INTRODUCTION

Since the mid-1960s, there has been controversy with regard to the effects of livestock grazing on elk winter range in the Elkhorn Mountains. Throughout the 1970s, debate continued over proposed management changes. In 1976 the controversy culminated in a congressional hearing in Helena. As a result, legislation required the study of 76,000 acres of the Elkhorn Mountains for inclusion in the Wilderness Preservation System. Following the Wilderness Study (USFS, 1982) in the Elkhorn Mountains, and the development of Forest Plans in the mid-1980s, debate continued over the best approach to manage increasing elk herds and existing grazing allotments (MTFWP et al., 2000).

Presently, the USFS oversees 160,000 acres in two National Forests and three Ranger Districts, the Bureau of Land Management (BLM) manages 70,000 acres, and private landowners manage the remaining 20,000 acres of the Elkhorn Mountains. Montana Department of Fish, Wildlife, and Parks (MTFWP) has jurisdiction over wildlife in the entire region (MTFWP et al., 2000). The Elkhorn Working Group (EWG) is working closely with the various agencies involved to provide "a catalyst for self-sustaining, local responsibility for problem solving in the Elkhorn's" (MTFWP et al., 2000).

In September of 2003, the Broadwater Conservation District put out a Request for Proposal for the Elkhorn Vegetation Study. ERG was subsequently awarded the task, and the results of the data inventory and evaluation are presented in this report.

This document is an independent review of existing vegetative and grazing allotment utilization in the Elkhorn Mountains. It is arranged by task as outlined in the RFP and includes six sections, plus technical appendices. Section 1, Evaluation of Assembled Existing Information, outlines all the information gathered and discusses the various sources. Within each source, i.e., USFS, the information is generally organized into allotments and vegetation. The MTFWP information also includes existing elk data and analysis. Section 2 is an interpretation of data from Satellite Imagery Land Cover Classification ver. 3 (SILC3), ECODATA, Timber Stand Management Record System (TSMRS), and USFS range polygons with regard to ecological condition of rangeland vegetation. This section also includes the types of analysis and maps used in the interpretation. Section 3, Trends, is a summary of overall historical trends (where data was available). Section 4 is a review of existing methods and data validity. Section 5 includes ERG's summation and recommendations, and section 6 is a comprehensive list of references.

I.1 STUDY AREA

The Elkhorn Mountains lie on the east side of the Continental Divide. They are a small and isolated range totaling approximately 250,000 acres. Several ecosystems are represented throughout the range; however, the Elkhorn Mountains are considered a contiguous landscape type (Thomas et al., 2002). Forest vegetation communities range from Ponderosa pine (*Pinus ponderosa*) at lower elevations to Engelmann spruce (*Picea engelmanni*) and subalpine fir (*Abies lasiocarpa*) at higher elevations. Lodgepole pine (*Pinus contorta*) and Douglas-fir (*Pseudotsuga menziesii*) are found throughout the area. In addition, native bunchgrass grasslands are common on the lower, drier slopes. Grassland species include Idaho fescue (*Festuca idahoensis*), rough fescue (*Festuca campestris*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and blue gramma (*Bouteloua gracilis*), among others. Big sagebrush (*Artemisia tridentata*), Rocky Mountain juniper (*Juniperous scopulorum*), and quaking aspen (*Populus tremuloides*) are found throughout the area. The climate for the area is described as modified continental, which means large variations occur between the annual and daily extreme temperatures. In the Elkhorn Mountains, there are approximately 273 miles of streams with 40 watersheds draining into three different bodies of water: the Missouri River towards the east and the northeast, Prickly Pear Creek to the west and northwest, and the Boulder River to the southwest (USFS, 1976).

