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PRELIMINARY MAMMAL SURVEY OF FOSSIL BUTTE NATIONAL MONUMENT, WYOMING

Tim W. Clark¹

ABSTRACT.—The mammalian community of Fossil Butte National Monument, Wyoming, consisted of at least 45 species. Snap trap sampling of the smaller species combined with sight and sign observations of the larger species formed the basis of this preliminary survey in the summers of 1974 and 1975. Snap-trapping samples (2880 trap days) yielded 44 least chipmunks and 89 deer mice. The distribution of all species was characterized by plant community occupancy. Heavy domestic livestock use of the communities nearest water has resulted in severe alteration in community structure; this has probably affected the distribution and abundance of at least some of the smaller mammals.

Fossil Butte National Monument, world famous for its ichthyological fossils, is a recent addition (1973) to the National Park System; it is about 18 km west of Kemmerer, Lincoln County, Wyoming. A preliminary survey of the mammals of the monument was made in the summers of 1974 and 1975 and may serve to develop public understanding and appreciation of the fauna and to promote more comprehensive ecological investigations.

STUDY AREA

Fossil Butte (3313 m above sea level) is a ruggedly impressive topographic feature rising from 2272 m at base. The climate is semiarid and cool-temperate. Annual precipitation, most of which falls as snow, averages about 23 cm. Winters are cold; summer days are warm, but summer nights are cool.

The monument lies in the Rocky Mountain Faunal Area (Long 1965). However, the Idahoan and Upper Green River divisions of the faunal area meet in the general area of the monument, bringing several species groups into contact. Six major plant communities, identified on the basis of physiognomy and taxonomy of the predominant overstory vegetation, are described in Table 1. The vegetation of Fossil Butte was described previously by Beetle

and Marlow (1974); they divided the area into 13 plant communities based on floral distribution. The correspondence of their communities to mine is listed in Table 1. Many of the communities listed by Beetle and Marlow (1974) are only a few meters wide and, as such, their boundaries were not meaningful to many mammalian species, especially the larger forms. Therefore, a lumping of their community categories seems necessary. Beetle and Marlow (1974) listed the species in each community. Vegetation of the monument appears characteristic of the surrounding area.

METHODS

Methods depended on the species investigated. Ecological distribution of larger kinds (e.g., beaver, carnivores, ungulates) was determined by direct observation of animals or of their signs. Smaller mammals were sampled using snap traps. Snap-trap transects of 20 stations 15 m apart were placed in each plant community. Three traps were set at each station. Traps were baited with rolled oats and peanut butter and were checked in the mornings and evenings of four consecutive days.

RESULTS

Twenty-three mammalian species were

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found on the monument, representing five orders, 11 families, and 22 genera. In addition, other unverified species no doubt occur on the monument.

Snap-trapping.— In 2880 trap days (TD) equally spaced among the six plant communities (Table 1), 134 small mammals were

caught. The catch included only two species, the least chipmunk (*Eutamias minimus*) (N=45) and the deer mouse (*Peromyscus maniculatus*) (N=89). Both species were caught at relatively low rates (1.5 captures per 100 TD for chipmunks, and 3.1 captures per 100 TD for deer mice) when

TABLE 1. Comparison of plant communities occurring on Fossil Butte National Monument, Lincoln County, Wyoming.

Plant community	Corresponding plant communities identified by Beetle and Marlow (1974)	Prominent species	Life-form structure	Characteristics
Grass-Forb	(not listed separately)	Gramineae	Grasses, forbs	Occurs on more exposed areas, especially at higher elevations (Xeric)
Sagebrush-Grass	Alkali sagebrush and grass, Mt. big sagebrush and shrub complex, Mt. big sagebrush and grass complex, basin big sagebrush complex, shadscale saltbrush and shrub complex, shadscale saltbrush and alkalibush complex, serviceberry complex	<i>Artemisia tridentata</i> Gramineae	Grasses, forbs, shrubs	Occurs on drier lowland sites (Xeric)
Mt. Mahogany	Mt. mahogany and serviceberry complex, Mt. mahogany complex, mixed shrub complex, chokecherry and antelope bitterbrush complex	<i>Cercocarpus montanus</i>	Grasses, forbs, shrubs	Occurs at higher elevations on flats and in protected areas on slopes (Xeric)
Pine	Mixed timber and shrub complex	<i>Pinus flexilis</i>	Grasses, forbs, shrubs, trees	Occurs on protected slopes, frequently on north-facing areas at higher elevations (Xeric-Mesic)
Meadow	(not listed separately)	Sedges (<i>Carex</i> sp.)	Grasses, forbs, sedges	Occurs in areas adjacent to willows and aspen on wet sites (Mesic-Hydric)
Aspen-willow	Aspen complex	<i>Populus tremuloides</i> , <i>Salix</i> sp.	Grasses, forbs, shrubs, trees	Occurs on wetter sites, usually on protected slopes, associated with springs and intermittent streams (Mesic-Hydric)

compared with capture rates for these species in studies 150 miles to the north (Clark 1975).

