

Bridger Bowl Base Area
Planned Unit Development

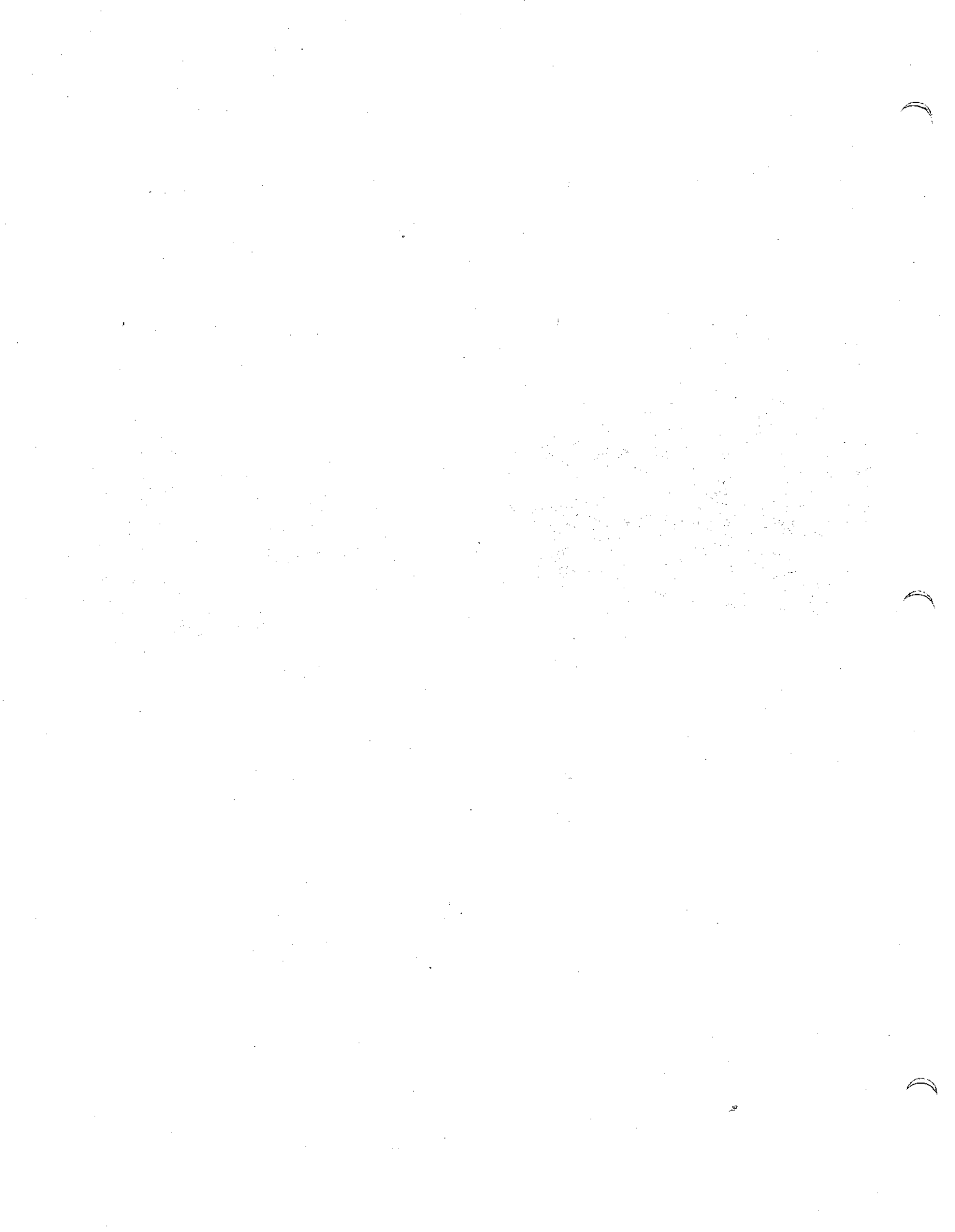


WILDLIFE ASSESSMENT

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Prepared By

Robert L. Eng, PhD
Richard J. Mackie, PhD



INTRODUCTION

The proposed Bridger Bowl Base Area Planned Unit Development (PUD) is located approximately 15 miles northeast of Bozeman in the south-center of the Bridger Mountain Range. The PUD will encompass 350 acres distributed roughly in the shape of a flattened "U" around the base of the Bridger Bowl ski area. Beginning in the mid-1940s, this area has grown to be a major winter recreational facility marked by expansion of recreational use and increasing development on private lands in Bridger Canyon. The currently proposed PUD is associated with further expansion of the ski area as described in detail in the January 2005 Final Environmental Impact Statement (FEIS) for Bridger Bowl Special Use Permit and Master Development Plan (US Forest Service 2005). That document assesses wildlife and other environmental impacts of further development of the ski area and surrounding lands. We have been asked to assess wildlife habitat and population characteristics and issues specifically associated with the Bridge Bowl Base Area PUD. Our assessment included revisiting the area to obtain current information on habitat characteristics and wildlife use of the area. We spent several days on the area, reviewed past wildlife and habitat studies and reports, including the FEIS, and visited with Montana Fish, Wildlife and Parks wildlife management personnel as to their concerns and explore measures to alleviate potential impacts.

WILDLIFE AND WILDLIFE HABITATS

A. Habitat