I.1.1 Hunting District 380

MTFWP manages the wildlife on Federal, State, and private lands inside the project area, collectively known as Hunting District (HD) 380. HD 380 is one of the most intensely hunted mountain ranges in Montana (MTFWP, 1990). Prior to 1986 any antlered bull was legal to a general license holder in the HD. By the mid-1980s the hunting public began expressing concern over the lack of bulls 2½ years and older in the population and the low number of bull elk observed on winter ranges. In 1985, out of 990 elk observed on the winter range, only nine were bulls, and they were all yearling animals (Carlsen, 1993).

> The lack of older bulls was a common situation in many hunting districts in southwest Montana. In an attempt to address public concern over this issue the Fish and Game Commission directed the department to try innovative regulations that may produce older bulls. The Elkhorn Mountains were a logical place to try a new regulation because a long term and ongoing elk study provided the opportunity to monitor the affect of a new regulation on the elk population. The regulation that the department recommended implementing consisted of any spike bull, defined as a yearling bull with less than a 4-inch branch, being legal to the general license holder, while branch-antlered bulls, defined as any bull with more than a 4-inch branch, would be legal by permit only. Because 10-15% of yearling bulls have a branch greater than 4 inches this segment of the yearling age class would be protected from harvest by the general license holder and would be available for recruitment into the next age class (Carlsen, 1993).

These changes in management strategies substantially changed the composition of the wintering elk herd from fewer than five bulls per 100 cows to 10 to 15 bulls per 100 cows (MTFWP, 2000).

MTFWP prepared a Montana Elk Management Plan (EMP) in 1992 that provided management goals and objectives by hunting district. HD 380 received much direction from the 1992 EMP.

The management goal defined by the 1992 EMP is:

> Manage for a healthy and productive elk population at current levels with a diverse bull age structure; closely cooperate with public land management agencies and private individuals in the management of elk habitats, and maintain good opportunity for elk hunters to harvest elk (MTFWP, 2000).

Habitat Management Objectives in the EMP are:

- Continued coordination to achieve consideration of elk habitat needs and elk hunting opportunity in resource management decisions involving timber, range, minerals, and recreation.
- Design and implementation of land management strategies (associated with timber harvest, prescribed fire, road management, and livestock grazing) designed to attract elk away from private land and encourage them to use public lands.
- Cooperative monitoring of road management on elk winter ranges, including adherence to restrictions for motorized vehicle use, to prevent elk from being displaced from publicly owned winter ranges.
- Coordination with the Helena National Forest to assure that mining activities are carefully planned and subject to restrictions designed to prevent habitat loss and displacement of elk from public lands onto private lands.
- Cooperation with private land managers with the objective of maintaining elk habitat and public hunting access (MTFWP, 2000).

The population objectives for HD 380 laid out by the 1992 EMP are:

- Maintain the current late-winter population of 2,000 elk.
- Maintain an observed late-winter bull:cow ratio of at least 15 per 100, with 10% of the elk population composed of antlered bulls.
- Maintain the current late-winter bull population comprised of at least 50% brow tine bulls.
- Maintain the current annual harvest of 300 antlered and 150 antlerless elk.
- Maintain the current annual bull harvest of 75% spike bulls and 25% brow tine bulls.
- Maintain the current 18,000 hunter recreation days for approximately 2,800 hunters each year (MTFWP, 2000).

A hunter opinion study conducted after the 1989 hunting season indicated support for MTFWP's innovative management strategies. In January 1990, 741 questionnaires were mailed to hunters who had hunted the Elkhorn Mountains in 1989. Results of the survey indicated that hunters had noticed a major change in the bull population following establishment of the spikes legal/branched antlered bulls-by-permit regulation, most notably an increase in the number of older bulls (MTFWP, 1990). A majority of hunters (79%) support the decision to manage for older bulls, with 80% believing the objectives of the

new regulations have been met and 73% showing support for the continuation of current hunting regulations.

