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Montana Department of Natural Resources and Conservation

Forested State Trust Lands

Habitat Conservation Plan

Final EIS

Environmental Impact Statement

Volume II
Appendices A through C

A: Habitat Conservation Plan
B: HCP Documents
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Montana Department of Natural Resources and Conservation

U.S. Department of the Interior
Fish and Wildlife Service

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ACRONYMS AND ABBREVIATIONS

ARM	Administrative Rules of Montana
AUM	animal unit month
BE	Bitterroot Ecosystem
BLM	U.S. Bureau of Land Management
BMP	best management practice
BMU	bear management unit
CEM	Cumulative Effects Model
CFR	Code of Federal Regulations
CLO	Central Land Office
CMP	corrugated metal pipe
CMR	cooperative management response
CMZ	channel migration zone
CWA	Federal Water Pollution Control Act (Clean Water Act)
CWD	coarse woody debris
CWE	cumulative watershed effects
CYE	Cabinet-Yaak Ecosystem
dbh	diameter at breast height
DNRC	Montana Department of Natural Resources and Conservation
EA	environmental assessment
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FMB	Forest Management Bureau (DNRC)
Forest Management ARMs	Administrative Rules of Montana for Forest Management (ARMs 36.11.401 through 456)
GIS	geographic information system
GYE	Greater Yellowstone Ecosystem
HCP	habitat conservation plan
HUC	hydrologic unit code
IGBC	Interagency Grizzly Bear Committee
Land Board	Board of Land Commissioners

ACRONYMS AND ABBREVIATIONS (CONTINUED)

LAU	lynx analysis unit
LCAS	Lynx Conservation Assessment and Strategy
LMA	lynx management area
LWD	large woody debris
MAPA	Montana Administrative Procedures Act
MB&G	Mason, Bruce and Girard
mbf	thousand board feet
MBTRT	Montana Bull Trout Restoration Team
MCA	Montana Code Annotated
MDEQ	Montana Department of Environmental Quality
MDHES	Montana Department of Health and Environmental Sciences
MEPA	Montana Environmental Policy Act
MEQC	Montana Environmental Quality Council
MFISH	Montana Fisheries Information System
MFWP	Montana Fish, Wildlife and Parks
MNHP	Montana Natural Heritage Program
MOU	memorandum of understanding
NCDE	Northern Continental Divide Ecosystem
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NRIS	Natural Resource Information System
NRCS	Natural Resources Conservation Service
NROH	Non-recovery occupied habitat
NWLO	Northwestern Land Office
OHWM	ordinary high water mark
ORD	open road density
Permit	incidental take permit
Plum Creek	Plum Creek Timber Company
RCA	restoration/conservation area
RMZ	riparian management zone

ACRONYMS AND ABBREVIATIONS (CONTINUED)

SFLMP	State Forest Land Management Plan
SLI	stand-level inventory
SMZ	streamside management zone
SMZ Law	Montana Streamside Management Zone Law
SPTH	site potential tree height
Stillwater Block	blocked parcels in the Stillwater and Coal Creek State Forests
Swan Agreement	Swan Valley Grizzly Bear Conservation Agreement
SWLO	Southwestern Land Office
TLMD	Trust Land Management Division (DNRC)
TMDL	total maximum daily load
TRD	total road density
U.S.	United States
USC	United States Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WADNR	Washington State Department of Natural Resources
WDFW	Washington State Department of Fish and Wildlife
WEPP	Water Erosion Prediction Project
WFPB	Washington State Forest Practices Board
WMZ	wetland management zone

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Chapter

Introduction

1 INTRODUCTION

The Montana Department of Natural Resources and Conservation (DNRC) has prepared this multi-species habitat conservation plan (HCP) to address the potential take of federally listed species on forested state trust lands managed by the Trust Land Management Division (TLMD) of DNRC. This HCP was prepared to comply with Section 10(a)(1)(B) of the federal Endangered Species Act (ESA) (16 United States Code [USC] 1531 et seq.) and the regulations that implement that section of the ESA. Section 10 of the ESA provides a regulatory mechanism to allow for the incidental take of federally endangered and threatened species by private interests and non-federal government agencies during otherwise lawful activities. The DNRC Forest Management Bureau (FMB) would be responsible for implementation of this HCP.

The United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) are the federal agencies responsible for ensuring compliance with the ESA, which provides legal protection for federally threatened and endangered species. Generally, the USFWS is responsible for terrestrial and freshwater aquatic species, while NMFS is responsible for listed marine mammals, anadromous fish, and other living marine resources. This HCP does not involve a federally listed species managed by NMFS, so this agency will not be involved in this HCP or the environmental impact statement (EIS) associated with this HCP.

This HCP was developed to protect five terrestrial and aquatic species (three of which are currently listed under the ESA) that occur on DNRC forested trust lands (HCP species): grizzly bear (*Ursus arctos horribilis*), Canada lynx (*Lynx canadensis*), bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*Oncorhynchus clarkii lewisi*), and ~~Columbia~~ interior redband trout (*Oncorhynchus mykiss gairdneri*). The interior redband trout is also commonly known as the Columbia River redband trout, Columbia redband trout, redband trout, and Columbia River interior redband trout and is herein referred to as the Columbia redband trout. Specifically, the HCP was designed to avoid, minimize, and/or mitigate the impacts of incidental take of threatened and endangered species as a result of timber harvest and related activities to the

Origin and Function of Trust Lands

By the Enabling Act approved February 22, 1889, the Congress of the United States granted to the State of Montana, for common school support, sections 16 and 36 in every township within the state. Some of these sections had been homesteaded, some were within the boundaries of Indian reservations, and others were disposed of before passage of the Enabling Act. To make up for this loss, the State of Montana selected other lands.

The Enabling Act and subsequent acts also granted acreage for other educational and state institutions, in addition to the trust beneficiaries. While all trust lands are considered state-owned, they may only be managed to fulfill the specific purposes for which the trust was created: to provide income for the designated trust beneficiary such as the common schools, agricultural college, mining college, asylums, reform schools, or public buildings. The original common school grant was for 5,188,000 acres. The additional acreage provided for other endowed institutions included 668,720 acres, for a total of 5,856,720 acres. The total acreage figure has changed over time due to land sales and acquisitions. Mineral acreage now exceeds surface acreage, because the mineral estate has been retained when lands are sold. Surface acreage at the end of fiscal year 2007 totaled over 5.1 million acres; mineral acreage exceeded 6.2 million acres (DNRC 2007). Nearly 548,500 acres of forested trust land will be covered under this HCP and incidental take permit.

maximum extent practicable. Take is defined under Section 9 of the ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct."

This HCP is part of an application for an incidental take permit (Permit) that is submitted to the USFWS for review and approval. Based on a careful review of the final HCP and the associated final EIS, the analysis of benefits and impacts to the trust beneficiaries, public review, and other appropriate analyses, DNRC will determine whether to enter into an agreement with the USFWS, and the USFWS will evaluate whether the HCP and supporting application documents meet the issuance criteria for the Permit. The resulting legal agreement between these two parties, referred to as an implementing agreement, will legally bind the USFWS and DNRC to the HCP terms and conditions.

1.1 SECTION 10 AND HCP OVERVIEW

Under Section 10 of the ESA, the United States (U.S.) Secretary of the Interior and U.S. Secretary of Commerce may, where appropriate, authorize the taking of federally listed wildlife or fish if such taking occurs incidentally during otherwise lawful activities. This authorization is granted through a Permit. The Permit under Section 10(a)(1)(b) allows non-federal projects to "take" federally listed species while ensuring their long-term survival and enhancement through an approved HCP.

Section 10(a)(2)(A) of the ESA requires a Permit applicant to submit an HCP that specifies, among other things, the impacts that are likely to result from the taking, and the commitments the applicant will undertake to minimize and/or mitigate such impacts to the maximum extent practicable. An HCP is designed to provide benefits to both fish and wildlife species that receive protection under the ESA, as well as to landowners who manage habitat for these species. For listed species (and other species that rely on similar habitat), HCPs emphasize long-term biological goals by encouraging the active participation of landowners. For landowners and local governments, an HCP creates a predictable regulatory environment, offering the creative flexibility and certainty needed for planning and management, while still providing protection for listed species. HCPs can also reduce uncoordinated decision-making that may result in incremental habitat loss, negative effects to other species, or inefficient and duplicative review.

The No Surprises regulations provide assurances by the federal government through the Section 10 (a)(1)(B) process to non-federal landowners. Through the No Surprises regulations, private landowners are assured that if "unforeseen circumstances" arise, the USFWS and NMFS will not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed to in the HCP without the consent of the permittee. The government will honor these assurances as long as a permittee is properly implementing the terms and conditions of the HCP, Permit, and other associated documents

The requirements of Section 10 and the HCP are contained in Sections 10(a)(2)(A) and 10(a)(2)(B) of the ESA, and 50 Code of Federal Regulations (CFR) 17.22 and 17.32. Additional guidance on the contents of an HCP is provided in the HCP Handbook (USFWS and NMFS 1996) and in an addendum to the HCP Handbook referred to as the 5 Points Policy (USFWS and NMFS 2000).

Two of the key requirements of the Section 10 and HCP process are:

1. Demonstration of the impacts likely to result from the proposed taking of the species for which Permit coverage is requested.

2. Demonstration that the impacts of the proposed take are minimized and mitigated to the maximum extent practicable.

Additional information on these requirements is provided in Sections 1.5 and 1.6 below.

1.2 ORGANIZATION OF THIS DOCUMENT

Overall, this HCP is organized as follows.

Chapter 1, Introduction. This chapter introduces the requirements of Section 10 of the ESA and HCPs as a planning tool. The basic HCP elements are summarized, along with a detailed description of the activities proposed for coverage under this HCP. This chapter describes the trust mandate and process used to develop the conservation commitments. This chapter identifies the impacts that may constitute take to be authorized by the Permit and minimization and mitigation measures to reduce the effects of take to the maximum extent possible.

Chapter 2, Conservation Strategies. These strategies form the core of the HCP and represent DNRC's commitments designed to minimize and mitigate the effects of timber harvest and associated activities on HCP species that occur on trust lands. This section includes the rationale for the conservation commitments based on a balance between the best available science for the species and practicability considerations for DNRC implementation.

Chapter 3, Transition Lands Strategy. This chapter describes how the implementation of the HCP will respond to changes in the overall land base resulting from disposition, acquisition, and conversion of trust lands to other uses.

Chapter 4, Monitoring and Adaptive Management. This chapter describes the processes for monitoring both the implementation of the conservation strategies and the effectiveness of the HCP's minimization and mitigation commitments. In addition, it addresses the foreseeable changes that might be necessary in the adaptive management framework, including cooperative management changes in response to information gathered during implementation and effectiveness monitoring.

Chapter 5, Alternatives. This chapter summarizes other alternatives to the HCP and why they were not pursued as viable alternatives.

Chapter 6, Changed Circumstances. This chapter describes how implementation of the HCP will change in response to events outside of land use changes. Changed circumstances include those resulting from foreseeable natural events and those resulting from changes in administrative procedures.

Chapter 7, DNRC's Identification of Impacts that Have the Potential to Constitute Take under the HCP. This chapter describes the covered activities that could potentially result in incidental take of the covered species. It identifies how incidental take will be calculated and limited under the HCP, ~~and~~ the related impacts expected to result from the covered activities, and the anticipated incidental take.

Chapter 8, HCP Implementation. This chapter provides information about the standard administrative procedures once the HCP is in place, addressing matters such as decision making, staffing, reporting, and plan amendment. Additionally, the ESA requires that the HCP describe the funding that will be made available to implement the proposed mitigation program. This chapter presents the anticipated costs of implementing the conservation strategies, as well as those associated with other long-term needs, such as biological monitoring and evaluation. This chapter also describes how the HCP and Permit will be incorporated into the Administrative Rules of Montana (ARMs) pursuant the Montana Administrative Procedure Act (MAPA), if approved by the Board of Land Commissioners (Land Board). The Land Board and its role in the HCP process are described in Chapter 2 (Environmental and Procedural Setting) of the EIS for this HCP.

Chapter 9, Data Sources Used in HCP Development. This chapter summarizes the data sources and assumptions used in preparation of the HCP and associated EIS.

Chapter 10, References. This chapter provides full citations for literature, reports, etc. used in this document.

Chapter 11, Glossary. This chapter contains definitions for key terms used in this document.

Appendices. Appendix B contains protocols, methods, and checklists for implementing the conservation strategies. Appendix C contains the figures referenced in this HCP. Appendices D and E contain the figures and tables supporting the EIS analysis, respectively. Appendix F contains the implementing agreement between DNRC and the USFWS. Appendix G contains responses to comments on the Draft HCP and associated EIS.

1.3 DEVELOPMENT OF THE DNRC HCP

The development of an HCP is driven by the applicant (DNRC), while USFWS personnel provide detailed guidance and technical assistance throughout the HCP process. Central to the HCP process is the development of the conservation commitments that DNRC will implement to minimize and mitigate incidental take to the maximum extent practicable. Fundamental to the development of the DNRC HCP are the trust obligations and fiduciary responsibilities of DNRC's TLMD, which oversees the management of the state trust lands. These obligations and responsibilities guided DNRC's formulation of management goals and objectives for the HCP, which then guided the development of the conservation commitments. In the course of developing this HCP, the USFWS and DNRC formed technical workgroups to collaborate on the design of conservation strategies for the HCP species and their habitats. The workgroups were composed of: (1) DNRC FMB specialists who have programmatic responsibility for developing threatened and endangered species policy and management approaches, including a terrestrial species biologist, a fisheries biologist, a

DNRC's Mission

DNRC is responsible for helping ensure Montana's land and water resources provide benefits for present and future generations.

TLMD's Mission

TLMD is responsible for managing the State of Montana's trust land resources to produce revenue for the trust beneficiaries while considering environmental factors and protecting the future income-generating capacity of the land.

(Guided by: MCA 77-1-301 MCA 77-1-202 MCA; Enabling Act of February 22, 1889; and 1972 Montana Constitution, Article X, Section 11.)

forest hydrologist, a silviculturist, and a forest inventory specialist; (2) DNRC field foresters who implement the forest management program; and (3) USFWS terrestrial and aquatic species biologists and ESA Section 7 and 10 specialists.

1.3.1 Trust Obligations and Fiduciary Responsibilities

The legal framework for the management of state trust lands is summarized below and described in detail in the Chapter 2 (Environmental and Procedural Setting) of the EIS for this HCP.

State trust lands are managed under Montana's Constitution and the Enabling Act. The Enabling Act provided that proceeds from the sale and permanent disposition of any of the trust lands shall constitute permanent funds for the support and maintenance of Montana's public schools and the various state institutions for which the lands had been granted. The Montana constitution provides that these permanent funds shall forever remain inviolate, guaranteed by the State of Montana against loss or diversion.

The Enabling Act further provided that rentals received on leased lands, interest earned on the permanent funds arising from these lands, interest earned on deferred payments on lands sold, and all other actual income shall be available for the maintenance and support of such schools and institutions. While the trust lands are considered state-owned, the lands may only be managed to fulfill the specific purposes for which the trust was created, and the use of trust lands must result in income to the intended trust beneficiary. Montana's constitution goes further and states that any use of the trust lands must generate "full market value" (i.e., the purchase price of a property must equal the appraised market value). Table 1-1 shows the non-HCP acres and HCP project area acres of trust lands by trust beneficiary for the three land offices with acreage in the HCP project area: Northwestern Land Office (NWLO), Southwestern Land Office (SWLO), and Central Land Office (CLO).

TABLE 1-1. NON-HCP ACRES AND HCP PROJECT AREA ACRES BY TRUST IN THE NWLO, SWLO, AND CLO

Trust Beneficiary	Non-HCP Acres[1]	HCP Project Area Acres	Total Acres in NWLO, SWLO, and CLO
Montana State University - 2nd Grant	15,600	16,100	31,700
Montana State University - Morrill	40,300	4,500	44,800
Common Schools	973,100	414,100	1,387,200
School for the Deaf and Blind	25,700	7,300	33,000
General Fund	40	0	40
Public Buildings	108,000	63,700	171,700
School of Mines	28,700	12,100	40,800
State Normal School	33,400	12,300	45,700
State Industrial School	35,100	18,400	53,500
University of Montana	5,200	0	5,200
Total	**1,265,140**	**548,500**	**1,813,640**

[1] Non-HCP acres only refer to non-HCP acres in the NWLO, SWLO, and CLO.
Source: DNRC (2008a), rounded to the nearest 100 acres.

Additionally, in 1996, DNRC published the State Forest Land Management Plan (SFLMP) EIS, which evaluated several alternative approaches to the management of forested trust lands. This document went through extensive public review and comment. The selected alternative, Omega, combines a coarse-filter and fine-filter approach to forest management. Under the coarse filter, DNRC manages for a variety of forest structures and compositions to support diverse wildlife habitats. The fine-filter approach allows DNRC to focus management on single threatened and endangered species habitat requirements to ensure that the full range of biodiversity is addressed through its management. From the SFLMP came the ARMs for forest management, ARM Title 36, Chapter 11, Subchapter 4 (Forest Management ARMs), which provide the specific legal mandate for resource management standards developed under the SFLMP, and under which DNRC operates its forest management program. The Forest Management ARMs therefore, represent the foundation of the conservation commitments developed for this HCP.

1.3.2 Goals and Objectives of the DNRC HCP

In developing this HCP, DNRC and the USFWS recognized it was critical to develop goals and objectives that could be integrated into DNRC's management and conservation programs with the intended results. Management goals address DNRC's fiduciary and legal responsibilities, while biological goals serve as broad guiding principles for development and implementation of the conservation commitments.

1.3.2.1 Management Goals

DNRC's management goals for development of the HCP and meeting ESA Section 10 requirements, while continuing to conduct forest management activities on trust lands, are described below.

1. To the maximum extent practicable, minimize and mitigate the impacts of DNRC's forest management activities on species covered by the HCP.
2. Provide habitat conditions that are necessary and advisable to conserve and enhance species populations and allow for the long-term survival of species covered by the HCP in a manner consistent with DNRC's trust mandate. To the extent unlisted species are covered by the HCP, DNRC's goal is to address the factors under its control such that the listing of such species would be unnecessary, assuming the strategies in the HCP were implemented by similarly situated landowners throughout a species' range.
3. Provide DNRC with predictability and flexibility to manage forested trust lands economically, consistent with its statutory mandate to generate revenue for trust beneficiaries.

By adhering to these goals within the conservation strategies, DNRC will be able to continue to provide reasonable and legitimate returns for trust beneficiaries through intensive forest management. While the goals were designed to minimize and mitigate the impacts of any incidental taking of HCP species, DNRC and the USFWS also recognize that opportunities to provide for habitat needs of species may be limited by the trust mandate, location and amount of trust land ownership on the landscape, and species distribution at the landscape scale (e.g., habitat amount and connectivity).

