Appendix E – Wildlife

Methodologies and Assumptions

The following table shows the assumptions, information used, methodologies and scientific accuracy applied to wildlife parameters:

Table E- 1. Wildlife parameters

Wildlife Parameter	Assumptions And Information Used	Methodologies And Scientific Accuracy
General Habitat	Information on wildlife and wildlife habitat in the Blackfoot Travel Plan Area has been extracted from field survey work throughout the landscape. Some of this information is summarized in the Blackfoot Landscape Analysis (HNF 1995) and in environmental analyses conducted for a variety of projects across the landscape. I have also employed recent modeling and map work by HNF GIS specialists. This section focuses on the direct effects of roads on forest, riparian, and grassland/shrubland habitat (habitat loss, fragmentation, edge effects). Edge effects are described for roads but not for trails. This derives from the observation that most trails on the HNF are narrow tracks that produce little, if any measurable edge. That is, trails in forest habitat run under the canopy rather than scouring out a contrasting corridor through the surrounding habitat. As a result, edge effects associated with these narrow travelways are assumed to be negligible.	Because wildlife species composition in any given area is primarily a product of available habitats, most wildlife is discussed at the “coarse filter” scale. That is, we assume that broad groups of similar vegetation will support similar arrays of wildlife species and levels of biodiversity (absent specific limiting factors generated by human interference or natural factors). Likewise, we assume that roads in each of these broad vegetation types will affect associated wildlife communities in similar ways. In some cases, individual species and their specific habitat needs are discussed—especially in the case of uncommon species dependent on particular habitat components for which data is available. This is a “fine filter” approach. Effects on general habitat are discussed in terms of habitat loss, fragmentation, and edge effects.
Old-Growth Forest	Information used to model old-growth is described in the documentation file created by HNF GIS specialists [Project File]. Modeling is based on sampling for the timber stand data layer (part of the Master Vegetation Layer). Effects generated by roads in old growth forest are assumed to be similar to those that occur in forested habitat in general.	Direct effects of roads are discussed briefly with regard to fragmentation, habitat loss (particularly with regard to snags), and edge effects. These data are not quantified.

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Riparian Habitats	Information used to assess effects on riparian habitat is based on data summarized in the Fisheries and Watershed Specialist Report and analyses conducted by HNF GIS specialists. We assume that these assessments are sufficient to indicate effects on these focal habitat sites that are important not only to species of special concern (such as western toads) but to a wide variety of wildlife.	Methodologies for assessing effects of motorized use within the 300 foot riparian zone (Riparian habitat conservation Areas) are described in the Fisheries and Watershed reports. This analysis reports miles of open road expected in these riparian areas under different alternatives.
Connectivity: Dispersal, Migration, and Travel Corridors; Linkage Zones; Fragmentation	The size and distribution of habitat patches away from the influence of open roads is used as a general indicator for comparing differences among alternatives. Assumptions used were that the fewer and larger the unroaded patches, the better the connectivity (the less the fragmentation). Better connectivity may be partially a function of lower road density alone, but primarily it reflects patterns of open road dispersion (regardless of density) that allow ample blocks of wildlife habitat to function free from road influences.	Background concepts for estimating the relative quality of connectivity among alternatives are from (1) a model developed by Walker and Craighead (1997) and expanded upon by Olimb and Williamson (2006) and (2) the FS Region-1 Connectivity Protocol. The 2 habitat models focus on the needs of animals needing the largest corridors (grizzly bears, mountain lions, and elk) and employ habitat suitability, habitat complexity, and weighted road density as key parameters. The Region-1 Protocol calculates the size and distribution of unroaded patches at least ½ mile from open roads, since research on several species (including elk and grizzly bears) indicates that ½ mile provides an adequate buffer. This assessment focuses on size and distribution of areas free from vehicle use. All unroaded and non-motorized patches larger than 1,500 acres are tallied, and changes between alternatives calculated. This gives a general sense of relative differences between alternatives—and of the potential effectiveness of the Continental Divide “linkage zone” or “movement corridor” for larger wildland species. Effectiveness of the linkage varies by species depending on their habitat needs, behavioral traits, and reaction to human presence. Lynx and marten, for example, prefer continuously forested environment, while grizzly bears and elk are best served by a mosaic of forested and unforested habitat.