In 2001 the population objective laid out by the 1992 EMP was revised to 2,000 +/- 10% (1,800-2,200). The MTFWP is currently in the process of updating the 1992 EMP for Montana. The population objectives for HD 380 are proposed to be broadened by the new EMP to 2,000 +/- 15% (1,700-2,300), with 10% as a minimum of bulls in the population (Carlsen, 2004). The retention of these bulls in the total population provides quality non-consumptive recreational value, in the form of wildlife viewing, and some of the best hunter success rates, for those who draw bull tags (Carlsen, 2004). MTFWP continues to use hunting as the primary tool for controlling elk populations, but broadening the population objectives still allows for an increase in elk numbers.

I.1.2 Wildlife Management Unit

Figure I.1.2-1 Irma Evans with Elkhorn elk rack (courtesy of Paul Smith)

The Elkhorns are designated as a special Wildlife Management Unit (WMU) area (see Map 1). A series of USFS actions and federal guidance resulted in this designation. As directed under the Multiple Use-Sustained Yield Act (MUSYA) and the National Environmental Policy Act (NEPA), the Helena National Forest (HNF) prepared the Multiple Use Plan Environmental Impact Statement (EIS) in 1974, which provided general management direction for the entire forest. Also in 1974, Montana Senator Lee Metcalf introduced the statewide Montana Wilderness Study Act to Congress. This bill contained ten National Forest roadless areas, including the Elkhorns, identified for possible inclusion in the Wilderness Preservation System (Crowley, 1984).

In June of 1976 the HNF released the Elkhorn Land Use Plan Final EIS, which divided the Elkhorns into five management units, placed management emphasis on wildlife, provided for timber harvest and mining in undeveloped areas, and set forth the construction of a trans-mountain road (USFS, 1976). The release of the Elkhorn Land Use Plan caused considerable public discussion over the potential loss of recreation and wildlife in the areas (Crowley, 1984).

The passage of NEPA in 1969 required all federal agencies to implement a standardized process for analysis and documentation of environmental effects of a proposed action and alternatives to the proposed action. NEPA required the scoping of issues, interdisciplinary team involvement in analysis and alternative development, and documentation of environmental effects of a proposed action in an EIS or Environmental Assessment (EA). The National Forest Management Act (NFMA) of 1976 directed preparation of Forest Land and Resource Management Plans on every National Forest. Forest Land and Resource Management Plans, commonly referred to as Forest Plans, provide broad direction for all resource planning and activities. The Federal Land Policy Management Act of 1976 (FLPMA), as amended by the Public Rangelands Improvement Act of 1978 (PRIA), required all federal agencies to include Allotment Management Plans (AMP's) in grazing permits. The NFMA directed the USFS to provide for diversity, but the Forest Plans did little to explain how to ensure diverse ecosystems (USDA, 1993c).

Evolving national environmental policy further directed management of public lands through a series of water quality legislation. In 1972 congress passed the Federal Water Pollution Control Act (FCPWA). The FCPWA was the first comprehensive national clean water legislation in response to growing public concern for serious and widespread water pollution (Berry, 2000). In 1977 the FCPWA was substantially amended and renamed the Clean Water Act (CWA). The CWA placed a value on wetlands by defining them as significant environmental resources that provide a wide range of important habitat and hydrologic functions and values (Berry, 2000). In 1988 the National Wetlands Policy, also known as the "No Net Loss" Policy, provided a goal of "no net loss" of the Nation's wetlands and a long-term goal of increasing the quality and quantity of the Nation's wetlands resource base (Berry, 2000). The Wetland Reserve Program, which commenced in 1991, directed the USFS to identify and protect wetlands, which, by definition, included riparian areas (Berry, 2000). This new legislation required public land managers to change priorities and management direction.