1.3.2.2 Biological Goals and Objectives

In the course of developing this HCP, the USFWS and DNRC formed technical workgroups to collaborate on the design of conservation strategies for the HCP species and their habitats. The basis for the conservation strategies is found in the biological goals and objectives listed in Table 1-2. Using the best information available for each species, the workgroups identified biological goals that provide the rationale to support the minimization and mitigation strategies. For each goal, the workgroups identified objectives that serve as measurable targets for achieving the goal.

The terrestrial workgroup developed goals and objectives for the two HCP mammal species. The aquatic workgroup developed goals and objectives for the three HCP fish species. Table 1-2 identifies the biological goals for each HCP species and the objectives that will be used to support those goals.

1.3.2.3 DNRC Practicability Considerations

In developing commitments for an HCP that would allow a Permit to be issued, the ESA requires an applicant to minimize and mitigate the impacts of the authorized incidental taking to the maximum extent practicable. Therefore, DNRC identified some practicability considerations to aid in the determination of the "maximum extent practicable" criterion.

- **Long-term sustainability**. Conservation strategies that promote only a short-term management focus are not practicable for a long-term business operation, such as forest management on trust lands.
- **Cost-effective conservation**. Commonly, a conservation strategy has a point of diminishing returns where increasing costs achieve a diminishing conservation benefit. It is not practicable to expend extensive resources for conservation commitments that have very little benefit, especially when those resources can be allocated somewhere else at a greater conservation benefit.
- **Scientific credibility**. DNRC can only invest in conservation if there is reasonable scientific certainty of a conservation benefit. Given the fiduciary responsibilities associated with the trust mandate, DNRC can only consider those conservation measures where there are clear and certain conservation benefits.
- **Operational practicality**. Some conservation strategies may be too operationally complex, rendering them impractical for foresters and loggers to implement on the ground.

The conservation commitments of this HCP, including the monitoring and adaptive management program, meet the DNRC management goals and HCP biological goals and objectives, as well as recognize DNRC's fiduciary responsibility to the trusts and the practicability considerations identified above. These commitments have a solid basis in scientific data and rationale and address additional concerns, uncertainties, and collaborative input from the USFWS. In addition to providing a significant conservation benefit, the resulting package of commitments ensures a predictable flow of income to the trusts through the long term.

TABLE 1-2. HCP SPECIES BIOLOGICAL GOALS AND OBJECTIVES

Species-specific Goals	Objectives
Grizzly Bear Support federal grizzly bear conservation efforts by providing quality seasonal habitat and avoiding or minimizing bear/human conflicts.	1. Promote safety for humans and bears in the HCP project area through vegetation management constraints, comprehensive sanitation policy, education, and livestock grazing commitments. 2. Minimize displacement of grizzly bears from suitable habitat and provide for seasonal habitat use and security through overall access management. 3. Contribute to grizzly bear recovery where the conservation of seasonally important grizzly bear habitat would complement federal efforts. 4. Promote grizzly bear habitat connectivity where the HCP project area lands occur in important locations. 5. Maintain important habitat features, including den sites, avalanche and snow chutes, lush riparian zones, and locations that produce high volumes of forage. 6. Increase DNRC's understanding of grizzly bear habitat quality in managed forests through HCP monitoring and voluntary cooperation in research programs as funding and budgets allow.
Canada Lynx Support federal Canada lynx conservation efforts by managing for habitat elements important for lynx and their prey that contribute to the landscape-scale occurrence of lynx, particularly in key locations for resident populations.	1. Minimize potential for disturbance to known active den sites. 2. Within preferred habitat types (Pfister et al. 1977), map potential lynx winter foraging, ~~young~~summer foraging, and other suitable and temporary unsuitable habitats. 3. Provide stand structures or attributes that provide habitat for prey species, particularly in winter. 4. Retain coarse woody debris and other denning attributes on managed sites. 5. Limit conversion of suitable lynx habitat to temporary unsuitable habitat per decade in key geographic areas of notable importance for lynx (termed lynx management areas and described further in Section 2.1.2.2, Geographic Scope). 6. Ensure that adequate amounts of foraging habitat are maintained in defined lynx management areas. 7. Provide for habitat connectivity on the landscape where vegetation and ownership patterns allow. 8. Maintain suitable lynx habitat on DNRC scattered parcels outside lynx management areas.
Bull Trout, Westslope Cutthroat Trout, and Columbia Redband Trout Implement conservation strategies designed to protect bull trout, westslope cutthroat trout, and Columbia redband trout habitat, and contribute to restoration of habitat, as appropriate, that has been affected by past DNRC forest management activities.	1. Manage for stream temperature regimes suitable for bull trout, westslope cutthroat trout, and Columbia redband trout. 2. Manage for in-stream sedimentation levels suitable for bull trout, westslope cutthroat trout, and Columbia redband trout. 3. Manage for levels of in-stream habitat complexity suitable for bull trout, westslope cutthroat trout, and Columbia redband trout. 4. Maintain stream channel stability and channel form and function. 5. Provide for connectivity among subpopulations of bull trout, westslope cutthroat trout, and Columbia redband trout, where appropriate.

1.3.3 Development of the Conservation Strategies

Conservation commitments represent the means by which DNRC can meet the goals and objectives of the HCP and measure its success. In developing DNRC's conservation commitments, the HCP planning team considered the biological goals for minimizing and mitigating potential incidental take of the HCP species, as well as management goals consistent with DNRC's fiduciary responsibility to the state trusts and the practicability considerations identified above.

The Forest Management ARMs served as the platform from which the HCP conservation commitments were developed. ~~The HCP planning team reviewed existing DNRC resources and published literature and met with researchers to gain the best available science for the HCP species.~~ For the HCP species, the HCP planning team relied on numerous local studies spanning several decades to develop the conservation strategies and the EIS analyses for these species. In several instances, meetings were held with local experts to obtain the best available information possible when published information was lacking (See Chapter 7, References, in the EIS for this HCP and the DNRC Species Accounts [http://dnrc.mt.gov/HCP]). This information was used to determine areas within the ARMs where DNRC rules, procedures, and requirements could be enhanced to further minimize and mitigate potential take of the HCP species. Much of this effort entailed discussing the existing ARMs and how they were implemented.

1.3.3.1 Incorporation of Existing Practices

Currently, the Forest Management ARMs, promulgated March 2003, provide the guiding framework for DNRC's management of forested trust lands. The ARMs implement the requirements of the SFLMP (DNRC 1996). The SFLMP takes a coarse-filter approach to biodiversity. The coarse-filter approach operates at the landscape scale and focuses on maintaining an appropriate mix of stand structures and compositions on trust lands. This approach is based on the understanding that, if DNRC maintains landscape patterns and processes similar to those with which the component species evolved, then the full complement of species will persist, and biodiversity will be maintained (Jensen and Everett 1994). Maintaining a diversity of stand structures and compositions (cover types) also provides a range of current and prospective trust revenue opportunities, including a sustainable yield of timber, maintenance of forest health and biodiversity, and other outputs, while reducing risks of catastrophic fires and insect or disease attacks. Because the coarse-filter approach may not adequately address the full range of needs required to support biodiversity, a fine-filter approach is employed to address the needs of threatened, endangered, or sensitive species as described in the ARMs (36.11.427 through 443).

The ARMs are considered effective in reducing impacts to the habitats upon which the HCP species depend, because they ensure that a variety of habitat and forest age is present over time and because they apply additional considerations when threatened, endangered, or sensitive species are present on the lands. In addition, the ARMs are familiar to DNRC forest management personnel who are responsible for their on-the-ground implementation. Therefore, DNRC and the USFWS agreed the ARMs were a suitable platform from which to develop the HCP conservation commitments. Additionally, existing programs such as the Montana Streamside Management Zone Law (SMZ Law) (MCA 77-5-301 through 307) and Montana Forestry Best Management Practices (BMPs) (DNRC 2004a) were incorporated into the HCP commitments.

For the purpose of implementing the HCP, all referenced rules, laws, plans, and policies are intended to be applied as those versions stated in the HCP and in place at the time the HCP is formally approved. For example, the Forest Management ARMs (36.11.401 through 36.11.450) promulgated March 2003 comprise the rule set that provides much of the foundation for the HCP, and these rules as referenced are intended to be implemented as phrased in the March 2003 Administrative Rules of Montana. This is important to note because, over time, policy numbering can change, wording in existing policies can be revised, or statutes can be repealed, creating a potential source of confusion or error for DNRC practitioners implementing the HCP in future decades. However, over the term of a 50-year conservation plan, some flexibility is needed to address minor necessary changes in wording, content, and numbering of such measures. Thus, if needed changes are identified over time, DNRC would propose and adopt necessary modifications in cooperation with the USFWS through the processes identified for changed circumstances outlined in Sections 6.1.2 (Process for Administrative Changed Circumstances) and 6.3.4 (Changes in DNRC's Rules, Laws, or Policies).

1.3.3.2 Use of DNRC Resources

In addition to published literature and ongoing research, DNRC relied on its own internal databases to support the development of the conservation commitments. The primary forest vegetation information source used in the development of this HCP was DNRC's stand-level inventory (SLI) database. The SLI is map-based and is stored in a geographic information system (GIS) database maintained by the Technical Services Section of the FMB. This database provided the basis for describing habitat conditions for much of the HCP project area.

The SLI covers more than 1.2 million acres of DNRC land, which includes 726,000 acres of forest land and exceeds 34,000 individual map polygons. Each forested polygon has a data record that provides information about the forest tree species, size, stocking level, potential vegetation class, productivity, and management objectives for a particular timber stand. Data pertaining to these parameters are based on observations made during inventories conducted by DNRC staff and private contractors. These inventories are based on a combination of observed data on the ground and photo-interpreted data. Inventories are conducted regularly by private contractors and by DNRC staff for planned and completed timber projects.

In addition to using the database to summarize current habitat conditions, this information will be used to track the availability and status of habitat conditions under the HCP. In developing the conservation commitments, the HCP planning team and Technical Services Section identified opportunities to enhance data collection efforts so that the commitments could be adequately monitored, tracked, and reported over the Permit term.

Additionally, the SLI database served as the basis of the forest management modeling process to determine the sustainable yield under current practices (ARMs and SFLMP) versus under the HCP. These data were also used to estimate future HCP species' habitat conditions and timber production under different HCP alternatives to test the feasibility of the various commitments to meet the biological objectives as well as the DNRC trust mandate. The modeling results and habitat conditions are described in Chapter 4 (Affected Environment and Environmental Consequences) of the EIS for this HCP.

1.3.3.3 Use of Best Available Information

As the HCP planning team and EIS interdisciplinary teams developed the HCP and EIS, respectively, team members gathered, reviewed, and used the best available scientific information. This includes material that was readily available from public (libraries, research institutions, schools, agencies) or private (researchers, timber companies, other HCP applicants) sources, as well as unpublished findings from ongoing research projects. Background information for the HCP species was compiled into species accounts, and comprises the best available science for these species. Based on information from the literature on the life history, occurrence, habitat needs, and status of the HCP species, these accounts serve as the primary technical information for each species and are the basis for the conservation commitments, which build upon the existing ARMs. The species accounts are available on the project website at http://dnrc.mt.gov/HCP. If substantive new information becomes available between finalization of the species accounts and issuance of the Permit, that information will be incorporated into the conservation commitments or addressed subsequent to Permit issuance through the process described in Section 4.2.3 (Adjusting for New Research).

The species accounts were developed with five objectives:

1. Develop each species' background to understand its status, occurrence, distribution, and life-history requirements applicable to state trust lands.
2. Examine the sensitivity of each species to covered activities and assess associated risk factors.
3. Identify the conservation strategies currently in place (through federal and state regulations and signed DNRC conservation agreements) to protect each species' habitat on trust lands.
4. Describe additional conservation strategies recommended or implemented by others that could provide benefit in protecting species' habitats on trust lands.
5. Identify existing or new species models that could be used to describe species' habitat use on trust lands and/or that might help to determine the effectiveness of the proposed HCP conservation strategies.

The science related to the effects of timber harvest and road use on grizzly bears is well-established and widely accepted in the scientific community. Numerous modern studies on grizzly bears have been published that span nearly 4 decades (1972 to 2008). These studies, as summarized in the species account, were considered while developing the HCP, and they provided the technical workgroup a consistent basis for understanding the needs of grizzly bears and their ecology. Both old and new studies have overwhelmingly identified human conflicts and habitat loss as leading risk factors for grizzly bear recovery and survival in the lower 48 states. The scientific community (including DNRC and USFWS) surrounding grizzly bear research remains active and broad, and encompasses several groups that meet on a regular basis to share information, pool funding and resources, and brainstorm new ideas for bear conservation.

Published studies related to habitat use by Canada lynx in Montana are relatively scant, and our understanding of their habitat needs, behaviors, and responses to timber harvest is still emerging. DNRC and USFWS reviewed existing literature and spoke with scientists in Washington who developed the state's *Lynx Habitat Management Plan for DNR-Managed Lands* (Washington

Department of Natural Resources [WADNR] 2005). Many studies have recently been initiated in Montana, and data are still being gathered or have not yet been published. To incorporate the most recent and best available information for lynx, DNRC and USFWS met with researchers to gain insight into their preliminary findings and field observations. Additionally, these researchers were asked to review and comment on the conservation strategies to help ensure that important habitat considerations were not overlooked. As recently as 2008 and 2009, when new studies were published, the conservation strategies were modified to incorporate the findings of this research.

Considerable research has been completed on the effects of timber harvest on streams and Pacific salmon and bull trout fish habitat. Additionally, since the designation of westslope cutthroat trout as a sensitive species and the petition to list it under ESA, a lot of research has been conducted for this species. All such literature was reviewed during the development of the aquatic conservation strategies. The aquatic strategies were also developed to incorporate the findings of several years of BMP audits and SFLMP monitoring. Lastly, DNRC and USFWS drew from the experience and findings of the Plum Creek Native Fish HCP and monitoring, which has been in effect for six years.

The information gathered through the review of best available information and development of the species accounts was applied in the development of the conservation strategies. While developing the conservation strategies, technical workgroups evaluated best available scientific information and practices used by others and identified opportunities to supplement existing ARMs and regulations to further reduce the potential for risks of impacts to HCP species that DNRC's forest management activities may present. The technical workgroups also strived to develop conservation commitments that were integrated into habitat-based commitments to meet the collective needs for all five HCP species.

1.4 BASIC ELEMENTS OF THE DNRC HCP

This section serves as a general introduction to this HCP, which has been prepared in support of the Permit application for DNRC. The subsections below provide a brief description of the HCP species, Permit lands, and the proposed Permit term, as well as a detailed description of the covered activities.

1.4.1 HCP Species

The HCP species are the species covered by the terms of the Permit and subject to its incidental take authorization. The HCP addresses the following three species listed under the ESA:

- Grizzly bear
- Canada lynx
- Bull trout.

The HCP also addresses two additional aquatic species should these species become listed during the Permit term:

- Westslope cutthroat trout
- Columbia redband trout.

Once listed under the ESA, these two species would automatically become covered under the Permit with no additional conservation commitments required outside those listed in the HCP. More information on the status of these species can be found in Sections 4.8 (Fish and Fish Habitat) and 4.9 (Wildlife and Wildlife Habitat) of the EIS for this HCP.

The ESA defines a species to include any species or subspecies of fish, wildlife, or plant and any distinct population segment of any vertebrate species that interbreeds when mature. Common names for these species will be used throughout this document. Additionally, Canada lynx will be referred to from here on as lynx.

1.4.2 HCP Project Area

DNRC determined which lands to cover in the HCP by assessing where lands within the distribution of the species of interest overlapped with lands containing appreciable amounts of manageable forest acreage. This approach identified the geographic area where risk to the HCP species ~~of concern~~ was deemed greatest over the Permit term. Approximately 92 stream miles of proposed bull trout critical habitat, 175,100 acres of lynx critical habitat, and 154,200 acres of grizzly bear recovery zone occur on the DNRC lands comprising the HCP project area.

The lands covered by the HCP, the HCP project area, include approximately 548,500 acres of trust lands within three DNRC land offices (Appendix C, Figure C-1), the NWLO, SWLO, and CLO. The HCP project area includes primarily forested lands (approximately 446,100 acres) but contains other lands that are non-forested (approximately 102,400 acres) that consist of grasslands, agricultural lands, water, rocky areas, etc., where forest management activities typically would not occur. Some of the non-forested lands included in the HCP project area may be needed to access forested parcels in the HCP project area.

The HCP project area occurs on both blocked lands and scattered parcels across the three land offices (Table 1-3). Blocked lands refer to large, mostly contiguous blocks of DNRC ownership specifically identified as the Stillwater and Coal Creek State Forests (Stillwater Block) and the Swan River State Forest. Scattered parcels refer to all other HCP project area lands outside of blocked lands.

Although the HCP project area spans three land offices, most of it is concentrated in the NWLO and SWLO (Table 1-3). Approximately 273,400 acres of the NWLO are included in the HCP project area and occur on both blocked lands (Stillwater Block and Swan River State Forest) and scattered parcels. The Stillwater Block and the Swan River State Forest comprise 41 percent of the HCP project area in the NWLO. HCP project area lands in the NWLO account for about 86 percent of DNRC ownership within the NWLO and about 50 percent of the total HCP project area. Approximately 161,920 acres of the SWLO are included in the HCP project area and occur solely on scattered parcels. These acres account for about 69 percent of DNRC ownership within the SWLO and about 30 percent of the HCP project area. Approximately 113,180 acres of the CLO are included in the HCP project area and also occur solely on scattered parcels. These acres account for 9 percent of DNRC ownership within the CLO and 20 percent of the HCP project area.

TABLE 1-3. ACRES OF DNRC LANDS AND HCP PROJECT AREA BY LAND OFFICE AND ADMINISTRATIVE UNIT

Land Office and Administrative Unit	DNRC Lands (Acres)	HCP Project Area Lands (Acres)	% of Total Lands in the HCP Project Area
NWLO	**316,100**	**273,500**	**87%**
Kalispell Unit (Scattered)	59,900	41,700	13%
Libby Unit (Scattered)	31,200	28,500	9%
Plains Unit (Scattered)	64,100	53,600	17%
Stillwater Unit (Blocked)	90,800	90,700	29%
Stillwater Unit (Scattered)	30,000	19,300	6%
Swan Unit (Blocked)	39,800	39,700	13%
Swan Unit (Scattered)	300	0	0%
SWLO	**234,700**	**161,800**	**69%**
Anaconda Unit (Scattered)	81,600	43,900	19%
Clearwater Unit (Scattered)	54,600	44,100	19%
Hamilton Unit (Scattered)	29,500	20,900	9%
Missoula Unit (Scattered)	69,000	52,900	23%
CLO	**1,262,500**	**113,200**	**9%**
Bozeman Unit (Scattered)	125,900	16,500	1%
Conrad Unit (Scattered)	359,600	0	0%
Dillon Unit (Scattered)	427,400	70,600	6%
Helena Unit (Scattered)	349,600	26,100	2%
Total	**1,813,300**	**548,500**	

Source: DNRC (2008a), rounded to the nearest 100 acres.

