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Observations on Behavior of Lone Bull Bison¹

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Abstract. Behavior of lone bull American bison (*Bison bison bison*) was studied during June, July and August 1966, at the Theodore Roosevelt National Memorial Park, Medora, North Dakota. Ingestive, shelter-seeking, grooming, agonistic, sexual, eliminative and investigative behavior patterns were observed. The sociological relationship of the lone bull to the bison herd was also observed.

General information on the lone bull American bison (*Bison bison bison* (Linnaeus)) has been published by McHugh (1958), Fuller (1960), and Egerton (1962). Data are too few to provide a basic understanding of the behavior and sociological relationship of lone bulls to the bison herd. In addition, the bison observed in those studies were confined to relatively small areas, possibly influencing the "naturalness" of behavior. For these reasons, the study of the lone bull for interpreting behavior patterns is important.

More national and state parks are establishing bison herds, and with increasing leisure time for many people, the study of lone bull behavior may produce information of recreational value. Visits to parks where such herds are located will become more meaningful and enjoyable if people know what behavior patterns they may see and the implications of each pattern. The study of lone bull bison behavior can make an important contribution to recreation.

Basic data on the behavior of the lone bull bison can also be useful in the anthropological study of the early American Plains Indians, who depended on the bison for their survival and even involved the animal in their religion, superstitions, and ceremonial rights.

The purpose of this paper is to present the techniques used in observing lone bull behavior and data gathered on this behavior.

METHODS

Behavior of the lone bull bison was studied at the South Unit of Theodore Roosevelt National Memorial Park at Medora, North Dakota, during June, July, and August 1966. This is in the severely eroded badlands, with buttes, canyons, plateaus, and Little Missouri River bottomlands. The park contains about 40,000

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acres and presently supports a herd of about 190 bison. The animals are free to range throughout the park, being limited by a four-strand boundary fence intended to keep domestic cattle out. The herd is free of Brucellosis, a disease common in many of the present bison herds.

Data on the behavior of the lone bull bison were collected such that the presence of the observer would not be detected by the lone bull. Observations were made from a car parked along park roads, from vantage points, and by stalking the bulls at distances of 30 to 50 yards. A 20x spotting scope mounted on a rifle stock and 7 x 50 binoculars aided in observation. A single lens reflex camera with a 55 mm lens and a Bell and Howell Super 8 movie camera were used to record behavior on film. Because of the distances involved in observing the lone bulls, telephoto lenses for both cameras would provide better film records.

Behavior observed was categorized according to the classification established by Scott (1958), including ingestive, shelter-seeking, agonistic, sexual, eliminative and investigative behavior. An additional category, grooming behavior, was added for convenience of classification.

Identification of individual bulls was made on the basis of horn wear and disfiguration, color of the pelage, and distinct body scars. In late July, two bulls were marked with white paint using a square of sponge rubber mounted on the tip of an arrow. This method is acceptable, but other colors may be more desirable since white, when covered with dust and dirt from wallowing, becomes difficult to distinguish from light-colored smears of soil.

RESULTS

A total of 14 lone bulls was observed during June, July and August. Only five of these were seen two or more times. Of the bulls observed, most moved less than 1 mile while under observation. Repeated observations on the same bull on consecutive days were made with only four bulls. In the other cases, the lone bulls could not be relocated in the vicinity in which they had been observed the previous day. This problem could be solved by using radio telemetry to track lone bulls.

Ingestive Behavior. The lone bulls grazed mostly in open meadows on the plateaus and south-facing slopes, along roadways, and in the Little Missouri bottomlands. Lone bulls were observed feeding during all daylight hours; however, most of the feeding was done between 6 and 9 a.m. and 3 and 6 p.m. Bulls generally fed heavily during the first part of the feeding period, seldom raising their heads, and moving very slowly. In contrast, the latter part of the period was characterized by abbreviated feeding, with the bulls taking a few mouthfuls of grass, raising their heads,

and standing or moving a short distance before eating more grass. The tongue is used to gather the blades of grass together in the mouth, which is then closed, and the grass pulled off with a backward and sideward movement of the muzzle.

Rumination was observed while the lone bull was loafing. The cud is chewed with a rotating motion of the lower jaw. Data on several ruminating buffalo indicate that each bolus is chewed 38 to 70 times at a rate of about one chew per second.

Lone bulls did not go to water once each day, contrary to the observations by McHugh (1958). Fresh water was available at concrete dish tanks, but lone bulls were also observed drinking from muddy pools in creek beds and brackish pools on plateaus. While drinking, the nose was partially submerged. When finished drinking, the lone bulls raised their heads and licked their noses.