At the same time public awareness of management in the Elkhorns was increasing, Senator Metcalf pushed his Wilderness Study Act through the Senate. The considerable public concern and media attention over the passing of the Wilderness Study Act prompted a special Labor Day Congressional Hearing in 1976. As a result of this hearing, Congress directed the USFS to evaluate one-half of the Elkhorns for possible wilderness designation (Crowley, 1984). This resulted in the HNF releasing the Elkhorn Wilderness Study Draft EIS in 1978. The preferred alternative proposed creating a 25,000-acre wilderness in the Elkhorns (USFS, 1978). Substantial public comment was received, with a majority (86%) of the comments being opposed to the wilderness acreage proposed by the USFS preferred alternative (Crowley, 1986). The final Elkhorn Wilderness Study EIS released in September of 1981 recommended no new wilderness designation, but rather a management unit which emphasized the very high wildlife values of the area (USFS, 1981). On November 25, 1981, USFS Chief Max Peterson issued his Record of Decision (ROD) accepting the recommendation in the Final Elkhorn Wilderness Study

(USFS, 1981). Also on November 25, 1981, Secretary of Agriculture John Block officially directed the USFS to establish a special WMU for the Elkhorns and recommended to Congress that the Elkhorn Wilderness Study Area not be designated as wilderness (Crowley, 1984). The Elkhorn WMU is unique in that it encompasses a 175,000-acre area, the largest parcel of USFS land in the country dedicated to wildlife management (MTFWP, 2000).

The Elkhorn WMU received specific management direction from the HNF Forest Plan in 1986. The Forest Plan divided the Elkhorns into eight different management areas. Management goals, standards, practices, and monitoring requirements were defined for each of the management areas (USFS, 1986). The Forest Plan stated the management of wildlife as a principal goal, and all proposed actions would have to benefit, or prove compatible with, wildlife. The 1986 Forest Plan dropped the idea of constructing a trans-mountain road, which the 1976 Elkhorn Land Use Plan had proposed. The 1986 Plan basically froze all commercial timber by stating, "…all commercial forestland in the Elkhorns is classified as unsuitable because the land is proposed for a resource that precludes timber harvest…" (USFS, 1986).

In 1989 the HNF prepared the Elkhorns IRMA, which set forth the management objectives for the eight management units in the Forest Plan. These objectives focused on optimizing elk winter, summer, and calving ranges, while maintaining livestock Animal Unit Months (AUMs) at 1983 levels. The Elkhorns IRMA laid out Desired Future Condition (DFC) for each of the management units, something that the Forest Plan had touched on but did not define (USFS, 1989). The 1989 IRMA also went through each elk herd unit (see Section 1.1.3) providing population trend charts, recommendations for vegetation management to improve wildlife habitat, and suggestions on maximum herd sizes per herd unit.

The task of preparing forest plans while ensuring resource sustainability drove the USFS to adopt the concept of ecosystem management. Under ecosystem management, land managers look at broad areas, or landscapes, to develop projects and actions that will mimic the natural balance and patterns of the area (USFS, 1993a). The mid-1980s found the USFS fully engaged in implementing ecosystem management techniques in preparation of regional analyses.

In 1993 the USFS, in cooperation with the BLM and MTFWP, released the Elkhorns Landscape Analysis. This document introduced "ecosystem management" and sought to implement Forest Plans while ensuring resource sustainability (USDA, 1993c). The Elkhorn Landscape Analysis was the first collaborative effort between agencies to manage the entire Elkhorn Mountains. This analysis developed a long-term integrated program of work, which follows from the direction established in Land Management Plans for the Elkhorns (USDA, 1993c). This document introduced "desired conditions" as a concise statement describing the status of resources across the landscape to be achieved in a timeframe of about fifty years (USDA, 1993c). Desired conditions were given for a variety of resources: vegetation, fish and

wildlife, recreation/transportation, watershed, visual quality, cultural, minerals, and livestock management. The 1993 Landscape Analysis divided the Elkhorns into three implementation areas: North Elkhorns, Crow, and South Elkhorns. Between 1993 and 1996, these three implementation areas prepared EAs which laid out management opportunities to achieve the desired conditions.