Some state trust lands in the three land offices were not included in the HCP project area for various reasons. These lands total 1,264,000 acres and include (areas rounded to the nearest 100 acres):

- 719,000 acres of non-forest lands
- All 359,600 acres in the Conrad Unit (CLO), where there is very little timber to manage over the Permit term
- 117,000 acres where HCP species habitat is not present
- 6,300 acres of land currently offered for sale in DNRC's land banking program
- 14,100 acres of land with a high likelihood of sale or development
- 12,800 acres of land currently proposed for land exchanges
- 12,600 acres of open water
- 10,800 acres in the Whitefish Neighborhood Plan, which was not completed, and the exact fate of those lands was not determined, at the time DNRC determined the HCP project area
- 9,300 acres of land with an existing real estate lease or development
- 2,400 acres at the McDonald Mine (SWLO)

The Permit and the requirements of the HCP would only apply to DNRC's forest management activities on state trust lands within the HCP project area. DNRC activities on lands not included in the HCP project area would continue to be subject to the provisions of Section 9 of the ESA and other federal and state laws addressing species protection.

1.4.3 Permit Term

DNRC has proposed that the Permit be issued to the TLMD by the USFWS for a period of 50 years in order to realize both the biological and economic benefits of the HCP. DNRC views the HCP as a long-term program for addressing and improving habitat needs across the landscape. This Permit term was selected by DNRC to ensure that it would have sufficient time and funding to implement the conservation strategies and make adjustments through adaptive management where needed. Securing an adequate amount of time to implement the HCP is expected to maximize the HCP's contribution to the recovery of the HCP species.

This time period also helps ensure that the costs and the effort of developing an HCP, obtaining the Permit, and implementing an HCP are spread over multiple years and balanced ~~would be offset~~ by the long-term ~~advantage of ensuring~~assurance that ESA regulatory requirements are met for the HCP species ~~over the next 50 years~~. ESA regulatory certainty will help DNRC plan forest management activities with the reassurance that those activities will not be subject to additional ESA regulatory restrictions due to the presence of a listed HCP species. If, in the course of the application process for the Permit, DNRC determines that the costs of implementing the HCP conservation strategies desired by the USFWS outweigh the benefits, DNRC can abandon this voluntary planning process at any time following discussion with the USFWS.

As part of its review of the Permit application, the USFWS will evaluate the proposed Permit ~~period to ensure that it is an adequate timeframe in which to fully mitigate for the expected incidental take of listed species. In addition, the USFWS will determine whether the proposed monitoring and adaptive management to be implemented will be adequate to assess the effectiveness of the proposed conservation commitments over the life of the HCP~~term while considering the four factors outlined in the 5 Points Policy (USFWS and NMFS 2000) for determining the Permit term: (1) the duration of the applicant's proposed activities and expected positive or negative effects on the HCP species, (2) the extent of information underlying the HCP, (3) the length of time necessary to implement and achieve the benefits of the operating conservation program, and (4) the extent to which the program incorporates adaptive management strategies.

1.4.4 Covered Activities

The DNRC forest management activities that will be covered under the HCP are summarized below. The existing management intensity and extent of each activity is described further in this section.

- **Timber harvest.** Includes timber harvest, salvage harvest, and silvicultural treatments such as thinning.
- **Other forest management activities.** Includes slash disposal, prescribed burning, site preparation, reforestation, fertilization, inventory, and access to forestlands for weed control.

- **Roads.** Includes forest management road construction, reconstruction, maintenance, use, and associated gravel quarrying for road surface materials, as well as installation, removal, and replacement of stream crossing structures.
- **Grazing.** Includes grazing licenses on classified forest trust lands.

1.4.4.1 Timber Harvest

Timber harvest is a broad term used to describe a series of forest practices designed to access, harvest, and regenerate trees in a defined land area for commercial purposes. DNRC is responsible for conducting all field work in the selection, location, examination, and appraisal of timber on forested state trust lands. The agency is required to supervise all timber management activities, including the sale of timber that requires approval by the Land Board. Between 2003 and 2006, DNRC sold between 43 and 57.8 million board feet of timber on trust lands statewide (Table 1-4). As shown in Table 1-4, between 22 and 26 sales were conducted for a total harvest between 44.5 and 57.3 million board feet. Revenues ranged from a low in 2003 of $6.9 million to a high in 2005 of $13.7 million. Timber harvest is conducted through two primary means: timber permits or timber sales. A timber permit is issued for the harvest of under 100 thousand board feet (mbf) of timber and, in the case of emergencies, for the salvage of under 200 mbf of timber. Timber permits do not require approval by the Land Board. All timber harvest in excess of these amounts is processed as timber sales and requires approval by the Land Board. Timber sales are sold and permits are issued to private contractors whose activities are administered by DNRC. The timber sale process is outlined in Chapter 2 (Environmental and Procedural Setting) of the EIS for this HCP.

TABLE 1-4. NUMBER OF TIMBER SALES, TIMBER VOLUME SOLD AND HARVESTED AND TIMBER REVENUES ON DNRC TRUST LANDS FOR 2003 THROUGH 2006

Year	Timber Sales	Timber Volume Sold[1] (million board feet)	Timber Volume Harvested[1] (million board feet)	Timber Revenue (in millions)
2006	23	53.3	56.5	$13.0
2005	26	57.8	57.3	$13.7
2004	22	50.1	46	$ 9.0
2003	26	43	44.5	$ 6.9

[1] The volume sold and harvested varies for the same year because the amounts of timber harvested may include volume from sales in the previous year.
Source: DNRC (2003a, 2004b, 2005a, 2006a).

Timber Harvest Treatments

The harvest type or treatments are applied to emulate natural disturbance (primarily fire) acting on the forest. For example, many of the treatments described below, including clearcut and seed tree harvests, emulate stand-replacement fire, while shelterwood treatments typically emulate mixed-severity fires. Commercial thinning and selection harvests emulate mixed-severity and non-lethal fire or gap-replacement disturbances. DNRC uses timber harvesting to maintain forest health, increase tree growth, reduce wildfire severity and mortality, and to achieve desired forest cover types or desired future conditions. Emulating natural disturbances and managing for desired future conditions is guided by the coarse-filter approach described in the SFLMP.

DNRC's timber harvests can be grouped into two categories of silvicultural treatments: regeneration treatments and intermediate treatments. Regeneration treatments aim to initiate or assist the development of a new age class in a stand, and can be accomplished by using even-aged methods or uneven-aged methods. Even-aged methods regenerate or maintain a stand with a single age class using such methods as clearcutting, seed tree, and shelterwood. Uneven-aged or selection methods regenerate or maintain a multi-aged stand by removing trees throughout the range of age and size classes present in a stand. Selection cutting can be done by removing single trees or small groups of trees within a stand.

Intermediate treatments are used to enhance the growth, quality, vigor, and composition of a stand after establishment and prior to final harvest. Two common intermediate treatments are commercial thinning and sanitation cutting.

These treatment methods are defined below.

- **Clearcut.** The cutting of essentially all trees in a harvest unit, producing a fully exposed microclimate for the development of a new age class. Regeneration is typically accomplished by planting or seeding or using seedlings established in advance of the treatment (Helms 1998). DNRC always retains some structural elements when clearcutting such as retention of large snags and snag recruits.
- **Seed tree.** The cutting of all trees except for a small number of widely dispersed trees retained for seed production and to produce a new age class in fully exposed microenvironment. Seed trees are often removed after regeneration is established, unless they are required to attain goals other than regeneration (i.e., live large tree or snag requirements) (Helms 1998).
- **Shelterwood.** The cutting of most trees, leaving those needed to produce sufficient shade to produce a new age class in a moderated microenvironment. Shelterwood trees may be removed after regeneration is established, unless they are required to attain goals other than regeneration (i.e., live large tree or snag requirements) (Helms 1998).
- **Selection.** A cutting method applied in uneven aged forests to regenerate and maintain a multi-aged structure by removing some trees in all size classes either singly, in small groups, or in strips (Helms 1998).
- **Commercial thinning.** Any type of thinning that produces merchantable material at least equal to the value of the direct costs of harvesting (Helms 1998).
- **Sanitation cutting.** The removal of trees to improve stand health by stopping or reducing the actual or anticipated spread of insects and disease (Helms 1998).

Most of the recent harvests completed on DNRC land have employed either selection or commercial thinning prescriptions (Table 1-5).

TABLE 1-5. PERCENT OF THE TOTAL TIMBER HARVESTED ON DNRC-MANAGED LANDS BY SILVICULTURAL METHOD FOR FISCAL YEARS 1998 THROUGH 2005

Silvicultural Treatment Method	Percent of Total Harvest[1]	
	Fiscal Years 1998–2000[2]	Fiscal Years 2001–2005[3]
Clearcut	4	5
Seed tree	8	18
Shelterwood	2	8
Selection	55	47
Commercial thinning	31	22

[1] Total harvest for fiscal years 1998 through 2000 was 27,141 acres; total harvest for fiscal years 2001 through 2005 was 31,492 acres.
[2] Source: DNRC (2000a).
[3] Source: DNRC (2005b). Percentages do not include fire salvaged acres.

Logging systems used for DNRC timber harvest activities include tractor, cable, and helicopter methods, with tractor-based logging being the most common. Approximately 91 percent of the acres harvested on state trust lands between 1998 and 2000 used tractor-based logging systems. The remaining harvests between 1998 and 2000 were completed with cable systems (7 percent) and helicopter systems (2 percent). Approximately 79 percent of the acres harvested between 2001 and 2005 were tractor-based systems. The remaining harvests between 2001 and 2005 were completed with cable systems (17 percent) and helicopter systems (4 percent).

Salvage Harvest

The term salvage is defined under ARM 36.11.403(71) as "the removal of dead trees or trees being damaged or killed by injurious agents other than competition, to recover value that would be otherwise lost." Injurious agents include wildfires and major outbreaks of insects and diseases that ultimately inflict high tree mortality rates throughout forested stands. Wind events can also be considered injurious; however, such events result in far less mortality than wildfires or insect and disease outbreaks. A considerable portion of recent DNRC harvest volume has been derived from salvage harvest. For fiscal years 2001 to 2005, fire salvage comprised 26 percent of the total harvest acreage on forested trust lands (DNRC 2005b). This harvest occurred primarily in areas affected by large wildfires, including the fires in the Sula State Forest in 2000 and Coal Creek State Forest in 2001, as well as the Maxey Ridge and Wilson Creek fires in the Bozeman area in 2001. The fire, insect, and disease salvage volume sold for fiscal years 2006, 2007, and 2008 and the percentage of the total volume sold comprising salvage harvest is presented in Table 1-6. The high fire salvage volume associated with fiscal year 2008 is attributed to large wildfires, including the Chippy Creek, Jocko Lakes, Blackcat, and Mile-Marker 124 fires. Salvage is expected to continue to represent a substantial portion of the DNRC annual harvest volume in response to mortality from wildfires and other causes.

TABLE 1-6. SALVAGE HARVEST VOLUME SOLD AND PERCENTAGE OF TOTAL VOLUME SOLD COMPRISING SALVAGE HARVEST FOR FISCAL YEARS 2006, 2007, AND 2008

Fiscal Year	Salvage Type	Salvage Harvest Volume Sold (million board feet)[1]	Percent of Total Volume Sold Comprising Salvage Harvest
2006	Insect and Disease	16.5	31.0
	Fire	1.0	1.9
2007	Insect and Disease	27.2	51.0
	Fire	6.5	12.2
2008	Insect and Disease	2.5	4.8
	Fire	19.9	37.8

[1] Salvage harvest volume sold does not include volume sold as timber permits.
Source: DNRC (2008b).

Pre-commercial Thinning

Pre-commercial thinning is defined under the Forest Management ARMs as "the removal of trees not for immediate financial return but to reduce stocking to concentrate growth on the more desirable trees." From 1998 to 2004, DNRC conducted pre-commercial thinning on approximately 12,466 acres statewide with an annual average of 1,781 acres. Most recently, pre-commercial thinning occurred on 1,537 acres statewide in 2006.

1.4.4.2 Other Forest Management Activities

Other activities associated with forest management that are covered under this HCP include slash disposal, prescribed burning, site preparation, reforestation, fertilization, inventory, and access to forestlands for weed control. These activities are described below. Additionally, most of the covered activities involve some degree of human presence and fieldwork activities. This human presence may affect HCP species through incidental contact, disturbance, displacement, or in other ways. The actual number of days spent engaged in the field is difficult to ascertain, but is in the range of hundreds of days per year for each land office. The average annual number of acres treated through forest improvement activities on forested trust lands statewide between 2001 and 2005 included plantation regeneration surveys (1,484 acres), tree planting (1,021 acres), tree browse prevention (567 acres), hand brush work (54 acres), managed tree improvement areas (19 acres), and cone collection (247 bushels). Other activities include, but are not limited to, field work associated with the completion of environmental analyses, preparation of timber sales, design and layout of roads, layout of pre-commercial thinning units, grazing inspections, and monitoring.

Slash Disposal and Prescribed Burning

Slash, also referred to as brush, is defined in the ARMs as "the woody debris that is dropped to the forest floor during forest practices and consists of stems, branches, and twigs." Slash disposal refers to the treatment of woody debris generated from forest management activities. Guidelines for slash disposal to meet fire hazard reduction requirements and to meet the nutrient and coarse woody debris retention requirements are included in the Forest Management ARMs (36.11.410 and 414).

Slash disposal is also an element of site preparation to facilitate stand regeneration. Slash disposal may include brush piling, pile burning, and broadcast burning. In 2006, pile burning was the most common type of slash disposal employed by DNRC (Table 1-7).

TABLE 1-7. AVERAGE ANNUAL ACRES OF SLASH DISPOSAL AND BROADCAST BURNING ON DNRC TRUST LANDS DURING FISCAL YEARS 1996 THROUGH 2005, COMPARED TO 2006

Method	Annual Average, 1996–2005[1]	Fiscal Year 2006[1]
Brush piling	817	1,654
Pile burning	1,677	3,792
Broadcast burning	285	417

[1] The acres indicated in the table represent the stand area where these treatments occurred, but do not necessarily reflect the actual area treated. The amount of area actually treated is typically much smaller than the stand area. For example, during the process of pile burning, slash from throughout a harvest unit is gathered into a small area before being burned.

Source: DNRC (2000a, 2005b, 2006a).

A prescribed burn is defined by the Society of American Foresters as "to deliberately burn wild land fuels in either their natural or their modified state and under specific environmental conditions, which allows the fire to be confined to a predetermined area and produces the fire intensity and rate of spread required to attain planned resource management objectives" (Helms 1998). In some areas, prescribed burning can be effectively and safely used to restore and maintain desired forest conditions and reduce unacceptably high risks of damage to human life and property, as well as potential losses of resource values. DNRC rarely uses prescribed fire as a management tool due to liability issues associated with its scattered ownership pattern and the proximity to private property and the prohibitively high costs to conduct prescribed fire projects. DNRC instead uses silvicultural treatments to emulate fire disturbances and manages for desired future condition as guided by the coarse-filter approach described in the SFLMP.

DNRC currently employs broadcast burning and pile burning as prescribed fire methods. These methods are used primarily to control the fire hazard associated with slash generated from forest management activities and for site preparation to meet reforestation objectives. As shown in Table 1-7, on forested trust lands statewide, an annual average of 1,962 acres were treated through prescribed burning (pile and broadcast burning) in 1996 through 2005, and 4,209 acres were burned in 2006.

Site Preparation

The Society of American Foresters defines site preparation as "hand or mechanized manipulation of a site, designed to enhance the success of regeneration" (Helms 1998). DNRC uses burning, herbicides, and mechanical scarification to create conditions conducive to the establishment and growth of desired tree species. Many of the activities conducted under slash disposal also accomplish site preparation goals, such as slash piling and burning. Note that only mechanical methods of site preparation, not herbicide use, are covered activities under this HCP.

Reforestation

The Society of American Foresters defines reforestation as "the reestablishment of forest cover either naturally or artificially by direct seeding or planting" (Helms 1998). DNRC regularly engages in reforestation activities, primarily by planting in burned areas or areas where regeneration harvest treatments have occurred, and by interplanting following partial harvests. DNRC reforestation is primarily limited to shade-intolerant species (ponderosa pine [*Pinus ponderosa*], western larch [*Larix occidentalis*], and western white pine [*Pinus monticola*]), often with seedlings selected from genetically superior seed sources.

Between 2001 and 2005, DNRC planted trees on approximately 5,103 acres statewide (or an average of 1,020 acres per year). Between 2001 and 2005, regeneration surveys occurred on approximately 7,421 acres for an average of 1,484 acres per year. Planting and regeneration surveys for this period occurred on more acres than for the period between 1996 and 2000, when an average of 679 acres were planted per year and 295 acres were surveyed per year. This is attributed to the large fires of 2000, 2001, and 2003, which were so severe that a minimal seed source remained in the burned areas to foster natural regeneration. Tree planting and regeneration surveys increased again in 2006, with 2,106 acres planted and 502 acres surveyed. Tree planting is conducted on the ground, whereas reseeding may occasionally include aerial application.

In planted areas, tree browse prevention (plastic tubes placed over newly planted trees) is applied when planting in big game winter range areas. Between 2001 and 2005, tree browse prevention was applied on 2,836 acres for an annual average of 650 acres. In 2006, tree browse prevention was applied on 1,084 acres.

Weed Control

DNRC employs an integrated pest management approach for weed control on forested trust lands. This integrated approach includes regular monitoring to determine if and when treatments are needed and includes physical, mechanical, cultural, biological, and educational approaches for controlling pest species to prevent unacceptable damage or annoyance. All pesticides and herbicides are applied in accordance with applicable regulations of the U.S. Environmental Protection Agency (EPA) and applicable laws of the State of Montana. The application of pesticides and herbicides is not a covered activity under the Permit because the USFWS does not authorize incidental take for pesticide and herbicide applications; those activities are covered by incidental take statements issued in connection with Section 7 consultations between the USFWS and the EPA. However, the monitoring activities and trips associated with application are covered. Noxious weed spraying is typically conducted through ground application, although aerial spraying is occasionally used. In 2005, noxious weed spraying occurred on 3,935 DNRC acres statewide, and herbicide applications associated with tree planting occurred on 680 acres statewide. A total of 17,170 acres were sprayed from 2001 to 2005 for an annual average of 3,434 acres. For the same time period, herbicide application occurred on a total of 2,084 acres for an annual average of 417 acres.

With regard to forest management activities, DNRC manages to control the spread of noxious weeds and prioritizes control measures where native plant communities are threatened. Prompt revegetation of road rights-of-way and other disturbed areas with site-adapted species (including native species) is a primary preventative measure. In general, DNRC seeds all new road construction and reconstruction with site-adapted grass seed. Other control measures include use of weed-free equipment and minimization of ground disturbance. DNRC cooperates with local county weed control boards on management projects and revegetation plans for land-disturbing projects. DNRC has also participated in cooperative projects involving the release of biocontrol agents for knapweed and leafy spurge on forested sites.

Fertilization

Fertilization associated with forest management consists of occasional applications of small amounts of fertilizers to individual planted trees. DNRC applies a few thousand doses of fertilizer annually on lands designated for tree planting. A dose is typically about 1 ounce, and there may be 200 to 300 doses per acre when trees are planted. These applications are designed to increase growth rates or to overcome nutrient deficiencies in the soil. DNRC also uses fertilizer on newly constructed road cuts and fills to promote grass establishment when warranted. The type of fertilizer applied varies based on the soil deficiency at the site, but is generally some combination of nitrogen, phosphorous, and/or potassium.