The Bridger Mountain Range is a highly complex and diverse environment, providing quality habitat for wildlife populations important for hunting as well as other recreation opportunities for residents of Bozeman and the surrounding area. Environmental characteristics of the Bridger Mountains, including major habitat cover types characteristic of the Bridger Bowl area have been described by Pac et al. (1991) and the U.S. Forest Service (Bridger Bowl FEIS 2005).

Located between approximately 5,900' and 6,200' elevation, the base area is dominated by mid-elevation montane forest cover types dissected by interspersed riparian shrub, meadow, and

aspen habitats associated with Bridger Creek, Maynard Creek, and attendant minor drainages. Montane forest cover types are predominantly Douglas fir, moist and dry phases, with open and closed canopies. Stands range from regenerating cutover areas characterized by diverse browse plants such as mountain maple, serviceberry, chokecherry, and mountain ash to various stages of maturity to diverse old growth (Fig. 1)



Figure 1. Diverse montane forest stands on the Bridger Bowl base area.

The diverse mid-elevation montane forest communities interspersed with riparian shrub, and aspen types associated with drainageways and other wet sites (Figs. 2 and 3) constitute some of the most productive summer-reproductive habitats for wildlife in the Bridger Mountains. However, orographic factors, including elevation and location immediately east of the main Bridger Divide also provide for seasonal precipitation patterns that result in high snowfall and relatively deep snow cover from November to May on much of the area. This restricts wildlife use, especially by large herbivores and many birds to the summer and fall seasons.

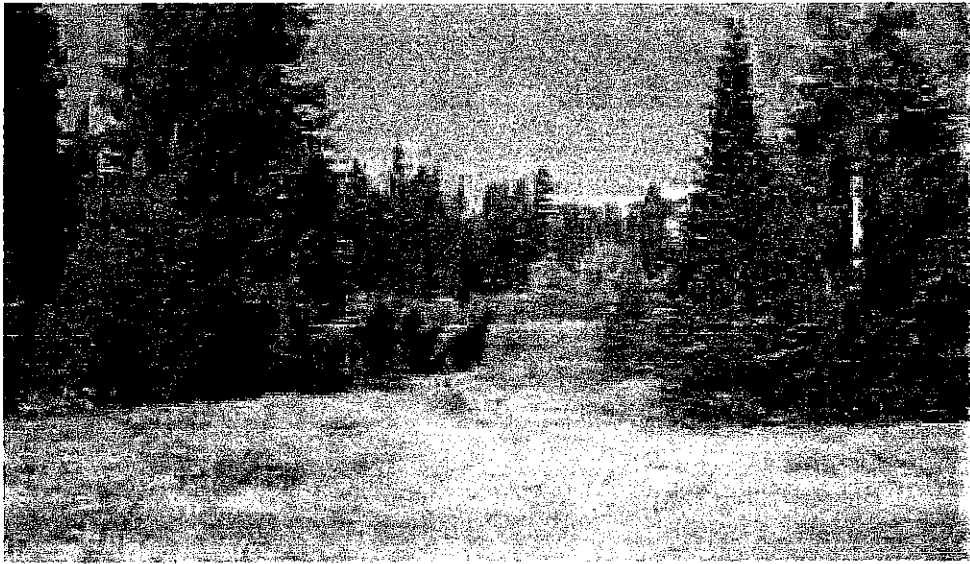


Figure 2. Interspersed montane forest, meadow, and riparian shrub-tree stands on the Bridger Bowl base area



Figure 3. Aspen stand on Bridger Bowl base area.

