



Activity patterns of grizzly bears in the Yellowstone ecosystem and their reproductive behavior, predation and the use of carrion
by Bart Otis Schleyer

A thesis submitted in partial fulfillment of the requirements for the degree of Masters of Science in Fish and Wildlife Management
Montana State University
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Abstract:

In 1979 and 1980 I conducted a study on the activity patterns of free-ranging grizzly bears (*Ursus arctos horribilis*) equipped with motion sensitive radio-transmitters in the Yellowstone ecosystem.

Data included general observations on behavior, reproductive behavior, predation and the use of carrion. A least squares analysis of variance procedure was used to study the relative importance between activity and time of day, time of year, individuality among bears, lunar phase, reproductive state, and four weather related factors. These explained a significant portion of the variation in activity. The level and probability of activity indicated that bears were least active shortly before denning or after emergence and were most active during the breeding season months. During the spring grizzlies were crepuscular and more diurnal than during the summer. In the summer they were nocturnal with crepuscular activity peaks while fall activity was mainly, during the crepuscular period at sunset with some nocturnal activity. Grizzly-human encounters could possibly be lowered if hikers avoided dense timber and restricted summer travel to the hours between 1030 and 1800. One grizzly had reversed or diurnal activity patterns. Published black bear studies indicate that their activity patterns are the reverse of grizzlies. This reversal affords a possible species niche separation by time territory. The major factors believed to affect activity patterns were intraspecific and interspecific social dominance, temperature regulation, seclusion from human disturbance, food habits and availability. It appears that predation by grizzlies on large ungulates in the Yellowstone ecosystem has been underrated and that a real behavioral difference between this and populations in other study areas may exist. All of the study bears used carrion and three preyed on elk. Grizzlies typically dragged carcasses to sites within the timber, covered them with soil, and bedded within 50 meters. The ability to travel over snowpack was estimated to be five times greater for grizzlies than for large ungulates. Breeding activity was observed once and one pairbond between "mates" lasted two months. Four instances of tree climbing were noted.

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AND THEIR REPRODUCTIVE BEHAVIOR, PREDATION AND THE USE OF CARRION

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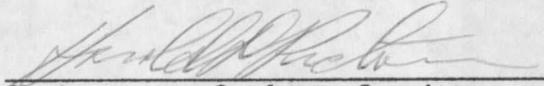
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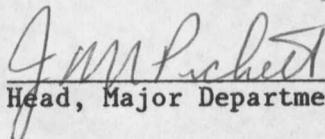
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ABSTRACT

In 1979 and 1980 I conducted a study on the activity patterns of free-ranging grizzly bears (*Ursus arctos horribilis*) equipped with motion sensitive radio-transmitters in the Yellowstone ecosystem. Data included general observations on behavior, reproductive behavior, predation and the use of carrion. A least squares analysis of variance procedure was used to study the relative importance between activity and time of day, time of year, individuality among bears, lunar phase, reproductive state, and four weather related factors. These explained a significant portion of the variation in activity. The level and probability of activity indicated that bears were least active shortly before denning or after emergence and were most active during the breeding season months. During the spring grizzlies were crepuscular and more diurnal than during the summer. In the summer they were nocturnal with crepuscular activity peaks while fall activity was mainly during the crepuscular period at sunset with some nocturnal activity. Grizzly-human encounters could possibly be lowered if hikers avoided dense timber and restricted summer travel to the hours between 1030 and 1800. One grizzly had reversed or diurnal activity patterns. Published black bear studies indicate that their activity patterns are the reverse of grizzlies. This reversal affords a possible species niche separation by time territory. The major factors believed to affect activity patterns were intraspecific and interspecific social dominance, temperature regulation, seclusion from human disturbance, food habits and availability. It appears that predation by grizzlies on large ungulates in the Yellowstone ecosystem has been underrated and that a real behavioral difference between this and populations in other study areas may exist. All of the study bears used carrion and three preyed on elk. Grizzlies typically dragged carcasses to sites within the timber, covered them with soil, and bedded within 50 meters. The ability to travel over snowpack was estimated to be five times greater for grizzlies than for large ungulates. Breeding activity was observed once and one pairbond between "mates" lasted two months. Four instances of tree climbing were noted.

INTRODUCTION

A study of the "daily routine" (activity patterns) of free-ranging grizzly bears (Ursus arctos horribilis) in the Yellowstone ecosystem was conducted in 1979 and 1980 as part of the research effort of the Interagency Grizzly Bear Study Team.

The Craigheads (1974) conducted detailed research on grizzlies within the Yellowstone ecosystem during the 1960's, but the closing of the open pit dumps in Yellowstone National Park brought about a change in the overall ecology of this bear population. Shortly thereafter, the Interagency Grizzly Bear Study (IGBS) was created and has conducted a broad research program including studies of the seasonal and annual movements, the seasonal food habits and habitat use of the free-ranging grizzly in the Yellowstone ecosystem (Mealey 1975, Blanchard 1978, Graham 1978, Kendall 1981). These investigations have noted a utilization of different habitat types and a shift in food habits through the changing seasons and, in addition, important forage items have been determined. Sizemore (1980) reported upon the daily movements of four grizzlies in West Central Montana. Amstrup and Beecham (1976) and Garshelis and Pelton (1980) have published studies of black bear activity patterns. The main objective of my research was to determine the time, duration and nature of activities of free-ranging grizzly bears on a 24-hour basis. Other objectives

were to report general observations on behavior, reproductive behavior, predation and the use of carrion.

This study included two field seasons. The 1979 field season lasted from 11 June to 13 September while the 1980 season extended from 19 March to 2 September, then from 7 October through 25 October.

STUDY AREA

General

This research was concentrated in an approximate 4200 km² (1622 mi²) area (Figure 1) located in the western half of Yellowstone National Park and contained within the 20,000 km² (7,722 mi²) study area established by the Interagency Grizzly Bear Study Team (IGBS) (Knight et al. 1975). Included in this section is the Sage Peak and Hebgen Lake area of the Gallatin National Forest, Montana, west of the park. The study area includes the Gallatin Mountain Range on the northwestern border with a crest elevation of 2876 m (9435 ft). Electric Peak, situated in the northeastern border, is the highest peak, on the study area reaching 3382 m (10,992 ft). The Norris, Gibbon, Lower, Midway and Upper Geyser Basins all fall within its boundaries. The Hebgen Lake basin, with elevations of about 1981 m (6500 ft) includes areas with the lowest elevation. In the geologic past many of the physiographic features were shaped by extensive volcanism and glaciation. The peculiar geology of the park has been described by Chittenden (1949), Fischer (1960), and Keefer (1976).

Flora

The vegetation of the study area can be divided into two major zones and two smaller zones (Despain, 1973). A lodgepole pine (Pinus contorta) zone covers the largest area, followed by a spruce-fur zone