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Snags and Downed Logs	Primary information sources and assumptions are summarized in Bate and Wisdom (2002a, 2002b) and Hillis et al. (2003). Additional information and assumptions are described in the text files and analyses run by HNF GIS specialists [project file]. In analyzing woody debris, I assume that effects are qualitatively similar for all 3 alternatives since the 300-ft rule for off-road camping applies in each case, and opportunities for firewood cutting are similar.	The methodology used to analyze indirect effects on snags and logs is described in the Snags and Downed Logs section. Indirect effects on snags and logs related to “edge” created by road prisms remaining on the landscape are described in the General Habitat section.
Motorized Use within 300-feet of Open Roads and Trails	The magnitude of impacts to wildlife and wildlife habitat from legal vehicle use within 300 feet of motorized routes is obviously tied to the miles of open road under any given scenario. Analyses by HNF GIS specialists yielded road miles. Effects apply to all open motorized routes regardless of habitat type. Effects on riparian habitat are analyzed by Riparian Habitat Conservation Areas (RHCA) which are buffers along stream corridor areas that vary from 150 to 300 feet wide on either side of streams.	Open route miles (“open” to wheeled vehicles) are used to determine habitat effects generated by motorized use within 300-feet of the routes. Any road that is open at any time of the year is included as an open route. The expectation was that relatively few new sites would be exploited within the 300-foot area, as most good camping/parking areas already have a road to them. The same is expected for the Blackfoot Travel Plan area as this area has a legacy of dispersed use.
Elk	Elk herd units (EHUs) were delineated by Helena National Forest (HNF) and Montana Fish, Wildlife and Parks (MFWP) biologists in 2003 and modified in 2007 and 2011. Herd units extend 1.5 mi beyond HNF boundaries, which we assume accounts for the area used by most elk that regularly move on and off the Forest in winter. Elk analyses described in “Methodologies” are based on the road attribute layers for each alternative. Summer range is assumed to be the entire herd unit (though this is often an overestimation). Hiding cover—which underlies the Forest Plan standard for elk summer range quality—is based on modeling by HNF GIS analysts (USDA 2009). To delineate Forest Plan winter range, I used maps developed for the HNF Oil and Gas Leasing EIS (1995). I chose this delineation after comparing plots of several thousand winter elk locations (from MFWP aerial surveys and radio-telemetry) to 3 available winter range maps—”Forest Plan” (1981-86),“Oil and Gas” (1995), and MFWP (1999-2010). The “Oil and Gas” map covered 96% of winter elk locations within herd units. I used the more broadly defined MFWP winter ranges when discussing elk habitat use and movement patterns beyond the HNF. A Forest Plan amendment associated with	Methodologies used to determine direct and indirect effects on elk include the following: Summer Habitat Effectiveness (Christensen et al. 1993) is based on open road density within each elk herd unit (including private roads) between May 16 and Sept. 30. Road locations and vehicle use patterns have been verified on the ground to the extent possible. Modeling of hiding cover (for Forest Plan compliance) provides a reasonably accurate estimate of % cover over broad areas, but it is not useful for drawing local, site-specific conclusions as to elk habitat use. Effects of travel management on winter range are based on open road and over-snow vehicle trail patterns on “HNF Oil and Gas EIS winter range” within HNF boundaries and on “MFWP winter range” in the 1.5 mile herd unit extension beyond those boundaries. Assessment of over-snow vehicle use comes from the most recent Forest over-snow vehicle trail maps and verification from discussion with local over-snow vehicle groups that regularly use the trail system. Elk vulnerability during the hunting season is based on the percentage of fall home range occupied by effective