B Mammals

The Bridger Bowl area constitutes productive habitat, at least seasonally, for several large mammal species: white-tailed deer, mule deer, elk, moose, black bear, and mountain lion that occur at least occasionally on the area during late spring, summer, and fall. However, the limited area, habitat and cover types, elevation, and climatic conditions limit both the total number of mammal species and seasons or periods of use of the area. Following is a preliminary listing of mammals either known or expected to occur based on the general location and habitats available.

Carnivores:

- Black Bear: Common. Montane forest and other cover types (CTs).
- Coyote: Occasional, probably transient. All habitats..
- Bobcat: Occasional. Open Montane Forest CTs.
- Lynx: Rare if occurs. Higher elevation montane forest CTs.
- Mountain Lion: Occasional. All habitats, steep slopes and outcrops.
- Marten: Occasional. Mature montane forest CTs
- Mink: Rare/Occasional. Riparian woodland and wetland CTs
- Striped Skunk: Occasional. Riparian to open montane forest CTs.
- Long-tailed Weasel: Occasional. Riparian to montane forest CTs.
- Short-tailed Weasel: Possibly occasional. Riparian to montane forest CTs.
- Wolverine: Rare. Montane to subalpine forest CTs.

Ungulates

- Elk (Wapiti): Common. All habitats. Montane forest to grassland CTs.
- Mule Deer: Common. All habitats. Montane forest CTs.
- White-tailed Deer: Common., Riparian and moist woodland CTs.
- Moose: Common. Montane forest, riparian woodland CTs.

Rabbits and Hares

- Snowshoe Hare: Common. Riparian to dense young montane forest CTs.

Insectivores

- Dusky Shrew: Probably common. Mid-elevation montane forest CTs.
- Masked Shrew: Possibly common. Streamside, montane forest CTs..
- Northern Water Shrew: Occasional. Streamside meadows in montane forest.
- Preble's Shrew: Possibly occasional. Shrub-grassland to open forest CTs.
- Vagrant Shrew: Possibly occasional. Low to mid elevation montane forest CTs.

Rodents

- Beaver: Possibly occasional. Streams with ponds, riparian woodlands CTs.
- Least Chipmunk: Probably common. Montane forest CTs.
- Yellow Pine Chipmunk: Possibly occasional. Montane forest CTs.
- Northern Flying Squirrel: Probably occasional. Montane forest CTs.
- Red Squirrel: Common. Montane forest CTs.
- Yellow-bellied Marmot: Possibly occasional. Rocky slopes and outcrops.
- Northern Pocket Gopher: Probably common. Open meadow and forest CTs.
- Deer Mouse: Probably common. Riparian, woodland CTs.
- Western Jumping Mouse: Occasional. Riparian grass to mesic forest CTs.
- Meadow Vole: Probably common. Moist grassland and meadow CTs.
- Montane Vole: Probably occasional. High meadow CT.
- Red-backed Vole: Possibly common. Dense montane forest CTs.
- Water Vole: Possibly occasional. Riparian CTs near streams.
- Porcupine: Occasional to common. Nearly all habitats and CTs.

The riparian, aspen, and moist conifer habitats comprise habitat complexes used seasonally by white-tailed deer associated with a population distributed through riparian-agricultural habitat along Bridger Canyon. Riparian shrubland, aspen, and various Douglas fir cover types, including cutover areas, are also important habitats for several moose that range on and around the base area during much of the year when and where snow conditions permit.

Shiras moose densities characteristically are low with individuals widely distributed on large home ranges throughout the Bridger and other mountains ranges where they occur. Heavy use of browse plants and Douglas fir (Figs. 4 and 5) indicates that the existing habitat complex around the Bridger Bowl base area has been attractive to these animals.



Figure 3. Moose browsing on Douglas fir (left) and mountain ash (right) on the base area.

The Bridger Bowl area provides summer reproductive and maintenance habitat for does from two mule deer population habitat units (Southwest Slope and Brackett Creek, Pac et al. 1991). Those two units generally support populations of 10-20 deer per square mile overall during summer. The majority (about 90% of all females in the southwest slope population and 50% of those from Bracket Creek) use middle elevation montane forest habitats during summer and fall. Based on recent radio-tracking studies by MDFWP, the Bridger Bowl area also provides summer maintenance habitat for some bucks from all three west slope populations as well as the South 16-Mile unit. Because of this, the surrounding area has been important for hunting mule deer in early fall, contributing considerably to the recorded harvest mule deer in the Bridger Range.

However, the base area itself has only limited, if any, access for hunting.