Capture rates of chipmunks increased from the Sagebrush-Grass (1.7/100 TD) and Aspen-Willow (1.7) communities to Mountain Mahogany (2.3) and Pine (3.7) communities. No chipmunks were caught in the two herbaceous communities of Meadow or Grass-Forb. Deer mice were present in all but the two wettest communities, Meadow and Aspen-Willow. They were least abundant in the Grass-Forb Community (1.8/100 TD), followed by Mountain Mahogany Community (2.8) and Sage-Grass Community (4.2), and were most abundant in the Pine Community (9.7).

Observations and signs.—Twenty-one other species or their signs were observed. Monument management philosophy and the author's time limitations precluded quantitative sampling of many larger forms.

Several species were distributed predominantly in the Grass-Forb and Sagebrush communities: desert cottontail (*Sylvilagus audubonii*), white-tailed jackrabbit (*Lepus townsendii*), Richardson ground squirrel (*Spermophilus richardsonii*), Uinta ground squirrel (*S. amatus*), and northern pocket gopher (*Thomomys talpoides*). Even though ground squirrels were abundant, none were captured. Three yellow-bellied marmots (*Marmota flaviventris*) were seen on the upper slopes. A single white-tailed prairie dog colony (*Cynomys leucurus*) of about 12 ha existed in Sec. 2, T21N, R118W; one sagebrush vole (*Lagurus curtatus*) was seen. Sixteen pronghorns (*Antilocarpa americana*), two badgers (*Taxidea taxus*), and a striped skunk (*Mephitis mephitis*) were sighted.

No species seemed to be restricted to the Mountain Mahogany Community, although nine mule deer (*Odocoileus hemionus*) and three elk (*Cervus canadensis*) were observed there. A moose (*Alces alces*) sign was evident in this community and two moose were seen in the Willow-Aspen Community. Red squirrels (*Tamiasciurus hudsonius*), bushy-tailed woodrats (*Neotoma cinerea*), and porcupines (*Erethizon dorsatum*) were associated mostly with the Pine Community. Two species were associated commonly

with the Aspen-Willow Community; they were moose and beaver (*Castor canadensis*). Several *Microtus* species (i.e., *M. pennsylvanicus*, *M. montanus*, and *M. longicaudus*) expected in the Meadow Community were not found, nor were any runways or nests located (cf. Clark 1973). Long (1965) listed specimens of all three species collected within 25 km of the monument, which shows their general occupancy of southwestern Wyoming.

A few ubiquitous species were present, including coyotes (*Canis latrans*), long-tailed weasels (*Mustela frenata*), and wild horses (*Equus caballus*) (N=12).

Species of unverified presence.—Long (1965) listed 39 other species known to occur in the region. No evidence of their presence was found in this investigation.

Domestic livestock.—Fossil Butte has a history of cattle, horse, and sheep grazing. Before the establishment of the monument, the area was managed by the Bureau of Land Management. The area is still utilized by domestic livestock under grazing permits that will expire in 1983; grazing by cattle and sheep has influenced the native plant communities (Beetle and Marlow 1974). Heaviest grazing is in the wetter communities, Meadow and Willow-Aspen, and in the drier communities adjacent to these areas. Current management further concentrates animals by placing salt blocks in these areas. In addition, sheep are wintered on the monument. Quantitative data on livestock numbers and ranging patterns were not taken in this study. Beetle and Marlow (1974) noted that the combined grazing by both cattle and sheep during the spring rapidly inhibits annual vegetation production.

DISCUSSION

Currently no data exist on the relative abundance of each species present in mammalian communities in the area with which to compare the results of this preliminary survey. The heavy, concentrated livestock use of the Meadow and Willow-Aspen communities and adjacent areas, which has resulted in an alteration of vegetation (close

cropped vegetation, trampling, possible relatively high nitrogen content of soil, etc.), probably has in turn affected the distribution and abundance of at least some of the smaller mammals (e.g., *Microtus* complex). Since the area adjacent to the monument receives similar heavy livestock use, it would be difficult to find a control area to test this hypothesis. However, with the removal of livestock in the future, it may be expected that several mammals that are currently rare or non-existent on the monument but that are characteristic of the area will be found in greater numbers (e.g., *Sorex cinreus*, *S. vagrans*, *S. nanus*, and *S. palustris*; *Microtus pennsylvanicus*, *M. montanus*, *M. longicaudus*, and *Zapus princeps*).

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