Forest Inventory

DNRC's forest inventory program is responsible for collecting and analyzing forest resource inventory data across the state. The forest inventory program is also responsible for the development and maintenance of a GIS database to support forest management planning activities and environmental analyses. Forest inventory field activities consist primarily of accessing inventory areas from forest road systems with motorized vehicles, conducting walk-through stand examinations, conducting cruise plots, and collecting other field data. Inventories are completed by both DNRC field staff and contracted employees.

From 1997 through 2002, an average of 47,450 acres of SLI data were collected each year. Most of the inventory field data were collected from within the NWLO and SWLO by DNRC contractors (and their employees). In 2004, the inventory program collected 14,200 acres of SLI data. To date, approximately 1,206,000 acres of forested and non-forested state trust land have been inventoried and mapped.

1.4.4.3 Road Construction, Road Maintenance, and Gravel Sources

Construction, Reconstruction, and Abandonment or Reclamation

Road activities associated with forest management include: construction, reconstruction, abandonment, reclamation, and maintenance. Road maintenance is described in the subsection below.

- Road construction is defined under ARM 36.11.403 (67) as "cutting and filling of earthen material that results in a travel-way for wheeled vehicles."

- Road reconstruction is defined under ARM 36.11.403 (70) as upgrading roads to accommodate proposed use.
- For this HCP, road abandonment refers to the process of making a road impassable and effectively closed (using gates or other barriers), but maintaining the road's drainage structures.
- For this HCP, road reclamation is similar to road abandonment, but road reclamation ~~also includes stabilizing the road bed surface and~~ requires ~~removing~~removal of culverts and other drainage structures.

Road projects are typically conducted through timber sale contracts. If additional roads are required for access to a timber sale area, these roads, including stream crossings, are constructed after contract award. Based on site-specific conditions, different timber sale contracts contain different provisions for post-harvest road management, including abandonment, temporary closure, and long-term maintenance. In recent years, timber sales have involved reconstructing roads more than constructing new roads, and abandonment or reclamation of roads has been uncommon (Table 1-8). DNRC abandons or reclaims roads that are deemed non-essential to near-term future management plans or where unrestricted access would cause excessive resource damage. DNRC determines which roads to abandon or reclaim during project-level analysis. Both abandoned roads and reclaimed roads are left in a condition that is stable and provides for adequate drainage. When DNRC abandons or reclaims a road, it removes and replaces stream crossing structures as appropriate for the proposed road use.

TABLE 1-8. TOTAL AND AVERAGE ANNUAL MILES OF ROAD CONSTRUCTION, RECONSTRUCTION, AND ABANDONMENT OR RECLAMATION THROUGH TIMBER SALE CONTRACTS, 1998 THROUGH 2005

Activity	1998–2000 Total	2001–2005 Total	Annual Average
Road Construction	105.9	149.0	31.9
Road Reconstruction	322.4	206.9	66.2
Road Abandonment or Reclamation	20.5	34.3	6.9

Source: DNRC (2000a, 2005b).

Road Maintenance

Road maintenance is defined under the ARMs as "the maintenance and repair of existing roads that are accessible to motorized use, including but not limited to: blading, re-shaping, or re-surfacing the road to its original condition; cleaning culverts; restoring and perpetuating road surface drainage features; and clearing the road side of brush." Funding for road maintenance is provided by timber sale contracts as well as the forest improvement program. As reported in the 2005 DNRC Monitoring Report (DNRC 2005b), approximately 412 miles of road were maintained on DNRC land statewide between 2001 and 2005. This mileage does not include routine blading and grading. Consequently, the miles of road receiving routine maintenance is considerably higher than that reported in the monitoring report. In 2006, road maintenance activities statewide occurred on 139 miles of road including grading, blading, and snowplowing, as well as some activities that do not lend themselves to reporting by miles, such as removing and maintaining bridges and installing culverts.

Gravel Quarrying

Gravel quarrying as a covered activity is limited to the following actions in support of forest management activities:

- DNRC's development and operation of gravel pits and borrow sites
- DNRC's obtaining, stockpiling, hauling, and unloading gravel from DNRC or non-DNRC borrows or gravel pits.

Third-party gravel pit operators and gravel permit holders using DNRC pits authorized under this strategy would not be covered for incidental take under this Permit. However, these operations would be subject to the limitations on the number of allowable pits and season of use as described for the Stillwater Block, Swan River State Forest, and scattered parcels in grizzly bear recovery zones and non-recovery occupied habitat.

There are three types of gravel quarrying operations associated with forest management activities: borrow, medium pits, and large pits (Table 1-9).

TABLE 1-9. DESCRIPTION OF GRAVEL QUARRYING OPERATIONS ASSOCIATED WITH FOREST MANAGEMENT ACTIVITIES

Operation	Description of Operations
Borrow	Gravel or rock sources consisting of up to 1.0 acre of disturbed area and located within 0.25 mile of an open or restricted road.
Medium Pit	Gravel or rock sources consisting of 1.0 to 4.9 acres of disturbed area.
Large Pit	Gravel or rock sources consisting of 5.0 to 40 acres of disturbed area.

Borrows are small sources of gravel, rock, or fill material within 0.25 mile of open or restricted roads. Size of borrows can range from a small, disturbed area associated with the removal of several cubic yards of material up to larger areas of 1.0 acre. Borrow sites are typically only active during road construction and maintenance work, and are not used regularly as large, long-term sources. Medium pits are sources of gravel or rock involving 1.0 to 4.9 acres of disturbed area. Medium pits receive intermediate levels of use and may be activated periodically to serve as sources for multiple road maintenance and/or construction projects in a given year or across multiple years. Medium pits may include excavating, crushing, sorting, and/or asphalt operations. Large pits are sources of gravel or rock that involve 5 to 40 acres of disturbed area. Typically, no more than 5 acres can be under operation and actively mined at any point in time. Large pits may be activated periodically or continuously to serve as sources for multiple road maintenance and/or construction projects in a given year or across multiple years. Large pits may include mining, crushing, sorting, and/or asphalt operations over 1 or more years. Large gravel pits are typically subject to rules, regulations, and permitting outlined in the Montana Opencut Mining Act (ARMs 17.24.201 through 225) administered by the Montana Department of Environmental Quality (MDEQ).

1.4.4.4 Grazing Licenses

Livestock grazing on trust lands is authorized under grazing licenses issued on classified forest trust lands or grazing leases on classified grazing lands. Grazing as an HCP covered activity is limited to the grazing that occurs on classified forest trust land in the HCP project area. DNRC currently administers approximately 261 grazing licenses on 454 different parcels (covering 198,907 acres) of classified forest trust land statewide. Most of these parcels are located west of the Continental Divide in the NWLO and SWLO.

Grazing licenses are generally issued for 10-year periods, with detailed range condition and capability evaluations completed during license renewal inspections. Grazing evaluations completed during license renewal include assessments of forage utilization, season of use, grazing system, tract conditions, riparian conditions and riparian forage utilization, streambank disturbance, noxious weed occurrence, and range improvements. Stocking rates are evaluated and assessed using guidelines adopted by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). Animal use months for each license are reevaluated every 10 years, prior to reauthorization of the license, and special stipulations and management plans are incorporated into the license agreements, if necessary.

Midterm evaluations of range and riparian conditions are completed for grazing licenses as directed under the SFLMP and ARMs. Practices that lead to an unacceptable level of impacts to riparian vegetation, damage stream banks, cause channel instability, or do not promote diverse and healthy riparian plant communities are identified as problems in need of remedial action. A grazing coarse-filter methodology has been developed using both numeric and narrative criteria to describe the general acceptable levels of use and impact. However, while these standards provide a useful reference point in identifying potential problems and determining relative risk, indices of healthy and functioning riparian communities, stream bank stability, and acceptable levels of impact are ultimately determined on a site-specific basis.

1.5 DNRC'S IDENTIFICATION OF IMPACTS THAT HAVE THE POTENTIAL TO CONSTITUTE "TAKE" UNDER THE HCP

Prior to issuing the Permit, the USFWS must determine the amount of incidental take that will be authorized under the Permit. To that end, DNRC with technical assistance from the USFWS, has determined: (1) how incidental take will be calculated and limited under the HCP, and (2) the level of take and related impacts expected to result from the covered activities. This analysis is provided in Chapter 7 (DNRC's Identification of Impacts that Have the Potential to Constitute Take under the HCP).

1.6 MINIMIZATION AND MITIGATION TO THE MAXIMUM EXTENT PRACTICABLE

The HCP issuance criteria require DNRC to demonstrate that the impacts of the proposed incidental take is minimized and mitigated to the maximum extent practicable. For the purposes of this HCP, to minimize an impact means to reduce the effect to the smallest possible amount or degree and to mitigate an impact means to alleviate the effect or moderate the force or intensity of the effect. Minimizing an impact might be accomplished by:

- Avoiding the impact (i.e., restricting certain activities during sensitive times for the affected species)
- Reducing or lessening the impact (i.e., limiting the duration of an activity or the types of activities that may occur and where they may occur).

Mitigating an impact might be accomplished by:

- Compensating for the impact, such as replacing or providing substitute resources
- Rectifying the impact by repairing, rehabilitating, or restoring the affected resource.

Table 1-10 shows the HCP commitments that comprise a minimization and mitigation program that is intended to meet issuance criteria. The USFWS must also determine that DNRC has minimized and mitigated incidental take to the maximum extent practicable. DNRC has identified some factors that define maximum extent practicable for its program. These factors are described in Section 1.3.1 (Trust Obligations and Fiduciary Responsibilities) and Section 1.3.2.3 (DNRC Practicability Considerations).

TABLE 1-10. SUMMARY OF THE PROPOSED MINIMIZATION AND MITIGATION COMMITMENTS COMPRISING THE CONSERVATION STRATEGIES FOR GRIZZLY BEARS, LYNX, AND AQUATIC SPECIES

Biological Objectives	Minimization and Mitigation Commitments
Grizzly Bears	
Promote safety of humans and bears	PR1[1] – Develop educational program (brochures and training).
	PR2 – Restrict firearm use by employees and contractors (and their employees).
	PR3 – Require proper food storage and sanitation for employees and contractors (and their employees).
	NR4 – Limit distance to cover to no greater than 600 feet for clearcut or seed tree harvest designs.
	NR5 – Develop minimization measures for small livestock grazing licenses.
	RZ2 – Retain visual screening on open roads and clearcut and seed tree units.
	RZ4 – Prohibit new small livestock grazing licenses. Do not initiate establishment of new grazing licenses.
	ST1, SW1 – Install interpretive signs about bear presence.
Minimize displacement of bears from suitable habitat, and provide security through access management	PR5 – Suspend activities near den sites.
	PR8, CY5 – Minimize disturbance from helicopter use.
	NR1 – Minimize construction of open roads.
	NR2, RZ6 – Discourage easements with private parties. Screen granting of easements and implement minimization measures in agreements.
	NR3, ST4, CY3 – Restrict management activities in the spring season.
	NR6, ST5, SW5, SC4 – Limit size, number, and period of operation of gravel pits.
	RZ3 – Maintain road closures. Examine all primary road closures annually, and repair ineffective closures within 1 year.
	RZ5 – Implement seasonal restrictions on activities in post-denning habitat.
	ST2, SW3, SC2 – Rest specified lands for 8 years following 4 years active management.
	ST3, SW4, SC3, CY1, CY2 – Allow one salvage harvest requiring 31 to 150 days per 8-year rest period. Various minimization measures apply.

TABLE 1-10. SUMMARY OF THE PROPOSED MINIMIZATION AND MITIGATION COMMITMENTS COMPRISING THE CONSERVATION STRATEGIES FOR GRIZZLY BEARS, LYNX, AND AQUATIC SPECIES (CONTINUED)

Biological Objectives	Minimization and Mitigation Commitments
	SW1 – Manage transportation systems to limit new roads and close or restrict existing roads. Apply spring restrictions on more activities to an additional 41 miles of existing road. All new roads (70.3 miles) would have restricted access and would be subject to spring restrictions. SC1, CY4 – Open road reduction program. ST1 – Manage transportation systems to limit new roads and close or restrict existing roads. Manage 18 miles of existing open roads as restricted roads. Apply spring restrictions to an additional 107 miles of existing road. All new roads (19.3 miles) would have restricted access, most of which (10.5 miles) would also be subject to spring restrictions.
Contribute to recovery	Addressed through the geographic hierarchy of the commitments, whereby greater restrictions apply adjacent to other land ownerships actively managing for bears. SW2 – Collaborate with adjacent landowners.
Promote habitat connectivity	PR6 – Retain cover to provide visual screening in RMZs and WMZs. NR1 – Minimize construction of open roads. NR3, ST4, CY3 – Restrict management activities in the spring season. RZ2 – Retain visual screening on open roads and clearcut and seed tree units. SC1, CY4 – Implement open road reduction program. ST2, SW3, SC2 – Rest specified lands for 8 years following 4 years active management. Existing Swan Agreement
Maintain important habitat features	PR4 – Reduce road construction in RMZs, WMZs,~~riparian zones~~ and avalanche chutes. PR5 – Suspend activities near den sites. PR6 – Retain cover to provide visual screening in RMZs and WMZs. PR7 – Comply with biennial weed agreements with county weed boards at DNRC gravel pits. RZ1 – Consider habitat needs in designing timber sale layouts. ST2, SW3, SC2 – Restrict management in rested areas in winter above 6,300 feet elevation.
Increase DNRC understanding of bear habitat quality in managed forests	Achieved through DNRC monitoring commitments outlined in Chapter 4 (Monitoring and Adaptive Management) of this HCP, including requirement to prioritize evaluation of Swan River State Forest and Stillwater Block transportation plans.
Canada Lynx	
Minimize den site disturbance	HB3 – Prohibit activities near active den sites.
Map potential lynx suitable habitat	HB1 – Establish and maintain a lynx habitat map.
Provide habitat elements for prey species	HB2 – Retain CWD in timber sale designs. HB4 – Retain foraging habitat during pre-commercial thinning activities.
Retain CWD and other denning attributes	~~HB2 – Retain den site attributes in timber sale designs.~~ ~~HB2 – Construct man-made structures for den sites.~~ HB2 – Retain CWD in timber sale designs and on blowdown salvage units, leave 1 percent unsalvaged.
Limit conversion of suitable habitat in LMAs	LM2 – Limit habitat conversion in LMAs from potential to non-suitable to 15 percent per decade.

TABLE 1-10. SUMMARY OF THE PROPOSED MINIMIZATION AND MITIGATION COMMITMENTS COMPRISING THE CONSERVATION STRATEGIES FOR GRIZZLY BEARS, LYNX, AND AQUATIC SPECIES (CONTINUED)

Biological Objectives	Minimization and Mitigation Commitments	
Ensure adequate amounts of foraging habitat in LMAs	LM1 – Maintain lynx habitat in LMAs in a 65/35 percent suitable/temporary non-suitable habitat ratio. LM3 – Maintain 20 percent of total habitat as winter foraging habitat. LM3 – Retain 20 percent of pre-commercial thinning projects targeting saplings in lynx habitat in an unthinned condition.	
Provide for habitat connectivity	HB5 – Design timber harvest units to maintain habitat connectivity.	
Maintain suitable habitat outside LMAs	HB6 – Maintain lynx habitat in a 65/35 percent suitable/temporary non-suitable habitat ratio on scattered parcels at the land office scale.	
Aquatic Species		
Riparian Timber Harvest Strategy		
Temperature, Sedimentation, Habitat Complexity, Channel Form and Function	RM1 — Class 1 streams and lakes ~~supporting HCP fish species~~	Establish RMZ with a minimum of one ~~SPTH~~100-year site index tree height. Maintain 50-foot no-harvest buffer. Outside buffer, retain shrubs, sub-merchantable trees, and 50 percent of trees greater than 8 inches dbh. Extend SMZ to incorporate adjacent wetlands. Extend RMZ on streams supporting HCP fish species where CMZ influences riparian functions. Do not develop gravel pits within SMZs. For borrow sites in SMZs, DNRC water resource specialist to develop measures to minimize risk of sediment delivery. Allow one medium non-reclaimed pit within the portion of RMZ extending beyond the SMZ in both the Stillwater Block and Swan River State Forest.
	~~RM1 — Tier 1 streams and lakes supporting non-HCP fish species~~	~~Implement existing rules, BMPs, and SMZ Law.~~
	RM2 – ~~Tier~~ Class 2 and 3 streams	Implement existing rules, BMPs, and SMZ Law.
	~~RM3 – Tier 3 streams~~	~~Implement existing rules, BMPs, and SMZ Law.~~
Sediment Delivery Reduction Strategy		
Temperature, Sedimentation, Habitat Complexity, Channel Form and Function	SD1	Implement transportation planning to minimize new roads and consider alternative yarding systems. Implement transportation planning to relocate roads in SMZs.
	SD2	Inventory roads and rank sites in need of corrective action – high, medium, low risk. Correct high-risk sites on bull trout systems where DNRC has access and sole ownership within 15 years of HCP implementation and, for other HCP fish species, within 25 years.
	SD3	For new roads, avoid sites prone to mass failure. When contract administration identifies unacceptable impacts, implement mitigation or rehabilitation measures. Administer road projects in watersheds supporting HCP fish species weekly to avoid and reduce potential for impacts. For new roads required on unstable sites, incorporate site-specific measures to reduce the risk of a mass failure. Ensure unnecessary roads that are abandoned or reclaimed will require no further maintenance. Resource specialist to review of specified activities in watersheds supporting HCP fish species.

TABLE 1-10. SUMMARY OF THE PROPOSED MINIMIZATION AND MITIGATION COMMITMENTS COMPRISING THE CONSERVATION STRATEGIES FOR GRIZZLY BEARS, LYNX, AND AQUATIC SPECIES (CONTINUED)

Biological Objectives		Minimization and Mitigation Commitments
	SD4	For projects with harvest greater than 100 mbf within HCP fish species watersheds, resource specialist to develop operating requirements and restrictions, special requirements and restrictions, and BMPs to avoid and minimize risk of sediment delivery. If needed for projects with harvest greater than 100 mbf within HCP fish species watersheds, resource specialist to develop site-specific measures to mitigate the risk of sediment delivery.
	SD5	Design and implement site-specific BMPs and other mitigation measures to reduce the risk of sediment delivery to streams affecting HCP fish species from all gravel pits. Comply with biennial weed agreements with county weed boards at DNRC gravel pits. Prohibit gravel pits within SMZs. If borrows occur in SMZs, measures to minimize risk of sediment delivery would be developed by a DNRC water resource specialist and would be integrated into the development of contract specifications or permits. Prohibit gravel pits within RMZs. If borrows occur in RMZs, measures to minimize risk of sediment delivery would be developed by a DNRC water resource specialist and would be integrated into the development of contract specifications or permits. In the Stillwater Block and the Swan River State Forest, only one medium non-reclaimed gravel pit is allowed within the portion of an RMZ that extends beyond the SMZ.
Fish Connectivity Strategy		
Connectivity, Channel Form and Function	FC1	Inventory connectivity for all streams supporting HCP fish species, and prioritize needed improvements. In the course of replacing culverts on streams supporting HCP fish species, implement minimization measures.
Grazing Strategy		
Temperature, Sedimentation, Habitat Complexity, Channel Form and Function	GR1	Inspect all licenses on a 5-year cycle. Evaluate and rank potential problems on licensed lands. Field-verify potential problem sites within 1 year of completing evaluations. Continue identification of problem sites. Implement corrective actions within specified timeframe.
Cumulative Watershed Effects (CWE) Strategy		
Temperature, Sedimentation, Habitat Complexity, Channel Form and Function, Connectivity	CW1	Through CWE evaluations, set water quality thresholds to ensure compliance with water quality standards and protection of beneficial water uses.