The upper Bridger Canyon/Bridger Bowl area is also subject to summer-fall use by several hundred elk from the population of 3,000 or more now inhabiting the Bridger Mountain Range. Many, if not most of the cow elk wintering along the west slope from Middle Cottonwood Creek north to Ross Peak probably summer and rear calves in mid-elevation montane forest habitats along Bridger Canyon, including the Bridger Bowl area. Elk also may range into the area from Brackett Creek, Battle Ridge, and other winter ranges.

Factors influencing use of the area by mule deer and elk have not been fully evaluated. However, the extensive stands of relatively old-growth montane forest that surround Bridger Bowl (and occur in small stands on the base area) typically are highly diverse and provide abundant, high quality forage as well as cover for both species from late spring through early fall. Openings and disturbed/managed habitats through the ski area probably provide additional quality forage. Soil-vegetation disturbance along with compaction of snow that delays snowmelt and increases soil moisture likely enhance forage diversity or quality. Delayed runoff from heavy snowfall and a high water table in portions of the base area with meadows and well developed aspen stands also contributes to high production and maintenance of succulent forb and shrub growth through summer.

Succulent forage throughout summer is especially important to lactating females. Among mule deer, bucks and non-reproducing does favor open areas in upper montane forest to sub-alpine and alpine zones, while productive females typically are found in the productive montane forest. Riparian shrub and aspen stands at lower elevation along drainages and foothill provide quality, productive habitats for white-tailed deer. High quality summer habitat for elk includes open, wet meadow-like areas dominated by grasses, sedges, and forbs, interspersed with diverse montane forests that provide cool resting and security cover along with succulent forage in late summer when meadows begin to "cure."

Open meadows and slopes covered by succulent herbaceous plants can also be used by black bear in spring and early summer. Mountain lions tend to distribute themselves in relation to their prey, and thus increase with increased occurrence and abundance of deer and elk.

Heavy snow accumulations in the upper Bridger Canyon/Bridger Bowl area essentially preclude deer and elk use from mid-fall through mid-to-late spring. With first heavy snows in late November or early October, all mule deer leave the area to winter on either steep south- and west-facing slopes along the west flank of the Bridger Range, along lower Brackett, Canyon, and Bangtail Creeks along the east flank. They return between late April and early June depending on snow melt.

The upper Bridger Canyon/ Bridger Bowl base area is located at the periphery, within the zone of overlap of two mule deer population habitat units. Because of this, and perhaps the extensive logging and human development that has occurred along Bridger Canyon from its mouth to north of Bridger Bowl, mule deer use and densities in much of the area appear to be in the lower range of or below levels that occur in surrounding unaltered, mid-elevation montane forest habitat. This is especially true of the base area. Because of this and the high likelihood of continued development, the base area in particular may no longer be considered a major habitat for sustaining or producing mule deer in the Bridger Range. However, concomitantly, with protection of riparian habitats, disturbance, and human developments, the area may be becoming more important for white-tailed deer.

The situation with elk is somewhat similar to that for mule deer though spring-fall elk use is generally more peripheral to major development and human use areas. Use on the base area may also be largely transient. However, as elk numbers continue to increase throughout the Bridger Range, and as further development precludes hunting and livestock grazing, it is possible that elk could adapt to the presence and activities of people and make increased use of the area.

As noted above, moose occur in low densities such that modest development in the base

area is not likely to greatly affect their numbers or habitat use and movements in Bridger Range to a significant extent. However, their occurrence and use locally around the Bridger Bowl area will likely decline.

B. BIRDS

As stated earlier, the diverse habitat on this property ranges from moist meadows to mature coniferous forests, a habitat diversity that is reflected by the presence of an equally diverse bird population. Presented below is a list of birds observed or heard on the property.

| | |
|-----------------------|------------------------|
| Cooper's hawk | Red-tailed hawk |
| Ruffed grouse | Common snipe |
| Mourning dove | Great horned owl |
| Calliope hummingbird | William's sapsucker |
| Downy woodpecker | Hairy woodpecker |
| Northern flicker | Red-naped -sapsucker |
| Western wood-pewee | Least flycatcher |
| Tree swallow | Gray jay |
| Steller's jay | Clark's nutcracker |
| Black-billed magpie | American crow |
| Common raven | Black-capped chickadee |
| Mountain chickadee | Red-breasted nuthatch |
| House wren | Ruby-crowned kinglet |
| Mountain bluebird | Townsend's solitaire |
| Veery | Swainson's thrush |
| American robin | European starling |
| Warbling vireo | Orange-crowned warbler |
| Yellow warbler | Yellow-rumped warbler |
| American redstart | Common yellowthroat |
| Western tanager | Chipping sparrow |
| Song sparrow | Lincoln's sparrow |
| White-crowned sparrow | Dark-eyed junco |
| Red-winged blackbird | Brown-headed cowbird |
| Cassin's finch | Brewer's blackbird |

Based on published data on bird distribution in Montana, time spent on the property and personal experience in the field, the following additional birds could likely be seen using this

habitat, at least seasonally (Lenard et al. 2003).