Shelter-seeking Behavior. For loafing and resting, the lone bulls chose an area of bare dirt and remained there between feeding periods during daylight, unless disturbed. While loafing, bulls ruminated and alternately stood and laid down. In lying down, bulls first dropped to the knee on the side on which they were going to lie, then, nearly simultaneously dropped the other knee to the ground and shifted their hind feet forward to the same side. After positioning their legs, the bulls slowly lowered and backed their hind quarters to the ground. Getting up reversed the process. Wallowing was often observed before the bull stood up, but in a few observations, bulls wallowed immediately after lying down, then resumed the recumbent position, and remained resting on the ground.

The typical reaction of the lone bull to human disturbance consists of a slight elevation of the tail, then ambling away, and stopping to look back at the people or automobile that disturbed him. On one occasion, a lone bull walked to within 4 feet of a park ranger and the investigator. When the bull saw us, his eyes opened widely, his tail raised to vertical position and he galloped away about 20 yards going through a grove of trees.

Only one observation of the reaction of lone bull bison to a canine was secured. A hunting coyote passed within 20 yards of a resting bull. The bull showed no reaction other than to watch the coyote as it trotted away.

Grooming Behavior. Wallowing was the major grooming behavior exhibited by lone bulls and consisted of one to three actions: pawing the ground with the forefeet (usually alternately), horning the ground or rubbing parts of the head on the ground, and rolling on the ground. Either or both of the first two actions were sometimes omitted. Often after rolling on one side, the bull stood up, shook, then laid down on the other side and rolled again. To

roll, the bull kicked hard with the hind feet and appeared to "push off" with the foreleg nearer the ground. No lone bulls were observed to roll completely over, evidently because of the large shoulder hump. Lone bulls observed wallowing did so on bare ground in many types of locations including bare ground in prairie dog towns.

Lone bull bison rubbed on trees and roadside posts. Small juniper trees were used for horning and rubbing behind the horns. In two instances, the horning turned into rubbing the head and neck and terminated with the breaking of the tree.

Lone bulls used the tongue to lick legs, body and nostrils. The hind foot was used to scratch behind the horn, ear and foreleg. While lying on the ground, the hind quarters were rubbed by a back and forward rocking motion of the body while propped up on the knees. Tail switching and kicking a hindfoot at the abdomen were done to chase flies.

Agonistic Behavior. Agonistic behavior was displayed by two of the lone bulls observed. In the first case, two lone bulls were involved. The aggressor snorted loudly, pawed and horned the ground, and wallowed several times. The bull toward which the aggression was directed ambled away with its tail vertical and stopped to wallow only once. The aggressor followed snorting loudly, also with tail vertical. In the second case, a lone bull met a herd of 17 other bison. The herd bull and the lone bull both pawed and horned the ground and then wallowed several times during the encounter. Both also snorted loudly and walked stiff-legged with tails erect.

Sexual Behavior. Sexual behavior by "lone" bulls was observed on three occasions. Bellowing, which sounds like a lion's roar and which is characteristic of the rut, was done by a lone bull standing about a quarter-mile from a herd. Investigation of cows in a herd was observed on two occasions. The first instance occurred after agonistic activity between a lone bull and a bull moving with a herd of 17 bison. In this instance the lone bull, with tail held vertically, sniffed the vulva of two cows but it did not subsequently exhibit a lip curl. In the second case, a lone bull exhibited the lip-curl following the act of sniffing. In exhibiting the lip-curl, the bull stood with its tail erect, its neck extended and its upper lip elevated in typical domestic bull fashion. This latter type of sexual behavior was described by Egerton (1962).

Eliminative Behavior. Eliminative behavior in lone bull bison includes urination and defecation. In urination, the tail is raised to about a 45° angle and the urine is passed. Defecation involves arching of the back as well as erection of the tail. Lone bulls ex-

hibited no use of toilet areas; however, during the rut, a lone bull was observed to urinate in a wallow and then wallow in it. Such wallows had an offensive odor that could be detected from a distance of 4 to 7 yards.

Investigative Behavior. Investigative behavior of the lone bull bison included sniffing grass, flowers, wood, wallows and water. The lip-curl posture was exhibited by one lone bull after sniffing grass growing in standing water on a mesa.

DISCUSSION

The daily range of a lone bull bison appears to be about 1-square mile; however, lack of repeated observations leaves this inconclusive.

The social relationship of lone bull bison to the herd is uncertain on the basis of the data collected. McHugh (1958) states in his summary, "Lone bulls were apparently not outcasts but voluntary isolates." Observation of the lone bull that investigated cows in the herd support this. However, observations on another lone bull chased away from the herd when he tried to enter, but seen in the herd two weeks later, clouds the issue. Additional data on this behavior will be secured in studies, which will be continued in 1967.

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