[1] Commitments are numbered and coded according to the HCP species they address and category of commitment under which they fall as described in Chapter 2 (Conservation Strategies) (e.g., GB-PR2 is the second program-wide commitment in the grizzly bear strategy).

BMP = best management practice; CMZ = channel migration zone; CWD = coarse woody debris; CWE = cumulative watershed effects; dbh = diameter at breast height; LMA = lynx management area; mbf = thousand board feet; RMZ = riparian management zone; SMZ = streamside management zone; WMZ = wetland management zone

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Chapter

Conservation Strategies

2 CONSERVATION STRATEGIES

The conservation commitments were developed by DNRC with the technical assistance of the USFWS. The process used to develop the commitments is described in Chapter 1 (Introduction). In this chapter, biological goals, objectives, strategies, conservation commitments, and rationale are included for each HCP species: grizzly bear, lynx, bull trout, westslope cutthroat trout, and Columbia redband trout. The monitoring commitments that directly relate to the conservation commitments are described in Chapter 4 (Monitoring and Adaptive Management). Refer to Chapter 11 (Glossary) for definitions of terms used in this chapter.

The conservation strategies and commitments were developed to meet the biological goals and objectives for the five HCP species in the HCP project area while balancing the requirements of the issuance criteria with the DNRC's trust mandate as reflected in the following guiding principles for development of conservation strategies and commitments:

1. Maximize long-term revenue to trust beneficiaries through intensive forest management while providing for healthy and diverse forests.
2. Avoid, minimize, and/or mitigate the impacts of any incidental taking of HCP species due to habitat alteration and disturbance related to forest management activities, recognizing that opportunities to provide for habitat needs of species are influenced by the trust mandate, DNRC ownership patterns, and the capability of differing landscapes to sustain species.

DNRC acknowledges the various inherent land management constraints associated with diverse land ownership patterns and differing objectives. Therefore, DNRC places greater conservation emphasis where it has the greatest level of control over large blocks of land that provide large and diverse areas of habitat for ~~listed~~HCP species. Conservation on these lands is further enhanced by their proximity to federal lands where active recovery efforts are most likely to be successful. On scattered parcels, where state lands are intermingled with private lands, the type and extent of mitigations reflect the constraints imposed by proximity to private urban and rural lands. DNRC does not consider scattered parcels as less valuable to overall biological goals, but believes surrounding land uses are an important consideration when developing effective, practical mitigation approaches.

2.1 TERRESTRIAL CONSERVATION STRATEGIES

2.1.1 Grizzly Bear Conservation Strategy

DNRC manages state trust lands located within grizzly bear habitat, and this conservation strategy specifies appropriate conservation commitments to support federal grizzly bear recovery efforts.

In addition to developing an HCP, DNRC participates in the Interagency Grizzly Bear Committee (IGBC) – Northern Continental Divide Ecosystem (NCDE) Subcommittee to align DNRC bear conservation with the *Grizzly Bear Recovery Plan* (USFWS 1993), as appropriate within DNRC's mission and legal mandates. The IGBC was created in 1983 to lead grizzly bear recovery in the contiguous United States.

The Swan River State Forest presents a unique scenario for grizzly bear management. Thus, DNRC is also presently a signatory party to the Swan Valley Grizzly Bear Conservation Agreement (Swan Agreement), an existing multi-party conservation agreement for grizzly bears in the Swan Valley (USFWS et al. 1995). The Swan Agreement provides a conservation framework for grizzly bears for intermingled land ownership in the valley. Cooperators currently include DNRC, Plum Creek Timber Company (hereafter referred to as Plum Creek), the Flathead National Forest, and the USFWS. In the Swan River State Forest, DNRC will continue to manage grizzly bears under the existing Swan Agreement. Should the Swan Agreement be terminated during the Permit term, DNRC would implement the HCP commitments for the Swan River State Forest for grizzly bears (described below). The HCP commitments described in this chapter for lynx and ~~bull trout~~the HCP fish species will be in effect in the Swan River State Forest upon issuance of the Permit and are not contingent upon termination of the Swan Agreement covering grizzly bears.

In addition to sitting on many collaborative working groups that focus on grizzly bear conservation and recovery, DNRC's commitment to species conservation also includes being familiar with other resource agencies' conservation efforts and planning documents. DNRC has reviewed *Montana's Comprehensive Fish and Wildlife Conservation Strategy* (Montana Fish, Wildlife and Parks [MFWP] 2005) and believes that the conservation strategies proposed in this HCP would complement grizzly bear conservation strategies set forth in MFWP's plan.

These efforts demonstrate DNRC's ongoing involvement and commitment toward federal grizzly bear recovery efforts.

2.1.1.1 Goals and Objectives

The goal of the grizzly bear conservation strategy is to support federal grizzly bear conservation efforts by providing quality seasonal habitat and avoiding or minimizing bear-human conflicts. The objectives outlined below provide the specific framework and key commitments that are developed more fully within the strategy to achieve this goal. The specific biological objectives of this strategy are to:

- Promote safety for humans and bears in the HCP project area through vegetation management constraints, comprehensive sanitation policy, education, and livestock grazing measures.
- Minimize displacement of grizzly bears from suitable habitat and provide for seasonal habitat use and security through overall access management.
- Contribute to grizzly bear recovery where the conservation of seasonally important grizzly bear habitat would complement federal efforts.
- Promote grizzly bear habitat connectivity where the HCP project area occurs in important locations.
- Maintain important habitat features, including den sites, avalanche chutes, lush riparian areas, and locations that produce high volumes of forage.
- Increase DNRC's understanding of grizzly bear habitat quality in managed forests through HCP monitoring and voluntary cooperation in research programs as funding and budgets allow.

2.1.1.2 Geographic Scope

DNRC's HCP project area includes approximately 147,845 acres located within the boundaries of the NCDE, approximately 6,174 acres within the Cabinet-Yaak Ecosystem (CYE), 182 acres in the Bitterroot Ecosystem (BE), and 0 acres within the Greater Yellowstone Ecosystem (GYE); these ecosystems are federally designated grizzly bear recovery zones. The BE is considered unoccupied at this time. The HCP project area also includes approximately 112,711 acres of habitat located outside the grizzly bear recovery zones, which is currently considered occupied by grizzly bears (Wittinger 2002). These lands, herein referred to as non-recovery occupied habitat (NROH), are associated with the NCDE, CYE, and GYE.

Appendix C, Figure C-2 shows the location of the HCP project area and other DNRC lands within the NWLO, SWLO, and CLO relative to the boundaries of grizzly bear recovery zones and NROH. Table 2-1 indicates approximate acreages of DNRC ownership within grizzly bear recovery zones and NROH covered under the HCP by DNRC administrative unit.

TABLE 2-1. APPROXIMATE ACRES OF DNRC OWNERSHIP WITHIN GRIZZLY BEAR RECOVERY ZONE AND NROH IN THE HCP PROJECT AREA BY ADMINISTRATIVE UNIT

DNRC Administrative Unit and Grizzly Bear Recovery Zone	Acres in Recovery Zone	Acres in NROH
NCDE		
Anaconda Unit	0	4,709
Clearwater Unit	4,781	35,990
Conrad Unit	0	0
Helena Unit	639	5,931
Kalispell Unit	7,079	5,965
Missoula Unit	2,478	648
Plains Unit	0	2,806
Stillwater Unit (Blocked)[1]	90,673	0
Stillwater Unit (Scattered)	2,494	16,826
Swan Unit (Blocked)	39,699	0
Swan Unit (Scattered)	0	0
CYE		
Libby Unit	2,861	9,865
Plains Unit	3,313	2,257
BE[2]		
Hamilton Unit	0	NA
Missoula Unit	182	NA
GYE		
Dillon Unit	0	19,582
Bozeman Unit	0	8,132
Total	**154,201**	**112,711**

[1] Includes blocked portions of the Stillwater and Coal Creek State Forests.
[2] The Bitterroot Ecosystem (BE) is currently considered to be unoccupied by grizzly bears.
BE= Bitterroot Ecosystem.
CYE = Cabinet-Yaak Ecosystem.
NCDE = Northern Continental Divide Ecosystem.
GYE = Greater Yellowstone Ecosystem.
Source: DNRC (2008a).

Lands in the HCP project area are positioned in various spatial arrangements. These arrangements include (1) blocked lands, which are grouped parcels comprising greater than 15,000 acres and can be a series of parcels in a checkerboard pattern or parcels adjacent to or in proximity of each other; and (2) scattered parcels, which are not part of blocked lands and are typically comprised of a section or parcel(s) smaller than one section. Neighboring ownerships include industrial timberland, tribal lands, national parks, U.S. Forest Service (USFS) lands, U.S. Bureau of Land Management (BLM) lands, other state lands, and private lands.

Because of the unique pattern of DNRC's land ownership, some of the conservation commitments apply to the entire HCP project area, whereas other measures are applicable only to parcels in specific locations in relation to grizzly bear recovery zones and NROH. Therefore, the grizzly bear conservation strategy is divided into the following categories to reflect this diverse ownership pattern and administrative boundaries important for conservation of grizzly bears:

1. Program-wide Commitments – Conservation commitments that apply to the entire HCP project area.
2. NROH Commitments – Conservation commitments that apply to all scattered parcels in the HCP project area within NROH (Wittinger 2002)—this includes portions of the Stillwater, Anaconda, Bozeman, Clearwater, Libby, Helena, Kalispell, Missoula, Plains, and Dillon Units, as well as scattered parcels and blocked lands in recovery zones within the HCP project area.
3. Recovery Zone Commitments – Conservation commitments that apply to the HCP project area within grizzly bear recovery zones, including only the NCDE and CYE at this time.
4. Stillwater Block Commitments – Conservation commitments specific to the blocked portions of the Stillwater and Coal Creek State Forests, hereafter referred to as the Stillwater Block.
5. Swan River State Forest Commitments – Conservation commitments specific to the Swan River State Forest.
6. Scattered Parcels in Recovery Zones Commitments – Conservation commitments specific to scattered parcels within grizzly bear recovery zones—this includes portions of the Stillwater, Clearwater, Libby, Helena, Kalispell, Missoula, and Plains Units.
7. CYE Commitments – Conservation commitments specific to the CYE recovery zone and NROH associated with the CYE recovery zone, which includes the Libby and Plains Units.

The list above starts by identifying the commitments that apply to the entire HCP project area and then progressively identifies higher levels of commitments that are applied to various areas as the likelihood of grizzly bear presence and the need for conservation increase. The progression culminates with the highest levels of DNRC conservation being placed on the HCP project area within the grizzly bear recovery zones, including the Stillwater Block, the Swan River State Forest, and numerous scattered parcels, including lands in the CYE (categories 3 through 7 above).

The grizzly bear conservation strategy consists of the following commitments, developed by DNRC with the technical assistance of the USFWS. These commitments are presented in separate sections that follow the progressive list of seven commitment categories presented above.

2.1.1.3 Program-wide Commitments

Program-wide commitments apply to all forest management activities DNRC authorizes in the HCP project area.

GB-PR1 Information and Education

DNRC will provide the following:

1. Written brochures that describe risks and concerns regarding humans living and working in bear habitat to contractors and their employees conducting forest management activities prior to start of operations.
2. Bear encounter avoidance training for new DNRC personnel within 1 year of their employment date, refreshing the training for veteran employees every 5 years.

Rationale: Working and camping in bear habitat poses risks for both grizzly bears and humans. Sharing consistent messages with contractors and their employees on a frequent basis, through an active information and education program, will help reduce the risks of surprise encounters resulting in subsequent grizzly bear mortality. Training will address topics such as avoiding bears, using bear repellent, being aware of seasonal habitats important for bears, and properly storing food outdoors.

GB-PR2 Firearms Restriction

DNRC employees and contractors and their employees are prohibited from carrying firearms while on duty, unless the person is specifically authorized to carry a firearm under DNRC Policy 3-0621.

Rationale: The firearms restriction reduces the likelihood that a grizzly bear would be shot by anyone conducting forest management activities on trust lands. Bears are illegally shot for trophies, through vandalism, in response to aggressive behavior near humans, and because of misidentification by hunters (Knight et al. 1988; Mace and Waller 1998; McLellan 1998; McLellan et al. 1999). The Forest Management ARMs currently prohibit contractors and their employees from carrying firearms when operating in the Stillwater Block (ARM 36.11.432(1)(m)), on scattered parcels in the NCDE and CYE recovery zones (36.11.433(1)(d)), and as well as in the Swan River State Forest (per the Swan Agreement). Additionally, DNRC employees are not allowed to carry or transport firearms on their person or in state vehicles under existing policy (Montana Department of Administration 1997). Under DNRC Policy 3-0621, *DNRC Guidelines on the Transporting or Carrying of Firearms*, effective May 20, 1999, the Director of DNRC may authorize specific individuals for a specific period of time and in specific situations to transport or carry firearms during fieldwork. This policy requiring written authorization would remain in effect under the HCP.

GB-PR3 Food Storage and Sanitation

DNRC personnel will adhere to the following requirements, and will incorporate these requirements in contracts for contractors and their employees who conduct forest management activities or camp in the HCP project area.

1. Human or pet food, livestock food, garbage, and other attractants will be stored in a bear-resistant manner.
2. Burnable attractants (such as food leftovers or bacon grease) will not be buried, discarded, or burned in an open campfire.

Rationale: Bears are attracted to garbage locations and human foods. Habituating them to unnatural foods can result in risks to human life, property damage, death of individual bears, or indirect mortality by putting bears at greater risk. When such events occur, the problem bears are typically removed. Bear-human conflicts at dumps and campgrounds led to the relocation of 12 of 81 studied bears in Yellowstone—second only to conflicts associated with residences and human developments (Blanchard and Knight 1995 *in* WADNR 2001:12). Bears trapped for management purposes at least once had a mortality rate nearly twice that of bears that had never been trapped (Pease and Mattson 1999 *in* WADNR 2001:12). Bears that have come in contact with humans only once during a poor forage season also exhibit a higher mortality rate in future years (Meagher and Fowler 1989 *in* WADNR 2001:12). Attraction of grizzly bears to improperly stored food and garbage is one of the six major categories of human-caused mortality identified in the USFWS' *Grizzly Bear Recovery Plan* (USFWS 1993:5).

No grizzly bear-human conflicts have been reported on DNRC projects during the past 10 years. However, as forest management activities occur in bear habitat, measures to inform DNRC personnel and contractors and their employees about bear conditioning will further decrease the probability of bear-human conflicts. Through DNRC contract language, there is an opportunity to address this issue and provide enforceable language in contracts covering forest management activities. DNRC and the USFWS recognize that human foods and attractants can be stored securely in a number of ways without necessarily requiring a specialized food container. It would be up to individual employees to ensure that foods are adequately stored. This commitment applies to individuals conducting defined forest management activities and does not include management of recreation areas, campgrounds, etc., which are not covered activities under this HCP, because they are outside the forest management program.

GB-PR4 New Open Road Construction in Riparian Areas and Avalanche Chutes

DNRC will minimize construction of new open roads in ~~riparian zones~~riparian management zones (RMZs), wetland management zones (WMZs), and avalanche chutes. In instances where construction of a new open road in an ~~riparian zone~~RMZ, WMZ, or avalanche chute is necessary for project or near-term management objectives, DNRC will document the circumstances in the Montana Environmental Policy Act (MEPA) environmental analysis. The ~~necessity~~ allowance to construct a new open road in an ~~riparian zone~~RMZ, WMZ, or avalanche chute would occur on no more than 10 percent of the DNRC projects ~~in any year~~averaged over a 5-year reporting period in the HCP project area.

Rationale: Habitat features consistently described in the literature as favored by bears include avalanche chutes (Zager et al. 1983; Mace et al. 1996; Waller and Mace 1997; Ramcharita and McLellan 2000; McLellan and Hovey 2001), fire-mediated shrub fields (Almack 1985, 1986; Hamer and Herrero 1987a,b; McLellan and Hovey 2001), and riparian areas (Servheen 1983; McLellan and Hovey 2001). Upon emerging from their dens in spring (May or June), grizzly bears are nutritionally stressed, having undergone a winter of general inactivity. As a result, their habitat use patterns during the spring, summer, and fall are driven by the need to maximize energy intake, or fatten up, to prepare for the next winter torpor. By minimizing construction of new open roads in riparian areas and avalanche chutes, DNRC can reduce displacement risk for grizzly bears using such areas, thus allowing bears continued use of these important habitats during important seasons, resulting in improved nutritional condition.

GB-PR5 Active Den Site Protection

DNRC will suspend all motorized forest management activities within 0.6 mile (1 kilometer) of an active den site from the date of discovery through May 31.

~~**Allowance:**~~

If DNRC confirms that bears have vacated the den site vicinity prior to May 31, DNRC may proceed with the suspended activities.

Rationale: Bears generally appear to tolerate motorized activities that occur more than 1 kilometer (0.6 mile) from the den (Linnell et al. 2000). There is some indication that close encounters with dens can cause physiological stress (Reynolds et al. 1984) or, in some cases, den abandonment (Swenson et al. 1997). Bears often stay near den sites (particularly sows with cubs) after they become active in spring, and they may occasionally re-enter dens. To avoid displacement of bears, firm evidence that bears have left an active den site is an important consideration prior to startup of activities. Confirmation that bears have vacated a den site would typically involve radio-collared individuals known to have traveled several miles from their den site. Allowing activities near an active den site prior to May 31 would require sound, documented evidence that bears have moved to spring habitat. Locating dens with radio-collared bears can be difficult and expensive, even under good monitoring conditions. Thus, it is understood by both parties that locating dens over time is expected to occur opportunistically as DNRC is made aware of them. Under this measure, no consistent, formal survey efforts are being proposed. DNRC expects that active dens would most likely be encountered sometime after November 1 in any given year. This commitment would apply from the date of discovery until May 31 of the following spring.

GB-PR6 Retention of Visual Screening in Riparian and Wetland Management Zones

DNRC will provide visual screening for grizzly bears in ~~riparian zones~~RMZs through the implementation of the HCP aquatic riparian timber harvest conservation strategy (see Section 2.2.3.1), and in WMZs through implementation of the Forest Management ARMs ~~pertaining to WMZs~~ (ARM 36.11.426).