Northern harrier
American kestrel
Spotted sandpiper
Great gray owl
Belted kingfisher
Brown creeper
Solitary vireo
Cedar waxwing
MacGillivray's warbler
Lazuli bunting
Red-crossbill

Northern goshawk
Blue grouse
Rock dove
Northern saw-whet owl
Violet-green swallow
Hermit thrush
Gray catbird
Northern waterthrush
Wilson's warbler
Rufus-sided towhee

Two game birds, ruffed grouse and blue grouse are common to the Bridger Mountains.

Ruffed grouse are closely associated with aspen habitats, especially in the winter when the buds may play a major role as a food item. Annual changes in populations of ruffed grouse measured by recording the number of "drumming grouse" (territorial males) heard during 4-minute listening stops along a transect. At least four drumming ruffed grouse males were present on the property during spring 2006.

Blue grouse are much more mobile, often participating in extensive movements between seasons. During late fall, winter and early spring, they occupy higher elevations in coniferous stands feeding on Douglas fir buds. Lower elevations are used during the breeding and brood rearing activities. At the lower elevations, they often utilize moist riparian areas, sharing some riparian habitats with ruffed grouse, further emphasizing the importance of this habitat type.

Over 65 percent of the birds observed on the property fell under those listed as neotropical migratory species. This group of birds is identified as species that breed or migrate through Montana and spend the winter in the "Neotropics" (Bergeron et al. 1992). Included in this group are many of the sparrows (i.e., white-throated sparrow), warblers (i.e., American redstart), and thrushes (i.e., Veery). There is increasing evidence suggesting that some of the species in this group are declining due to reduction or fragmentation of habitat in the U.S. and loss of wintering habitat in Mexico, Central and South America, and the Caribbean.

Over 22 percent of the species seen or heard on the property are cavity nesters. Many of these species excavate their own cavities (e.g., most of the woodpeckers) whereas many other species occupy a natural cavity or one initially constructed by others (house wren, saw-whet owl). Most of the woodpecker activity on the property was in logged-over habitat, probably related to the occurrence of snags and the greater ease of excavating nest sites.

C. OTHER SPECIES

Relatively few species of amphibians and reptiles either are known or are likely to occur on the area. Among toads and frogs, the western toad, western chorus frog, and Columbia spotted frog are most likely to occur, being found at waters edge, in wetlands, and damp woodlands in montane forest. Possible reptiles include the bull or gopher snake that may occur in open montane forest, though usually at lower elevations, the western terrestrial garter snake that is found in various habitats, especially lower elevation wetlands, and the rubber boa, usually found around rocks, logs, etc., in woodlands.

D. THREATENED, ENDANGERED, AND SENSITIVE SPECIES

No Federally listed birds are known to inhabit the Bridger Bowl base area or the

immediate vicinity. Bald eagles are commonly observed during spring and fall migrations and the peregrine falcon occasionally during fall as part of a heavy migration of raptors through the Gallatin Valley to the west, along the spine of the Bridger Range, and through the Shields Valley to the east. While both are listed, neither is known to nest in the vicinity of the proposed development. "Sensitive" or "species of special concern" that might occur include the boreal owl, flammulated owl, northern goshawk, and black-backed woodpecker.

Except for the possible occurrence of a rare Canada lynx, no threatened or endangered mammal would be expected to occur on the area. However, the U.S. Forest Service has listed the wolverine as "sensitive" on national forest lands in the area. The main Bridger Range is not considered habitat essential to recovery efforts involving either grizzly bear or the gray wolf, though both species might rarely occur as transients and the east side of the Bridger Range is viewed by many as part of a wildlife "corridor" linking the Greater Yellowstone and Northern Continental Divide ecosystems.

Among the few amphibians and reptiles that may occur, none is considered threatened or endangered at this time.

