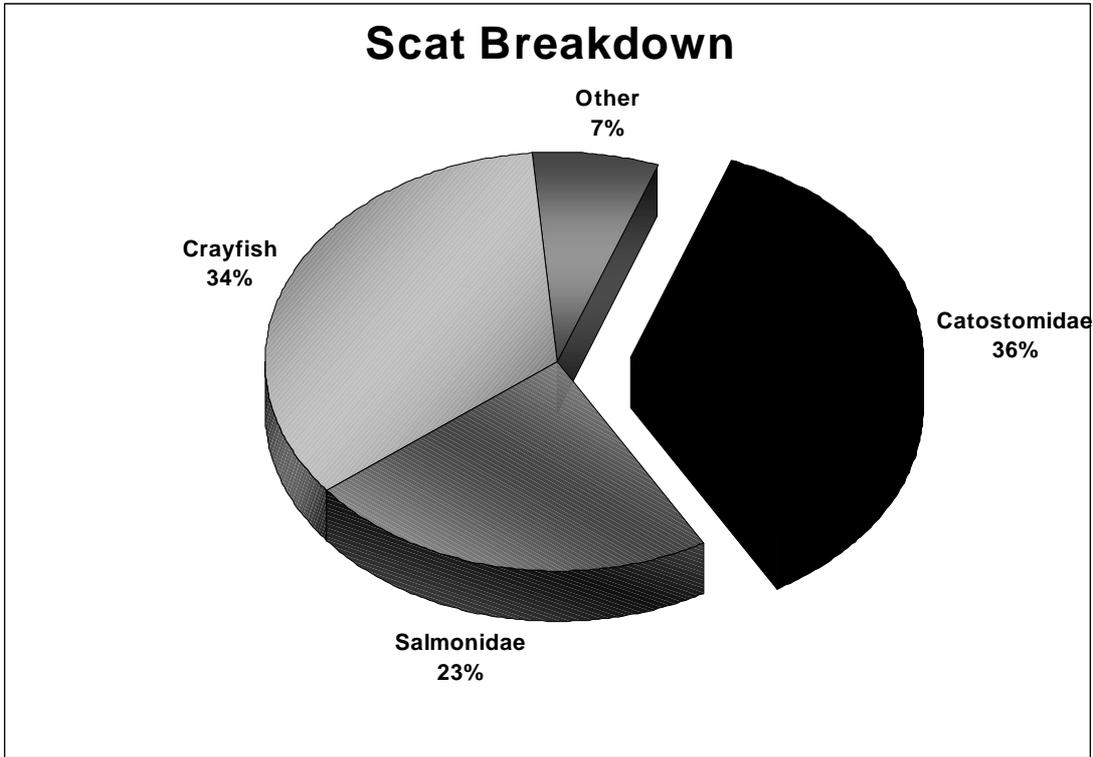


Figure 1. The diet of river otters in the upper Colorado River basin for the years 1993 – 1996. The percentages are based on a relative frequency analysis of 98 scats.

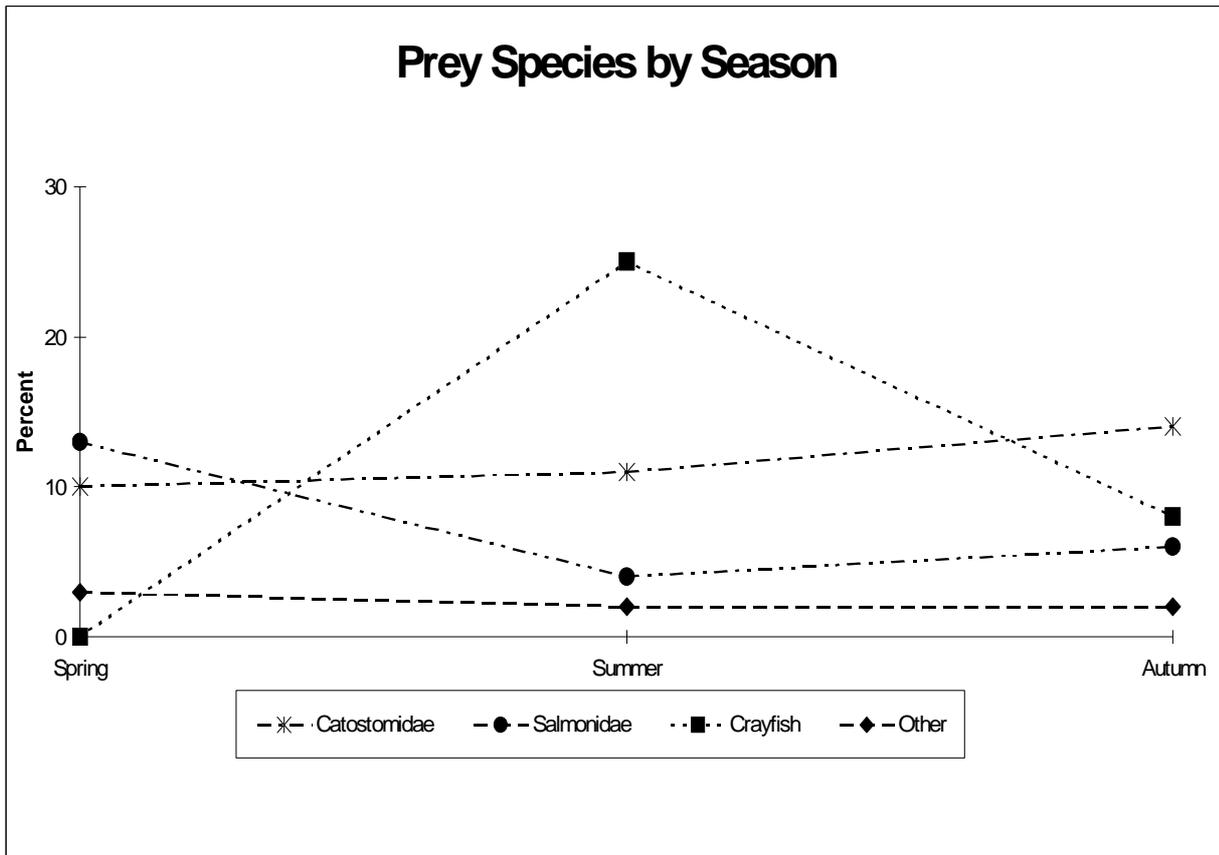


Figure 2. Seasonal trends in the diet of river otters in the upper Colorado River basin for the years 1993 – 1996. Percentages of each category and each season are based on the total number of analyzed scats.

CONCLUSIONS

1. The results of the survey of the upper Colorado River system showed that 15 to 17 river otters may eventually be present in the study area.

2. Fish were the major component of the river otter's diet, with crayfish dominant during the summer months. These findings are consistent with other otter food habit studies conducted in North America (TOWEILL and TABOR, 1982). The non-game fish species from the Catostomidae family dominated the otter's diet. This substantiates findings from other areas of the country that otters primarily take the slower moving forage fish species, such as Catostomidae, compared to the faster moving game species, such as Salmonidae (TOWEILL and TABOR, 1982; MELQUIST and DRONKERT, 1987; SERFASS et al., 1990; MACK, 1994).

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