Rationale: The intent of this measure is to maintain coniferous and herbaceous vegetation to help impede human detection of bears near riparian areas and ~~WMZs~~wetlands, which can be important, productive foraging areas during much of the non-denning period. This measure is intended to minimize habitat quality reductions of such areas while allowing limited removal of commercial timber to accomplish DNRC harvest objectives. This measure is also intended to provide visual screening in important foraging areas to lower risk of direct bear mortality caused by mistaken identity or malicious actions.

GB-PR7 Noxious Weed Control at Gravel Pits

DNRC gravel pits will comply with biennial agreements established with county weed boards. Noxious weeds will be managed using an integrated weed management approach. Such practices include, but are not limited to: (1) the use of weed-free equipment; (2) re-vegetation of disturbed areas with site-adapted species, including native species as available; (3) biological control measures; (4) chemical methods as appropriate; and (5) other stipulations and control measures included in timber sale contracts and Plans of Operations (as required under ARM 17.24.217). Non-vegetated areas associated with large gravel pits may not exceed 40 acres.

Rationale: By addressing noxious weeds and restricting the size of the area that may occur in a non-vegetated condition, potential impacts on native food species, available habitat, and forest cover are expected to be minimized.

GB-PR8 Helicopter Use

DNRC will design helicopter operations requiring flights less than 500 meters (1,640 feet) above ground level for forest management activities in a manner that avoids or minimizes flight time over known seasonally important areas in NROH or recovery zones, scattered parcels in rest in recovery zones, grizzly bear subzones in rest in recovery zones, and/or federally designated security core areas in recovery zones. Where practicable, DNRC will design flight paths less than 500 meters (1,640 feet) above ground level to occur at least 1 mile from such areas.

Rationale: Similar to other motorized activities, helicopters can disturb grizzly bears and/or displace them from preferred areas (McLellan and Shackleton 1989a). On an infrequent basis, DNRC incorporates log yarding with helicopters to access harvested timber in otherwise inaccessible terrain and/or areas in which road construction and maintenance are not feasible. From 1998 to 2005, the statewide annual amount of DNRC's harvest units logged using helicopter equipment ranged from approximately 160 to 320 acres (DNRC 2005b), which corresponds to a range of 2 to 4 percent of total harvest, respectively, based on an approximate statewide total harvest of 8,000 acres per year. Only a portion of these units would have occurred on HCP project area lands within grizzly bear recovery zones.

Over the past 2 years (2008 to July 2010), no DNRC timber sales included helicopter logging units. On rarer occasions, DNRC has used helicopters to accomplish various other short-duration forest management activities. Such activities could include weed control, prescribed burning ignition and control efforts, aerial seeding, and moving large pieces of equipment or materials to remote and/or rugged locations. Such administrative activities rarely occur and are of short duration (i.e., 1 to 2 days of operating time). While helicopter use for forest management is infrequent, the associated disturbance can have adverse effects on grizzly bears.

Research findings regarding helicopter disturbance have been mixed (USFS and USFWS 2009), and the significance of the effects can be influenced by a number of factors, including the (1) proximity of the action to the species, (2) distribution of the activity across the landscape, (3) timing of the activity, (4) nature of the effect, (5) duration of the disturbance, (6) frequency of the disturbance, (7) intensity of the disturbance, and (8) severity of the disturbance. Evaluation of the frequency, altitude, and duration of helicopter trips are key considerations for evaluating potential effects on grizzly bears.

According to a 2009 guide developed by the USFS and USFWS (2009) to address activities involving helicopter use on federal lands, the following levels of effects are likely based on altitude, frequency, and duration:

- Flights more than 500 meters (1,640 feet) above ground level with no landings are likely to have minimal effects on grizzly bears, regardless of their frequency and duration.
- Low-altitude flights less than 500 meters (1,640 feet) above ground level are likely to elicit a response by bears, which may result in adverse effects to varying degrees depending on their frequency and duration.

In areas where grizzly bears are present, helicopter yarding associated with DNRC's logging activities are likely to disturb bears because flights tend to occur less than 500 meters (1,640 feet) above ground level, activities typically involve frequent trips for several days up to several months at a time, and flights usually require periodic service landings. Thus, this commitment would avoid or minimize the potential for disturbance and displacement from important habitats, particularly those associated with quiet areas in rest and federally designated secure habitat. In areas where grizzly bears are present and where DNRC would conduct short-duration activities for administrative purposes, the activities are likely to disturb and effect bears for brief, infrequent periods (less than 2 consecutive days) because flights would tend to occur less than 500 meters (1,640 feet) above ground level with several repeated trips and landings. However, because these activities would be of short duration, they would be much less likely to adversely affect grizzly bears, particularly given the measures contained in this commitment.

2.1.1.4 Non-recovery Occupied Habitat Commitments

In addition to the program-wide commitments, the following NROH commitments apply to the grizzly bear NROH as defined by Wittinger (2002). While DNRC recognizes that this boundary may change over time, the intent is to apply the following commitments within the NROH boundary as specified within Wittinger (2002) for the term of the Permit.

GB-NR1 New Open Road Construction

DNRC will minimize construction of new open roads. New roads will only be managed as open when necessary to meet project or near-term management objectives. Existing roads that are restricted will generally remain restricted, except in cases where access easements are granted. There is no target or cap on total road densities.

Rationale: Consistently, descriptions of grizzly bear habitat use and population dynamics emphasize the grizzly bear's need for isolation from humans and human-associated activities (Archibald et al. 1987; Mattson et al. 1987; McLellan and Shackleton 1988, 1989b; Kasworm and Manley 1990; Mace et al. 1996, 1999). Grizzly bears have evolved life-history strategies that depend on high survival rates of adults. In the Rocky Mountains, the overwhelming majority of adult deaths are caused by humans (Mace and Waller 1998; McLellan et al. 1999; Benn and Herrero 2002; Wakkinen and Kasworm 2004; Haroldson et al. unpublished data). Limiting human activity in grizzly bear habitat is intended to ensure that survival rates remain high enough to balance relatively low reproductive rates.

In particular, the presence of roads has been shown in a number of North American studies to either lessen the effectiveness of habitat near the roads if grizzly bears are displaced by the roads, or to increase mortality risk to grizzly bears if they are not displaced by the roads (either directly through shooting or indirectly through habituation, leading to subsequent death in a control action). Some analyses have suggested that even unused roads lessen the effectiveness of nearby habitat for grizzly bears (Mace et al. 1999). In contrast, Wielgus et al. (2002) found that, although grizzly bears used areas near public roads less than expected, male grizzly bears did not avoid closed roads, and both male and female grizzly bears did not avoid roads used only for forestry operations. Additionally, a radio-collared survey of 10 grizzly bears (six male and four female) in the Swan Valley from 2001 to 2005 demonstrated broad use of the valley and tolerance of high road densities (Hicks et al. 2010). ~~Non-motorized recreation can also displace grizzly bears from preferred feeding areas (Mace and Waller 1996; White et al. 1999; Graves 2002).~~

The intent of this measure is to reduce the displacement risk to grizzly bears from open roads. Additional open roads would be needed during the 50-year Permit term for DNRC to address access needs of other state, county, federal, and private entities on neighboring ownerships; to access parcels DNRC does not currently have access to through necessary granting of reciprocal easements; and to provide access within parcels in areas where new open roads are necessary or would be difficult to close effectively. DNRC must retain the ability to issue easements across state lands. Specific easement needs are not known at this time and are difficult to anticipate. To a limited extent, DNRC can maintain restricted roads it has complete control over as restricted. DNRC can also restrict most newly constructed roads. However, there are situations where the amount of open roads would increase by leaving newly constructed roads open or by opening currently restricted roads. This is expected to be the exception rather than the rule and will be minimized while taking into account project, access management, and land management objectives.

Restricted and temporary roads in use for commercial forest management activities are not considered as open in the context of HCP commitments. They may, however, be considered as open by DNRC, at their discretion, for the purpose of quantifying resource effects in environmental analyses. To limit the amount of total roads occurring on DNRC ownership, DNRC will minimize the number of roads necessary to conduct forest management activities and limit road construction to those necessary to meet near- and long-term forest management needs as described in Section 2.2.3.2 (Sediment Delivery Reduction Conservation Strategy), and as further defined in ARM 36.11.421.

GB-NR2 Granting of Easements

DNRC will discourage granting of future easements that relinquish DNRC control of roads, except for reciprocal access agreements, cost share agreements, and other federal road agreements (e.g., with the BLM).

Rationale: When DNRC grants access to other parties, different rights for access are often sold or exchanged. This can result in DNRC giving up sole control over access, which can reduce the ability to control use of a particular road and/or activity level beyond a closure structure. Gated roads may become functionally "open" roads due to higher levels of legal use. By discouraging such easements, DNRC will maintain greater control over roads on managed lands, which will minimize risks to bears. Cost-share agreements are administered through the *State of Montana, Department of Natural Resources and Conservation, USDA Forest Service, Northern Region, Road Right-of-Way Construction and Use Agreement*. DNRC also enters into road agreements with the BLM, and an agreement may include easements that relinquish DNRC control over the use of the road. Subsequent use of federally controlled roads would be conducted in accordance with existing federal regulations that protect threatened and endangered species.

GB-NR3 Spring Management Restrictions

These commitments apply during the spring period in spring habitat. In the Stillwater Block, these restrictions would also apply in non-spring habitat during the spring period.

1. Commercial forest management activities, including salvage harvests, are prohibited during the spring period in spring habitat.

   Spring habitat is defined as:
   - Areas associated with roads possessing restricted status during the spring period on the Stillwater Block
   - All habitat below 5,200 feet elevation in the Swan River State Forest
   - All habitat below 4,900 feet elevation on scattered parcels.

   Spring period is defined as:
   - April 1 through June 15 for non-spring habitat and April 1 through June 30 for areas within spring habitat for the Stillwater Block
   - April 1 through June 15 for lands within the Swan River State Forest and DNRC scattered parcels in recovery zones and NROH.

2. The following low-intensity forest management activities are prohibited during the spring period in spring habitat:
   - Pre-commercial thinning
   - Heavy equipment slash treatment.

3. Each year, 10 days total are allowed on each administrative unit during the spring period in spring habitat for the purposes of mechanical site preparation, road maintenance, and bridge replacement. Any combination of these three activities, in aggregate, counts toward the 10-day limit.

4. DNRC will minimize motorized activities on restricted roads during the spring period in spring habitat.

   Motorized use is allowed to conduct the following low-intensity forest management activities in spring habitat during the spring period:
   - Sale preparation
   - Road location
   - Tree planting
   - Prescribed burning
   - Data collection (including monitoring)
   - Non-heavy-equipment slash treatment (chainsaws allowed)
   - Patrol of fall/winter slash burns
   - Noxious weed management.

Commitment GB-CY3 supersedes items (3) and (4) of this commitment in CYE.

Rationale: Upon emerging from their dens in spring, grizzly bears are nutritionally stressed, having undergone a winter of general inactivity. As a result, their habitat use patterns during the spring are driven by the need to maximize energy intake. By limiting the types of allowable activities during the spring period in areas where bears are more likely to be present, DNRC can minimize risk of displacement from important habitat at this important time in a bear's life. Minimizing this risk is accomplished by only allowing activities that are typically of short duration that must occur during narrow spring windows, or that provide indirect benefits to bears. Allowing these activities provides a reasonable window for DNRC to conduct administrative activities while prohibiting more intensive commercial activities and salvage harvests each year.

Waller and Mace (1997) defined the spring period as the period from den exit to July 15 based on apparent changes in food habitats and behavior. For this strategy, the spring period is defined for the Stillwater Block as April 1 through June 15 for non-spring habitat and April 1 through June 30 for areas within spring habitat. For lands within the Swan River State Forest and DNRC scattered parcels, the spring period is defined as April 1 through June 15. These dates were selected to balance DNRC operational needs with the security needs of bears. The June 15 date is consistent with current management associated with the Swan Agreement. The June 15 date provides protective restrictions for the period immediately following the emergence of bears from dens when they are nutritionally stressed following hibernation. In the *Response to Peer Review of the A19 and Proposed Approach to Managing Access in Grizzly Bear Habitat* document prepared by the NCDE Technical Group (USFWS 2001:11), the authors acknowledge that the June 30 date used in that approach was an attempt to accommodate social concerns, but they felt justified in modifying the date to June 15 for two reasons. First, the most urgent concerns related to displacement from good habitat due to snow, mortality risk during black bear season, and vulnerability during the grizzly bear breeding season were all reduced or gone by the end of June. Second, the team acknowledged that there is no dramatic shift in elevation by bears after mid-June.

The list of allowed low-intensity forest management activities includes activities that (1) occur relatively infrequently or are of short duration (e.g., monitoring, data collection, burning, sale preparation, non-heavy-equipment slash treatment, road location, emergency BMP repairs); (2) may provide benefits for grizzly bears (e.g., tree planting, prescribed burning, weed control); or (3) must occur in the spring during narrow windows (e.g., tree planting, weed control, prescribed burning). Displacement risk to grizzly bears given one or any combination of these activities occurring on any given parcel during any given year is expected to be low. DNRC is not proposing to track vehicle road passes, but will restrict days of use to 10 days on each administrative unit during the spring period each year for the purposes of mechanical site preparation, road maintenance, and bridge replacement. Gravel pits situated within 0.25 mile of an open road may be developed and operated without restrictions on season of use and duration of motorized activity. Pits located more than 0.25 mile off an open road may be operated, however, the operating days are limited to a maximum of 10 days and must count against the 10-day allowable operating days for low-intensity forest management activities during the spring period (see gravel pit measures under commitment GB-NR6 below). The commitments pertaining to this subsection are not intended to restrict DNRC from conducting forest management activities on any roads open for use by the general public.

5. Commercial forest management activities (including salvage harvests) and low-intensity forest management activities are allowed within 100 feet of an open road during the spring period in spring habitat.

Rationale: The intent of this measure is to allow DNRC use within a narrow, definable area along open roads where legal public activities are likely to be occurring. Many legal public activities (e.g., firewood cutting, discharge of firearms, parking, county road maintenance) occur near roads open to general public use. DNRC activities occurring within 100 feet of an open road are presumed not to appreciably displace bears beyond the level of displacement associated with legal public activities along existing open roads, and are presumed not to increase the risk of direct mortality.

The 100-foot distance allows for conservative salvage of blowdown and dead and dying trees having a high probability of falling across roadways or being illegally removed as firewood. Further, it provides a reasonable distance/size limit for log landing areas, log loading zones, and maintenance work on equipment. This measure is not intended to allow for removal of forest products beyond 100 feet with cable or winch systems. This measure does not supersede commitment GB-RZ2. Thus, when this allowance is applied in grizzly bear recovery zones, vegetation capable of providing visual screening cover along open roads must also be retained consistent with commitment GB-RZ2. Both DNRC and the USFWS acknowledge that longer-duration motorized activities may differ from non-stop vehicular traffic in the displacement risk they pose. However, both parties acknowledge that this allowance would be for reasonable levels of activity when considering the sizable uncertainty associated with the unpredictable frequency and duration of lawful public activities that are likely to occur along open roads.

GB-NR4 Distance to Visual Screening

DNRC will design new clearcut and seed tree cutting units to provide topographic breaks in view or to retain visual screening for bears by ensuring that vegetation or topographic breaks be no greater than 600 feet in at least one direction from any point in the unit.

~~**Allowance:**~~ Limiting new opening sizes may not be practical in situations involving steep, open faces; where broadcast burning is prescribed for post-harvest treatment; or where insects, disease, prescribed fire, or wildfire have hampered retention of live vegetation. ~~If this allowance is invoked~~In instances of impracticability, DNRC will document the circumstances in the MEPA environmental analysis.

Rationale: In the past, this measure has been recommended to land managers with the intent of providing adequate cover “for bear movement, resting, feeding, security, and possibly thermal regulation.” It was observed in early bear studies in the GYE that bears spent more time in ecotones and in proximity to escape cover, and they avoided the middle of large openings (USFWS 1990). At that time, available literature on elk use of openings also suggested that elk use of large openings tapered off beyond 600 feet from cover. As written above, this measure is intended to promote habitat use by grizzly bears and provide visual screening associated with harvest openings to reduce risk of them being illegally shot. Creating irregular-shaped unit boundaries, retaining patches of vegetation that would hide a bear in close proximity to created openings, or utilizing breaks in topography to limit site distance are suitable means to comply with this measure. No particular spot in a harvest unit will be more than 600 feet to visual screening or topographic breaks (i.e., openings no greater than 1,200 feet across). For example, a circular harvest unit with radius 600 feet would be allowable.

GB-NR5 Grazing Restrictions

1. DNRC will submit a weed grazing mitigation plan for the use of small livestock on NROH lands to the USFWS for review 30 days prior to a decision to grant a grazing license or lease for the purpose of weed control. The weed grazing mitigation will include a description of the location of the project and documentation identifying known activity by bears in the area. The plan will document whether DNRC followed the USFWS’s suggestions (if any were submitted) and if not, which measures were selected instead and why. The intent of this review is to give the USFWS an opportunity to provide DNRC with relevant information regarding site-specific bear use in the area and/or new mitigation measures. If the USFWS does not respond within 30 days, DNRC may proceed with issuance of the license or lease and implement the mitigation plan. Mitigation measures in the plan may include, but are not limited to, requirement of a full-time shepherd, guard dogs, nighttime electric pens, lessee assuming cost of losses incurred by predators, prohibition of grazing in spring habitat during spring periods, attending training on hazing techniques, and maintaining a list of professionals providing hazing services.

Rationale: Domestic sheep and goats are currently used in integrated noxious weed management efforts to control weeds. However, bears are attracted to sheep grazing operations and facilities. Bears may kill sheep, which results in risks to human life, property damage, death of individual bears, or indirect mortality through habituation. When such events occur, at some point the problem bears are typically removed from the population. This measure is intended to apply to new licenses following adoption of the HCP. This measure is also intended to provide for development of sound, site-specific measures that would lessen potential livestock depredations associated with weed control operations, and minimize risk of direct bear mortality or removal in the event that such grazing control measures are deemed warranted. This measure is not intended to be an approval mechanism for the USFWS, but rather a comment and advisory tool. Documentation of known activity by bears would consist of contact with local bear biologists with the most current information about bear activity in the affected area.

2. DNRC will cooperate with other parties, agencies, and bear management specialists on a case-by-case basis to address prompt removal of livestock carcasses in the HCP project area that have been identified as creating the potential for bear-human encounters.

Rationale: Carcasses of dead livestock can serve as an attractant and food source for grizzly bears. Grizzly bears can benefit from feeding on livestock carcasses in remote locations away from people. However, when dead livestock occur near human dwellings or other areas with high levels of human activity, the potential for bear-human encounters may be high, which can eventually lead to the death of the bear through management actions. Disposing of dead livestock repeatedly in established bone yards can be particularly problematic, because bears may become habituated to such sites year after year. To minimize risks of grazing activities on grizzly bears, DNRC will commit to cooperate with other parties and agencies on a case-by-case basis to remove carcasses in the HCP project area where they create the potential for grizzly bear-human conflicts.