CONCLUSIONS AND RECOMMENDATIONS

The most significant characteristic of wildlife habitat on the Bridger Bowl base area is the richness and diversity of the mid-elevation montane forest and riparian cover types that occur. Maintenance and enhancement of this diversity and the balances that exist between habitats should be a primary consideration in planning and future management of planned developments.

Because the PUD constitutes only a relatively small portion of the upper Bridger Canyon-Bridger Bowl area that has been and continues to be rather heavily developed for recreation and

at least seasonal housing, it seems imperative that special effort be made to avoid undue fragmentation and loss of linearity among natural communities. In particular, avoiding intrusion into riparian areas and aspen stands during and after development would minimize adverse effects on birds.

While potential for both direct and indirect, as well cumulative effects through development exists, most wildlife species will continue to use the area, at least to some extent. It is also possible that some aspects of development could prove attractive to some species. For example, limited or patchy disturbance may increase the complexity or diversity of an area. This may increase the kinds, abundance, and palatability of plants and encourage or attract greater wildlife use within the entire developed area. Such disturbance that could result in increased opportunity for human-wildlife interactions during summer and early fall should be held to the minimum necessary.

There are two major patterns of impact of human housing and recreational developments on wildlife in places like Bridger Bowl. The first and most obvious is intrusion of humans into undeveloped habitat. This reduces the amount of natural habitat available. It also may result in alteration of wildlife behavior (local distribution, movements and home range characteristics, use of vegetation/cover types, activity habits or patterns, and food habits). The usual effect of this is to reduce the numbers and kinds of wildlife that can live in the area. In adjusting to the presence and activities of humans, animals may use developed areas, gardens, shrubbery, and garbage, in a way that they become nuisance animals that have to be eliminated.

There may also be other behavioral "sink" effects. These involve altering the behavior and biology of animals away from normal patterns best suited to survival and reproduction in the area. Again, for example, deer on or adjacent to the development may adapt to humans, human activity, and human induced habitat alterations such that some will come to live yearlong in proximity to housing. As a result normal survival strategies for life in that environment may

become lost.

A secondary effect is that predators (e.g., mountain lion or black bear) that occur in some abundance throughout the Bridger Mountains could be attracted to the area increasing mortality rates and creating human safety problems or concerns. Increased vehicle traffic could also lead to greater mortality from road kills.

We estimate that the proposed developments on the Bridger Bowl base area will have some, though probably limited direct impacts on large mammals through habitat loss. While housing development away from the core Bridger Bowl area reflects movement of humans and human activity further into wildlife habitat, it will, for the most part, occur adjacent to existing developments in an area of relatively high human activity and light use by deer and elk. Assuming that housing and human activities are largely clustered on small envelopes within relatively large lots, the area could remain somewhat productive of deer, elk, and other species. ●

Within this context, it will be extremely important to develop protective covenants and architectural design and landscape guidelines with provision for rigid enforcement. Pet and other domestic animal restrictions, discretionary selection of plants for landscaping, small building envelopes, appropriate set-back from wetlands and important habitat cover types, no artificial feeding, control of garbage, control of use of firearms, fences, if any, consistent with wildlife movement through the area, and owner acceptance of some conflict should be included as follows:

- Prohibit or strictly control the occurrence of domestic animals (dog, cats) in the development. Visiting pets should be required to be on leash and/or boarded in a "pet center" provided in the development. Horses and other livestock should be prohibited.
- For landscaping require selection of plants from lists provided in brochures for "living with wildlife" in this area available from Montana Department of Fish, Wildlife and Parks, Montana State University Extension Service, and many landscape companies. Avoid use of

fruiting shrubs and trees.

- Require small building envelopes to minimize disturbing natural habitat and growth of native plants attractive to wildlife where possible.
- Provide for maximum possible setback of building envelopes from wetlands, riparian shrub and tree stands, and aspen groves. Because aspen is a key species, not extensively distributed, landscape management should strive to enhance reproduction and spread of stands whenever possible.
- Prohibit any form of artificial feeding of wildlife. Allow use of bird feeders only during winter months (December-February).
- Prohibit any open garbage containers within the area. Provide for regular garbage pickup from home and cabin sites or require disposal of all domestic garbage at wildlife-proof transfer stations.
- Fences should be prohibited. If necessary, any interior or perimeter fences should follow guidelines for fencing allowing wildlife movement through the area.
- Prohibit the discharge of firearms within the core development, but retain the option to control nuisance wildlife using other means as deemed appropriate by the Montana Department of Fish, Wildlife and Parks.

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Submitted by:

Robert L. Eng

Richard J. Mackie

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