The three EAs, prepared for each of the implementation areas, set forth detailed work schedules which attempted to meet the desired conditions laid out by the parent document, the 1993 Landscape Analysis. The three EAs focused on ways management could resolve conflicts. With the development of national wetlands policy, rehabilitation of riparian areas came to the forefront. Management opportunities were defined to help rehabilitate riparian areas, which were "not rested and have been heavily used historically" (USDA, 1994). Promotion of beaver dams, the building of riparian exclosures, and streambank revegetation were all considered as management opportunities to help promote riparian health and function. Elk security also became an important issue, with roads being considered for closure, additional restrictions considered for trails, and scrutiny of livestock grazing to increase distribution and decrease elk/cattle conflicts (USDA, 1994). Shrub and conifer encroachment were also identified as a problem. Controlled burns and other mechanical thinning methods were proposed to help maintain herbaceous biomass with a native species component intact (USDA, 1994). Even though the Helena Forest Plan removed timber harvest as one of the multiple uses that the Elkhorns were to provide, timber was addressed in the implementation EAs. Maintaining patch size, age structures, old growth, and canopy structure similar to natural conditions were identified as priorities for the forests in the Elkhorns (USDA, 1994). Species of special concern (i.e., mountain mahogany, black sage, bitterbrush, old growth, and narrowleaf cottonwood) and noxious weeds were addressed under management opportunities.

Insert Map 1: Project Area Map

I.1.3 Elk Herd Units

Seven distinct elk herd units exist in the Elkhorn WMU (see Map 2) (USFS, 1989). These elk populations were determined by the Elk Monitoring Program conducted by MTFWP from 1982 to 1991 (DeSimone, 1996). The different herd units are the Sheep Creek, Kimber Gulch, North Crow, South Crow, Devil's Fence, Elkhorn, and Prickly Pear. Development of the seven elk herd units, or population segments, was based primarily on winter surveys and the monitoring of radio collared elk (DeSimone, 1996). In addition, the Spokane Hills herd unit was added to MTFWP reports in 1995 (Carlsen and Northrup, 1995), bringing the total number of herd units to eight. DeSimone (1996) reports that, as with other elk populations, those in the Elkhorn Mountains exhibit strong association to seasonal ranges. Distribution and movement patterns of 328 radio-collared elk (179 bulls and 149 cows) were monitored seasonally for nine years to provide general descriptions of the elk population segment patterns. Over the course of the study, over 10,000 observations were made, then stratified by sex and season. The smallest population units that could be monitored yearly were identified in an effort to establish cause and affect relationships between elk characteristics and habitat/land-use conditions within a particular population segment (DeSimone and Thompson, 1983). In part, the purpose of the Elk Monitoring Program was to document habitat use differences in cow, bull, young bull, and older bull behavior. This data, when coupled with further distribution work, could provide insight into elk response habitat alterations due to logging or natural events such as wildfire (DeSimone, 1996). Generally, DeSimone (1996) found that in the winter (December 1 to March 31), elk were found at lower elevations in areas of lighter snow accumulation. In spring (April 1 to May 31), elk often were located at the upper reaches of the winter range in areas where spring green-up was occurring. DeSimone (1996) found that in some years, depending on spring snows and the timing of spring green-up, elk remain on their spring range yearlong. In the summer (June 1 to September 15), cow elk are found in nursery areas such as mesic meadows and at the heads of various drainages. In the fall (September 16 to November 30), elk are located throughout their ranges, depending on snow conditions and hunting pressure. The North and South Crow Creek winter ranges support one of the largest concentrations of elk on National Forest lands in the United States. The grazing allotments present in these drainages are the largest allotments on the HNF, as well as some of the largest allotments in the Northern Region (DeSimone, 1996). Despite the high concentrations of wildlife and livestock, DeSimone (1996) acknowledges that, within a broad perspective, range condition on the public land is generally good compared to other USFS managed grazing allotments; however, he did document the need for a quantification of the range condition in the Elkhorn Mountains.

Insert Map 2: Elk Herd Units Map

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