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	this project substitutes elk security areas for the former hiding cover/road density index as a measure of elk security in the fall. Field research suggests that the security area methodology is the more accurate and sensitive of the two measures. Information on elk populations and seasonal distribution is based primarily on annual survey work by MFWP (including aerial census and check-station data), but also from past MFWP radio telemetry studies.	elk security areas. Security areas were initially delineated via methodology developed by Hillis et al. (1991). "Hillis" security areas are blocks of generally forested country with boundaries ≥ ½ mi from routes open to motor vehicles during the hunting season. Area boundaries were then adjusted to account for a variety of local, site-specific conditions likely to increase or decrease the effectiveness of security. Smaller areas are often eliminated. Adjustments are based on aerial photos, topographic maps, road system maps, hunting data from MFWP, and wide-ranging fieldwork. Security is calculated for "hunting season range" within HNF administrative boundaries for each elk herd unit. Open routes include all roads and motor trails (public and private) available to vehicles during the big game rifle season (Oct. 15 – Dec. 1). An alternative time period is Sept. 1 – Dec. 1 (the bow and rifle season). Many of the insights as to the accuracy of interpretations derived from models, maps, and data bases come from personal fieldwork throughout the Travel Plan Area over the past 20 years.
Threatened and Endangered Species		
Canada Lynx	The Northern Rockies Lynx Management Direction (NRLMD) (USDA 2007b) provides the background information, standards, guidelines, and general management underpinning for dealing with lynx. While this direction addresses all NF lands in the northern Rockies, I assume that our local survey work and habitat modeling are sufficient to allow us to tweak aspects of it to provide a better fit for the Blackfoot landscape. Potential lynx habitat and suitable snowshoe hare habitat have been modeled by HNF GIS personnel using a combination of data from the timber stand management record system (TSMRS) (field-based stand data) and V-Map satellite imagery (USDA 2009). Road and over-snow vehicle use are derived from GIS processes that tally miles of these routes in suitable lynx habitat in LAUs [documented in the Project File]. I assume, based on NRLMD guidance, that the effects of open roads in lynx habitat are imposed more by the access they provide competing carnivores and trappers than by the general presence of humans on these	Area-wide distribution of potential lynx and snowshoe hare habitat has been modeled and mapped by HNF GIS personnel, using criteria from the NRLMD. Field-based information for validating habitat modeling efforts has come from a variety of sources—including general wildlife surveys that have made note of habitat components useful to lynx throughout the landscape since the 1990s, lynx denning and foraging habitat surveys in the Tenmile drainage in 2003, and ongoing Forestwide field surveys of potential snowshoe hare habitat conducted according to Regional protocols. The relative effects of over-snow vehicle are inferred from the miles of over-snow vehicle trail in lynx habitat in different alternatives. Wild Things Unlimited (Bozeman) has run track surveys and collected DNA samples using established protocols since 2006 in the MacDonald Pass area and parts of the Little Blackfoot and Tenmile drainages (Gehman et al.

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	routes. Much of the background information for interpreting results of field surveys and modeled habitat data has come from the Lynx Science Report (USDA 1999), the Lynx Conservation Assessment and Strategy (Ruediger et al. 2000), and The Scientific Basis for Conserving Forest Carnivores (USDA 1994).	2007-2010). DNA from hair and scat samples have been analyzed by the USFS Rocky Mtn Research Station (Missoula) to identify species and individuals (Pilgrim 2007-2010). We have made use also of track survey transects run regularly by MFWP along the Divide for several years, as well as fortuitous observations by a number of individuals.
Grizzly Bear	Basic guidance for grizzly bear management comes from the Grizzly Bear Recovery Plan (USDI 1993) and the Interagency Grizzly Bear Committee (IGBC) Guidelines (1986), and the Grizzly Bear Management Plan for Western Montana (MFWP 2006). Application of this direction is modified by ongoing research, the slow expansion of occupied grizzly range southward across the HNF, and the development of updated management documents. The Travel Plan Area north and west of Mullan Pass lies within the Grizzly Bear "Distribution Zone" associated with the Northern Continental Divide Ecosystem (NCDE) Grizzly Bear Recovery Zone. The USFWS delineated the Distribution Zone in 2005 based on the pattern of grizzly sightings to that point. I assume, however, based on information from MFWP and observations from a number of sources since that time, that grizzly bears occupy the entire landscape, though in very low numbers. It seems likely that periodic adjustments of the Distribution Zone southern boundary will be in order as field data on grizzlies becomes more complete in the Blackfoot landscape. Given the information on grizzly bear distribution, environmental assessments in the Blackfoot landscape in recent years have applied management guidelines for IGBC Management Situation #5—which I assume is appropriate in this case as well.	No specific methodologies were used other than estimates, for each alternative, of (1) open road densities and of (2) large non-motorized habitat patches (>2,500 ac) more than 0.3 mi from open roads—both within and beyond the bounds of the Grizzly Bear Distribution Zone. Information on distribution of grizzly bears and suitable habitat components across the Blackfoot landscape has been derived from wildlife surveys by HNF biologists since the early 1990s, data from MFWP, and observations by field-going personnel and Forest-users. Observations of bears have been ranked as to credibility, and the information applied accordingly. Criteria outlined in the Grizzly Bear Recovery Plan and the IGBC Guidelines were served as the basis for analysis. We do not have enough systematic observations by trained personnel to allow us to estimate population numbers for the Blackfoot landscape or to determine if individuals are resident or transient.