GB-NR6 Gravel Operations

The following measures supplement commitment GB-PR7, and are further supplemented by commitments GB-ST5, GB-SW5, and GB-SC4.

Third-party gravel pit operators and gravel permit holders using DNRC pits authorized under this strategy will not be covered for incidental take under this Permit. However, these operations will be subject to the limitations on the number of allowable pits and season of use as described below in this commitment.

1. For each DNRC administrative unit, three specific pits may be considered active for a particular calendar year within the combined geographic area bounded by the grizzly bear NROH and grizzly bear recovery zone boundaries. No more than two active pits may be large pits. There is no restriction on the number of pits on scattered parcels outside of these distinct geographic areas.
2. When counting active pits, those pits used for state and federal road projects that are more than 0.25 mile from an open road will be counted in the number of allowable active pits at the administrative unit level. Gravel pits used for state and federal road projects that are within 0.25 mile of an open road will not be counted in the total number of allowable active pits and will not be subject to restrictions on season or duration of use (see item (4) below).

Rationale: DNRC must have ready access to gravel material to construct new roads and maintain existing roads. Each year, gravel may be applied to repair sites to maintain roads at necessary standards and comply with BMPs. Various seasons, particularly the grizzly bear spring period, are valuable times to develop and stockpile gravel prior to startup of active periods and road construction activities following spring break-up. Contractor availability is also high in the spring, and year-end funding is available to conduct such activities. By regulating the size and number of pits that may be active in any given year, DNRC minimizes the active disturbance area to lessen risk for grizzly bears, lynx, and aquatic species. Transportation costs associated with gravel hauling are high; thus, the indicated number of pits is needed to maintain available sources and minimize transportation distances. The number and use of gravel pits associated with state and federal road projects accessed from open roads are not restricted by these commitments, because such projects are subject to other forms of environmental review and federal oversight (including ESA Section 7 consultation). Also, disturbance associated with gravel pits will occur in conjunction with state and federal road projects and is expected to pose minimal additional disturbance to listed species. In its use of these sites, DNRC will adhere to commitments made during those environmental reviews and consultations specific to the pit and road project. Additionally, the use of state and federal road project gravel pits for DNRC forest management activities is encouraged to limit further disturbance associated with developing new material sources in areas accessed by restricted roads and/or parcels receiving rest.

3. Gravel pits situated within 0.25 mile of an open road may be developed and operated without restrictions on season of use and duration of motorized activity. For gravel pits within 0.25 mile of seasonally restricted roads, operations may occur only during the season(s) they are not restricted under transportation planning.

Rationale: Gravel pits are allowed within 0.25 mile from an open road because motorized disturbance and activity associated with pits less than 0.25 mile from open roads is expected to be relatively non-discernable from normal traffic on open roads.

4. Limited gravel pit operations may occur during the spring period in pits more than 0.25 mile from an open road, but the operating days will count against the 10-day allowable operating days for low-intensity forest management activities during the spring period (see commitment GB-NR3).

Rationale: To allow for some flexibility to access gravel and conduct necessary road maintenance during the spring period, the “up to 10 days” spring allowance (commitment GB-NR3) of operation for pits more than 0.25 mile from open roads may be invoked, which carefully limits the number of operating days and potential for disturbance to grizzly bears in spring. Disturbance is also limited during this period through the total number of allowable pits as stated in these commitments.

5. Gravel development and use associated with borrows is considered a normal and necessary component of road construction and road maintenance. Development and use of borrows is allowed unconstrained when associated with allowable road construction and/or road maintenance activities.

Rationale: Borrows typically involve very small amounts of additional ground or motorized disturbance when considered in conjunction with other mechanized activities associated with road construction and road maintenance. Development and use of this material, which typically occurs immediately adjacent to road surfaces, is expected to have minimal additional impact.

2.1.1.5 Recovery Zone Commitments

In addition to the program-wide and NROH commitments, this set of commitments applies to all projects in the HCP project area within the occupied grizzly bear recovery zones identified in the *Grizzly Bear Recovery Plan* (USFWS 1993) (see HCP Project Area within areas shaded purple in Appendix C, Figure C-2). At this time, this includes the NCDE and CYE and applies to both blocked lands and scattered parcels in these geographic areas. There are no HCP project area lands in the GYE. Also, although DNRC manages some scattered parcels within the BE (Table 2-1), the following conservation measures do not apply to these lands because this ecosystem is not currently occupied by grizzly bears. If the BE becomes occupied, as determined by the USFWS, a changed circumstance would be triggered. Refer to Chapter 6 (Changed Circumstances) for additional information on how the USFWS and DNRC would proceed under changed circumstances.

GB-RZ1 Habitat Considerations

When designing timber sale projects in recovery zones, DNRC will assess impacts to important grizzly bear habitat elements. Examples of such habitat elements include important berry fields, avalanche chutes, riparian areas, wetlands, white bark pine stands, and unique congregation or feeding areas. DNRC will develop site-specific mitigation measures that minimize impacts to these elements. Mitigation measures would typically involve scheduling activities to occur while bears are not likely to be using an area or locating roads or skid trails to conserve important vegetative features, such as dense stands or thickets that provide visual screening. In instances where habitat elements cannot be incorporated into project designs for practicability reasons, DNRC will document the circumstances in the MEPA environmental analysis. ~~The impracticability or infeasibility of implementing this strategy will occur on no more than 10 percent of DNRC projects within a 5-year period in the HCP project area within grizzly bear recovery zones.~~

Rationale: The intent of this commitment is to recognize that some areas managed under the HCP offer more conservation benefit to grizzly bears than others, and to ensure that important habitat elements are considered and maintained to the extent practicable considering all project objectives. If there are specific habitat elements present in a project area, DNRC can benefit grizzly bears by either conserving habitat characteristics and/or by timing activities to avoid displacing bears likely to be using an area.

GB-RZ2 Visual Screening

DNRC will leave up to 100 feet of vegetation between open roads and clearcut or seed tree harvest units. Open roads where visual screening must be retained are considered those accessible to the general public during any portion of the grizzly bear non-denning season.

~~**Allowance:**~~ Leaving vegetation will not be practicable in some areas, such as, but not limited to, where landings and skid trails intersect or are adjacent to roads, in visual clearings for traffic safety at intersections, in localized fuels reduction areas, in units harvested by aerial cable, in salvage units with limited standing live vegetation near the roadway, and in prescribed burn units where the open roads serve as the control boundary. In instances of impracticability, DNRC will document the circumstances in the MEPA environmental analysis.

Rationale: The primary intent of leaving vegetation along roads open for public use is to impede and reduce human detection of bears, with a secondary effect of making it more difficult to shoot a bear if one is detected. DNRC anticipates that most of the retained material will be non-merchantable trees and brush, which can provide effective screening. Human access and development have been shown to negatively impact grizzly bears in the contiguous United States (Mattson et al. 1996; Merrill et al. 1999; MFWP 2002; ICST 2003). McLellan and Mace (1985), as referenced in Mace (1987), reported considerable differences in behavior, response, and habitat use of exposed grizzly bears affected by road traffic, seismic exploration, and people on foot when compared to grizzly bears secluded by some form of vegetative cover. In particular, the presence of roads has been shown in a number of North American studies to either lessen the effectiveness of habitat near the roads if grizzly bears are displaced by the roads, or to increase mortality risk to grizzly bears if they are not displaced by the roads (either directly through shooting, or indirectly through habituation, leading to subsequent death in a control action). Providing visual screening along open roads will minimize such risks and reduce the probability of a malicious or mistaken-identity mortality in or near places the public can rightfully use. Some DNRC roads with gates are classified as open in conjunction with access easements because DNRC does not have full control over their usage. However, such roads are typically used for traditional purposes (such as logging access), and they are not open to use by the public for motorized use and recreation. Requiring visual screening along roads open to public access during the grizzly bear non-denning season is considered the priority, and helps ensure that those areas with elevated risk of impacts to grizzly bears are minimized.

GB-RZ3 Road Closure Maintenance

DNRC will examine all primary road closures in recovery zones annually and repair ineffective closures within 1 year of identifying the problem.

Rationale: The intent of this measure is to disallow an increase in the current level of displacement and mortality risk to grizzly bears attributable to functionally open roads intended to be restricted. Examining and repairing all closure devices in recovery zones on an annual basis will minimize risk of closures being illegally breached and left in disrepair. Thus, bear displacement and mortality risks attributable to ineffective closures on intentionally restricted roads would be minimized. Secondary closure devices are occasionally present on road systems where the existing primary access controls serve to adequately restrict access. Such secondary closures would typically not require checking. Exceptions to this may occur in situations where primary closures are known to have been breached. Relevant background information regarding effects of roads on grizzly bears is presented in the rationale for commitment GB-NR1, New Open Road Construction, above.

GB-RZ4 Grazing Restrictions

For projects in the recovery zone, this commitment supersedes commitment GB-NR5.

1. DNRC will prohibit authorization of any new small livestock (smaller than a cow) grazing licenses, including those for the purposes of weed control, and will also not convert existing licenses to allow the grazing of small livestock.
2. DNRC will not initiate establishment of new grazing licenses. Proposals initiated by the public for larger, less vulnerable classes of livestock (such as cows and horses) may be considered and allowed by DNRC.

Rationale: Careless husbandry practices and protection of livestock are two of six human-caused mortality factors identified in the *Grizzly Bear Recovery Plan* (USFWS 1993). Bears can be attracted to, and become habituated to, facilities where livestock are maintained. Habituation frequently leads to bears being removed in management situations as problem individuals. By discouraging such operations on classified forest trust lands within recovery zones, the mortality risk to bears associated with recovery zones is expected to remain stable or decrease during the term of the HCP. Grazing licenses are issued for a period of 10 years, with a minimum of two inspections by DNRC, one inspection at the 5-year midterm point and one at the end of the license period prior to renewing the license.

GB-RZ5 Post-Denning Mitigation

DNRC will prohibit motorized activities at elevations above 6,300 feet on slopes greater than 45 percent from April 1 through May 31.

Rationale: The literature on disturbance and impacts to grizzly bears during denning (or immediately before or after denning) suggests that the greatest risk involves females with young cubs who have recently emerged from den sites (Mace and Waller 1997; Reinhart and Tyers 1999; Graves and Reams 2001). Cubs are still vulnerable at this age, and it has often been noted that these family groups will remain near dens for some time before heading for lower-elevation areas with better forage. Based on Mace and Waller (1997:41), the lower-elevation limit of potential denning habitat is approximately 6,300 feet. Bears generally appear to tolerate motorized activities occurring more than 1 kilometer (0.6 mile) from the den (Linnell et al. 2000). There is some indication that close encounters with dens can cause physiological stress (Reynolds et al. 1984) or, in some cases, den abandonment (Swenson et al. 1997). Den abandonment, in turn, increases the likelihood of early cub mortality. This conservation commitment provides additional security for identified denning habitat where forest management activities are taking place.

GB-RZ6 Granting of Easements

This commitment supplements commitment GB-NR2.

1. The FMB will have an active role in the review and authorization of future easements across the HCP project area in a recovery zone.
2. Easements granted for existing restricted routes or newly proposed routes will require the applicant to demonstrate that all other access possibilities have been explored prior to DNRC considering the application for access across trust lands.
3. When granting easements for motorized access in recovery zones, DNRC will work with easement applicants to incorporate measures to avoid or mitigate impacts to bears. Easement terms may include, but are not limited to, gated entry, maintenance of visual screening along routes, and absorbing costs of gating associated with secondary and primary access routes.
4. For each easement granted in a recovery zone, DNRC will provide the USFWS with documentation on how the granting of the easement was evaluated, how alternative routes were considered, and how mitigations were considered and/or applied.
5. Pertaining to access agreements on roads in grizzly bear recovery zones, the following shall occur where DNRC is the Grantor. In the development of new reciprocal access agreements and during the reassignment of easement rights under existing reciprocal access agreements, DNRC will attempt to work with the existing and future grantees to avoid or mitigate impacts to grizzly bears associated with motorized use.

~~**Allowance:**~~ This commitment does not apply to road agreements with federal agencies (e.g., cost-share agreements with the USFS or road agreements with the BLM), because the federal agencies retain jurisdiction of the roads, and those agencies are required to comply with Section 7 of the ESA.

Rationale: The rationale for this conservation commitment is similar to that described above for easement granting in the NROH lands (commitment GB-NR2). DNRC identified all the likely existing access routes into neighboring Plum Creek ownership and the potential for future access needs into non-industrial private ownership on the Stillwater Block and Swan River State Forest. The greatest uncertainty for DNRC is related to possible ownership or landuse changes that may occur over the 50-year Permit term on nearby industrial timber lands. Given the existing transportation systems, the need to grant additional easements is expected to be minor.

2.1.1.6 Stillwater Block Commitments

In addition to the program-wide, NROH, and recovery zone commitments, the following measures apply to the Stillwater Block, which consists of the blocked portions of the Stillwater and Coal Creek State Forests, within the NCDE recovery zone, as depicted in Appendix C, Figure C-3.

DNRC categorized the lands within the Stillwater Block into two distinct grizzly bear conservation management classes, A and B. Commitments GB-ST1 and GB-ST5 address both Class A and Class B lands. Commitments GB-ST2 and GB-ST3 address Class A lands, while commitment GB-ST4 addresses Class B lands.

Class A lands are primarily adjacent to federal ownership currently classified by the USFS as secure habitat for grizzly bears (IGBC 1998), also referred to as security core or security core areas, within the NCDE recovery zone. Habitat maintenance and security are key considerations for Class A lands. Conservation of Class A lands contributes to connectivity with adjacent federal lands, which helps ensure future opportunities for conservation and habitat function on DNRC lands and on federal lands where management for grizzly bear recovery is mandated. Quiet areas for grizzly bears provided through the HCP and low levels of existing development on Class A lands contribute to DNRC's ability to provide for linkage, "the area between larger blocks of habitat where animals can live at certain seasons, and where they can find security to successfully move between these larger habitat blocks" (Servheen et al. 2001). For the HCP, quiet areas are areas relatively free from commercial activities, and they are rested subzones, scattered parcels, or areas rested seasonally.

Class B lands are lands adjacent to industrial private or federally managed timberlands and rural/residential property (highway corridors, industrial land with high development potential, large private development, railroad tracks, etc.). Minimizing the potential for bear-human conflict and maintaining areas with limited disturbance during important seasons, where opportunities exist, are the management priorities for these lands. Access restrictions for lands in this class promote linkage, as defined by Servheen et al. (2001), during the applied periods of restriction.

GB-ST1 Transportation Management

1. DNRC commits to transportation management in the Stillwater Block as identified in Table 2-2 and the transportation plan maps (Appendix C, Figures C-4A and C-4B). This transportation plan identifies:
    - Road miles by road class, activity category, and restriction type under current management strategies (Table 2-2 and Figure C-4A) and estimated under the HCP (Table 2-2 and Figure C-4B)
    - Permanent routes needed but not yet constructed by DNRC to fulfill agency responsibilities for the 50-year Permit term (see Proposed Roads in Table 2-2 and Figure C-4B).
2. If a road is encountered that is not in the transportation plan, and evidence suggests that the road existed prior to the signing of the HCP, DNRC will promptly notify the USFWS of the road being added to the transportation plan. The road would be considered part of the original baseline.
3. In addition to the permanent roads identified in the transportation plan, DNRC may maintain up to 8 miles of temporary roads at any one time. These roads will be built to a minimum standard and abandoned or reclaimed within one operating season following completion of project-related activity.
4. If a DNRC parcel in the Stillwater Block is sold or traded, the numbers in Table 2-2 will be adjusted to accurately reflect baseline road amounts. The numbers will also be adjusted as needed if parcels are added to the Permit following a land exchange or purchase. Future open road needs on acquired parcels will be scrutinized, added to the table, and reported to the USFWS as described in the transition lands strategy (Chapter 3).

Rationale: In developing the Stillwater Block transportation plan, situations were identified where greater opportunities exist to provide for conservation through consideration of the federal ESA conservation obligations of major adjoining landowners (e.g., federal, industrial private, rural/residential private). The ability to provide conservation in some areas is constrained by ownership pattern, amount, and associated activities of other major adjoining landowners. As well, the transportation plan is designed to take advantage of situations where ownership characteristics are likely to provide greater conservation opportunities. Most of the HCP project area situated within the Stillwater Block is either adjacent to federal ownership, where active recovery efforts are occurring; industrial private ownership, where efforts are designed to avoid or minimize take; or rural/residential private ownership, where grizzly bears face increases in human activity. Generally, DNRC lands are positioned between or adjacent to all of these differing conditions.

On Stillwater Block lands within the NCDE recovery zone, the transportation plan commits DNRC to a predetermined, fixed road system. This transportation plan is designed to minimize the number of new permanent roads and rely on operational equipment that does not require extensive road systems. Having a fixed system allows DNRC to commit to a management approach that provides for seasonal security associated with habitat value, particularly in the spring period when secure habitat is likely to be most limiting. Linkage and habitat connectivity, important for facilitating bear movements, is also a consideration addressed in the transportation plan. Access restrictions are based on DNRC operational needs; habitat quality, which was visually assessed using resource selection function maps (Mace et al. 1999); and local knowledge of the area provided by DNRC field staff. Management under the transportation plan is expected to reduce the amount of activity on total roads for the Permit term.

TABLE 2-2. ROAD MILES BY ROAD CLASS, ACTIVITY CATEGORY, AND RESTRICTION TYPE FOR THE STILLWATER BLOCK UNDER CURRENT MANAGEMENT STRATEGIES AND ESTIMATED UNDER THE HCP

	Activity Category			Road Miles	
Road Class[1]	**Motorized Public Access**	**Commercial Forest Management Activity**	**DNRC Low Intensity Forest Management Activity**	**Current[2]**	**HCP[3]**
Existing Roads					
Open (Highway/ County) − 170	Open Year-Round	Open Year-Round	Open Year-Round	1.9	1.9
Open (Forest Road) − 190	Open Year-Round	Open Year-Round	Open Year-Round	123.4	105.1
Restricted − 130	Restricted Seasonally	Restricted Seasonally	Open Year-Round	6.4†	25.3†
				−	19.2††
Restricted − 131	Restricted Seasonally	Restricted Seasonally	Restricted Seasonally	−	4.5†
				−	5.0††
Restricted − 120, 121	Restricted Year-Round	Open Year-Round	Open Year-Round	229.3	122.1
Restricted − 127, 128	Restricted Year-Round	Restricted Seasonally	Open Year-Round	−	34.1†
				−	21.5††
Restricted − 125, 126	Restricted Year-Round	Restricted Seasonally	Restricted Seasonally	−	17.4†
				−	4.8††
			Subtotal	**361.0**	**360.9**
Proposed Roads					
Proposed − 021	Restricted Year-Round	Open Year-Round	Open Year-Round	−	8.8
Proposed − 027	Restricted Year-Round	Restricted Seasonally	Open Year-Round	−	2.6††
Proposed − 025	Restricted Year-Round	Restricted Seasonally	Restricted Seasonally	−	4.3†
				−	3.6††
			Subtotal	0.0	19.3
			TOTAL	**361.0**	**380.2**

[1] Numbers reflect those used in DNRC road database and are shown in this table for organizational purposes.
[2] See Appendix C, Figure C-4A.
[3] See Appendix C, Figure C-4B.
† Spring Restrictions − April 1 - June 30.
†† Spring/Fall Restrictions − April 1 - June 30 AND September 16 - November 30.
Source: DNRC (2008a).

Restriction allocations to proposed and existing road miles under the HCP reflect DNRC commitments to grizzly bear security in the Stillwater Block. All permanent routes needed but not yet constructed (19.3 miles) would be closed to the public year-round. There would be a 15 percent reduction (18.3 miles) in existing road miles open year-round to all activity categories (road class 190). This 18.3 miles is in addition to approximately 107.2 miles of existing road currently closed year-round to the public yet open year-round to commercial and DNRC forest management activities (road classes 120, 121) that would be managed and distributed across other road classes that would offer grizzly bears greater protection during the spring period (April 1 to June 30) and/or the fall period (September 16 to November 30). As a part of this redistribution of road miles, an additional 47.6 miles would become seasonally available to the public in summer to access several popular destination points (road classes 130, 131). Summer tends to be the period when there is a broad range of foods and habitats available to grizzly bears.

The transportation plan facilitates management of large blocks (approximately 19,400 total acres) of DNRC lands adjacent to USFS lands on a schedule of 4 years of management and 8 years of rest. These blocks are termed Class A “subzones.” Construction of additional permanent roads in these areas is prohibited for the Permit term, which will minimize long-term displacement and mortality risk to bears using these areas. The fixed transportation system, along with seasonal restrictions and management of these large blocks of quiet areas, is a departure from the existing ARMs, which were based on earlier interim access management guidelines that required no net increase in open or total road density and no net decrease in security core (approximately 39,600 acres) from the 1996 DNRC baseline road inventory. Establishment and maintenance of secure habitat for grizzly bears under earlier policies eliminated a considerable amount of blocked-land acreage from the DNRC timber base, which impeded DNRC’s ability to generate revenue from those lands. Secure habitat for grizzly bears (as defined by the IGBC [1998]) as implemented earlier by DNRC is not explicitly a part of this strategy. Under this approach to managing access, the concept of secure habitat evolves from habitat being located in fixed areas on the landscape to one of providing quiet areas on the forest relatively free from commercial forest management for 8-year rest periods on Class A lands as described below. In this approach, seasonal security is provided for grizzly bears in some locations while DNRC gains improved access to blocked-land acreage for active management in others.

5. DNRC will install signs indicating bear presence on the main open roads (portal roads) entering the Stillwater and Coal Creek State Forests. DNRC will determine the exact number and locations of signs to post, and will be responsible for keeping signs in good repair. Repairs will be integrated into the normal course of seasonal maintenance activities. DNRC will have 2 years from the issuance of the Permit to install the signs.

Rationale: The intent of posting signs is to inform people entering the state forests of the presence of bears and raise public awareness as to the importance of avoiding bear-human interactions. An estimated 11 signs will be needed to cover both Stillwater and Coal Creek State Forests.

GB-ST2 Class A Lands

The following commitments will apply to Class A Lands in the Stillwater Block:

1. **No New Permanent Roads.** No additional permanent roads, beyond those that currently exist, will be constructed on Class A lands for the duration of the Permit. Access needed for management activities would be from existing or temporary roads.
2. **Active Management Followed by Rest.** Class A lands are divided into four geographic subzones, as depicted in the transportation plan maps (Appendix C, Figure C-4B). In each subzone, DNRC may conduct commercial forest management activities including salvage harvest for a maximum management period of 4 years, followed by a mandatory rest period of at least 8 years. Each subzone will have its own management/rest period schedule

independent of the other subzones. The 4-year management period may be extended due to management delays beyond the control of DNRC, such as extreme weather events, fire events, area closures due to fire danger, or legal injunction. In such cases, DNRC will write an explanation of the extension and submit it to the USFWS at the time the extension is invoked. Contractor equipment failure and extensions to address market fluctuations are not considered allowable delays.

3. **Management Activities Allowed During Rest.** The following activities will be allowed in rested subzones.

    a. Rest is intended to be a mitigation measure for the period when bears are active. Therefore, the rest status does not apply during the winter period (November 16 through March 31), and commercial forest management activities are allowed in winter below 6,300 feet without limitation during rest periods.

    b. Low-intensity forest management activities will be allowed during the rest period, except for restrictions during the spring period, as described in commitment GB-NR3, Spring Management Restrictions. Spring restrictions and allowable road use on the Stillwater Block are built into the transportation plan.

    c. Commercial forest management activities will be allowed for minor projects, including salvage, after the spring period in the Stillwater Block. A total of 30 operating days in aggregate are allowed per year, per rested subzone (days can only be used June 16 through November 15 in non-spring habitat and July 1 through November 15 in spring habitat). This 30-day allowance may also be applied to resting subzones that have exceeded rest beyond 8 years that are not yet ready for large-scale planned commercial harvest. When tracking the number of operating days allowed for minor projects:

        i. Two commercial operations within 0.5 mile of one another count as one operation for those days both are active. Operations more than 0.5 mile apart are considered distinct, and operating days must be considered additive and tallied separately.

        ii. Commercial forest management activities within 100 feet of an open road do not count toward the allowable operating day limits.

Rationale for rest/management: The intent of these conservation measures is to minimize risk of take associated with displacement and mortality of grizzly bears. Through this approach of 4 years active and 8 years rest, DNRC intends to provide as many locally secure and quiet areas as possible for bears in a manner that allows management of lands in its timber base. A similar approach is currently implemented in the Swan Agreement. The Swan Agreement currently provides active periods of 3 years and inactive periods of 6 years (1:2 management to rest ratio). The commitment of 4 years active and 8 years inactive maintains the same ratio of rest to management as in the Swan Agreement, but provides grizzly bears a longer period free from the disturbance of major commercial activity in the subzones, and provides DNRC greater flexibility to concentrate on and complete projects. Activities occurring in the winter period below elevations normally used for denning by grizzly bears have minimal potential for adverse effects, particularly for females with cubs. The commitments pertaining to this subsection are not intended to restrict DNRC from conducting forest management activities on any roads open for use by the general public, including those crossing parcels in rest.

Rationale for extending the 4-year management period: Commercial forest management activity extensions granted for actions or events that occur beyond DNRC's control are envisioned to accommodate delays due to extreme weather events, fire events, area closures due to fire danger, and legal injunction. The intent of this allowance is to ensure that a full 4 years of active management can be accomplished, not to extend 4-year active management periods for a total duration of more than 4 years. For example, if in year 3 of a project, a severe fire event causes a loss of one management season, then the amount of time lost because activities could not occur (in this case, one season) could be used during the first available operating window in year 5 to accomplish project objectives. Following this, 8 years of rest is required to serve as compensating mitigation for the 4 years of activity. Such extensions are not intended to accommodate planning inefficiency, contractor equipment failure, extensions to address market fluctuations or accumulations of periodic short-term shutdowns, such as those caused by periodic wet weather conditions. If a fire burns an area in active management and additional time is needed to implement a salvage harvest, the salvage harvest would be an interruption of the rest period and could be completed as allowed in commitment GB-ST3 (assuming it meets all the commitments) or as a changed circumstance (see Chapter 6).

Rationale for minor projects: DNRC must maintain the ability to capture value of timber and minimize insect outbreaks through removal of beetles by salvaging dead and dying material. DNRC is required by law to administer a salvage timber program that provides for the timely salvage logging of dead or dying timber on state trust lands. Under this requirement, DNRC will, to the extent practicable, harvest dead and dying timber before there is substantial wood decay and value loss (MCA 77-5-207).

DNRC also has an active green timber permit program that is necessary to conduct smaller projects and take advantage of specialty markets. DNRC recognizes the importance of minimizing these activities during rest periods to minimize impacts on grizzly bears; thus, DNRC will limit the number of days per year for areas in rest. Allowing regulated amounts of time for such activities on an annual basis will provide for continued harvest using green and salvage timber permits, while minimizing risk of short- and long-term displacement of grizzly bears from suitable habitat. The Kalispell Unit received a greater limit than other units because they manage a larger relative acreage in the recovery zone.

Rationale for two operations within 0.5 mile: Two operations within 0.5 mile are considered close enough together that much of the noise disturbance would be overlapping and compensatory. This allows DNRC additional operational flexibility with little additional displacement risk to grizzly bears. This allowance does not allow multiple strings of several operations within 0.5 mile of one another that could have a continuous disturbance footprint of activity associated with them.

Rationale for activities within 100 feet of an open road: Many lawful activities (e.g., firewood cutting, discharge of firearms, parking, road maintenance) can occur near roads open to general public use. The intent of this allowance is to allow for a reasonable level of use associated with limited types of activities within a narrow, definable area along open roads where lawful public activities are likely to occur. Activities occurring within 100 feet of an open road are presumed not to appreciably displace bears beyond the level of displacement associated with existing open roads or to increase risk of direct mortality.

The 100-foot distance allows for conservative salvage of blowdown and dead and dying trees that have a high probability of falling across roadways or being illegally removed as firewood. It provides a reasonable distance/size limit for log landing areas, log loading zones, and maintenance work on equipment. This measure is not intended to allow for removal of forest products beyond 100 feet with cable or winch systems. Both DNRC and the USFWS acknowledge that longer-duration motorized activities may differ from non-stop vehicular traffic in the displacement risk they pose. However, both parties acknowledge that this allowance would be for reasonable levels of activity when considering the sizable uncertainty associated with the unpredictable frequency and duration of lawful public activities likely to occur along open roads.

GB-ST3 Salvage on Rested Class A Lands

1. DNRC will conduct salvage harvest activities under the following order of preference, when economically and operationally practicable:
    a. Conduct salvage during the winter period
    b. For salvage harvest that must occur outside of the winter period, conduct the harvest in an expedient manner
    c. Days used for operating salvage harvest from June 16 through November 15 shall count toward the 30 days allowed for minor projects (described in commitment GB-ST2)
    d. DNRC will forgo unused annual operating days in other inactive subzones to compensate for the number of days required to complete such projects.
2. Salvage projects that cannot be accomplished using the four approaches above may be extended between 31 and 150 days during the non-denning period. The following conditions would apply:
    a. Following a 31- to 150-day extension for salvage, DNRC would be required to restart a new 8-year rest period. In this situation, a full uninterrupted 8-year rest period must be achieved before allowing another 31- to 150-day interruption. If a salvage harvest during the restarted rest period requires more than 30 days to complete, the action would be processed as a changed circumstance (see Chapter 6).
    ~~3~~b. DNRC will document the necessity for interrupting the rest period. A DNRC wildlife biologist will develop a site-specific mitigation plan addressing potential effects on grizzly bears through habitat considerations, timing restrictions, and transportation management and access. Examples of habitat considerations include important secure areas, berry fields, avalanche chutes, riparian areas, wetlands, white bark pine stands, and unique congregation or seasonal feeding areas. The DNRC project leader and DNRC decision maker will consider the input from the biologist. A copy of the mitigation documentation highlighting those measures implemented by the project leader and decision maker (Appendix B, Document B-1 – HCP Checklist for Salvage Projects Proposed for Parcels in Rest within Grizzly Bear Recovery Zones) will be submitted to the USFWS prior to a project decision.

Rationale for salvage projects: Under this commitment, a rest period will be broken for an intermediate-sized salvage harvest. Conducting these salvage activities during rest periods is expected to be the exception rather than the norm. However, some disturbance events requiring salvage will occur during rest periods, and it will be important for DNRC to be able to promptly address them.

DNRC recognizes the importance of minimizing harvest activities during rest periods in order to reduce impacts to grizzly bears. However, DNRC must also maintain the ability to capture value and minimize insect and disease outbreaks by salvaging material that is dead and dying. Pursuant to MCA 77-5-207, DNRC is required, to the extent practicable, to harvest dead and dying timber before there is substantial wood decay and value loss. This commitment is important for DNRC to be able to plan and conduct salvage activities under a broad rest scheme so that they are not forced to forgo revenue due to foreseen, but unpredictable disturbance events. Prohibiting salvage on rested subzones could force DNRC to forgo considerable revenue and volume associated with natural disturbance agents. In fiscal years 2006, 2007, and 2008 salvage harvest comprised 2.3 percent, 12.3 percent, and 35 percent, respectively, of the total volume sold on forested trust lands. This trend is likely to continue because of the effects of environmental and human factors such as drought, fire suppression, cyclic insect populations, and climate change. The intent of these conservation measures is to minimize take associated with displacement of grizzly bears while allowing DNRC to maintain the ability to capture timber value and minimize insect and disease outbreaks by salvaging material that is dead and dying.

To mitigate the potential effects of salvage harvest on rested subzones, DNRC will forgo unused annual operating days in other inactive subzones to compensate for the number of days required to complete such projects. The expected result is that salvage activities would be localized and of longer duration for one project, but activities across the forest would be reduced (i.e., one activity for a longer duration in one location is expected to cause less disturbance than several small projects in several inactive subzones for up to 30 days each). The intent is to allow for one intermediate-sized salvage harvest, not to allow for frequent or periodic small, planned projects, which might appreciably diminish rest. In developing a project mitigation plan, the intent is to draft a plan that the biologist and project leader intend to implement and submit it to the USFWS during the planning stages of the project. This is necessary to provide an opportunity for the USFWS to review the draft plan, provide additional information, and/or make suggestions that might improve the effectiveness of the mitigation measures. This review is not intended for approval purposes. While developing the mitigation plan, the DNRC wildlife biologist is encouraged to communicate with the USFWS for input on mitigation appropriateness and design. Additionally, DNRC would be required to restart the rest period for the rested subzone after completion of the salvage harvest. Although unlikely, if a 31- to 150-day interruption for salvage purposes is required during the restarted rest period, DNRC and the USFWS would follow the changed circumstances process to address the effects of the additional proposed project on grizzly bears. A general intent of this measure is to ensure that an uninterrupted 8-year rest period is achieved before allowing a second 31- to 150-day interruption in any particular subzone. Restarting of rest periods in this manner is not required for scattered parcels; however, only one interruption of this type can occur within any given 8-year rest period, firmly limiting the degree to which additional disturbance could occur. This minor difference provides DNRC slightly more operational flexibility on scattered parcels, which are inherently more difficult to manage as effective quiet areas due to varied surrounding ownerships and their smaller size when contrasted with much larger blocked areas in rest.

GB-ST4 Class B Lands

The following commitments will apply to Class B Lands in the Stillwater Block:

1. Additional roads necessary to access DNRC lands to conduct forest management activities in the future are identified in the transportation plan. Access needed to conduct management activities would be from existing, proposed, or temporary roads. DNRC is committing to the total number of proposed road miles and approximate locations as identified in the transportation plan map (Appendix C, Figure C-4B) and as shown in Table 2-2. Individual road locations and distances may vary when project-level engineering and design occur.
2. Specific seasonal restrictions are also identified in the transportation plan (Appendix C, Figure C-4B). Additional year-round restricted roads are identified with specific seasonal restrictions on DNRC commercial forest management activities during appropriate periods. The intent of these restrictions is to increase the level of security for grizzly bears during important seasons and in key locations.
3. DNRC will prohibit commercial forest management activities and motorized use associated with low-intensity forest management activities during the spring period on a total of 39.6 miles of road identified as restricted in the transportation plan (Appendix C, Figure C-4B). Various individual roads may move in or out of this subset, but the 39.6-mile total will not change. Low-intensity forest management activities conducted without motor vehicles or motorized equipment are allowed on the 39.6 miles. Note: 7.9 miles of this 39.6 miles identified in the transportation plan have not yet been built; thus, until they are constructed, DNRC must constrain low-intensity forest management activities during the spring period to the 31.7 miles that currently exist.

Rationale: Restricting a subset of roads from low-intensity forest management activities during the spring period will reduce the chance of grizzly bear displacement from these roads and further improve spring habitat security for grizzly bears. This commitment applies to a subset of road miles, and particular roads may move in or out of this subset. These roads, which total 39.6 miles, have also been identified on the transportation plan map and are those where this measure would primarily be applied. This equates to 28 percent of the total miles of road that are restricted in the transportation plan. This subset includes segments of road that typically could be restricted from any motorized administrative use during the spring period without large adverse effects to the forest management program on the Stillwater Unit.

During spring operations, if an employee needs to enter one of the road segments in this subset to conduct low-intensity forest management activities, an equal or greater amount of road within the larger entire set of spring-closed roads would be substituted and restricted from use for those purposes. Natural disturbance events, such as fires or large blowdown events, that create a road failure or risk to water quality, may also require emergency repair measures during the spring period. Roads could be substituted and restricted in the same manner for these purposes. Allowances to address such events are contained in Chapter 6 (Changed Circumstances).

4. On roads where spring restrictions are identified on the transportation plan map (Appendix C, Figure C-4B), the spring habitat restrictions (commitment GB-NR3) extend through June 30. On all other roads on Class B lands that do not have spring restrictions identified on the transportation plan map (i.e., those in non-spring habitat), spring habitat restrictions would extend through June 15.
5. A general description of the location and length for proposed road segments is provided in the transportation plan map (Appendix C, Figure C-4B). Estimated road lengths are rounded to within 0.1 mile (see Table 2-2). Precise miles and locations may vary slightly during construction.

Rationale: The intent is to clearly define the approximate amount of proposed new roads and the areas they would access but allow for changes in exact location and length, as project-level engineering has not been conducted. Any minor deviations in length are not anticipated to result in additional risk to grizzly bears.

GB-ST5 Gravel Operations

The following commitments supplement commitments GB-PR7 and GB-NR6.

1. DNRC will limit the number of active gravel pits on the Stillwater Block as follows: five specific pits may be considered active for a particular calendar year (no more than three may be large).
2. Gravel pits situated within 0.25 mile of an open road may be developed and operated without restrictions on season of use and duration of motorized activity.
3. Large gravel pits more than 0.25 mile from an open road are prohibited on Class A lands.
4. During the 4-year window for commercial forest management in active subzones on Class A lands, gravel pits that are more than 0.25 mile from an open road may be developed and operated outside of the spring period without restriction on amount and duration of activity.
5. Only one gravel pit may be operated more than 0.25 mile from an open road on Class B lands. Operations and duration of use will be conducted in accordance with the transportation plan. Such pits requiring more than 2 consecutive years of frequent motorized activity (average of one or more trips per week) will require an amendment to the transportation plan to accommodate the associated road system, which will be managed as functionally open.
6. One gravel pit may be operated more than 0.25 mile from an open road on Class B lands without following transportation plan restrictions if: (1) DNRC minimizes the distance of the pit from an open road, and (2) to the extent possible, DNRC ceases activities on all allowable remaining pits while the gravel pit is active. Purchasers or other licensed third parties will be allowed to continue to operate within the active pits that have legally defined operating periods by license or contract.

Rationale for gravel operations: Gravel pits in areas open for management and more than 0.25 mile from an open road are allowed, because disturbance in those areas will be in conjunction with other ongoing commercial forest management activities. Activities at gravel pits will likely not be discernable or additive to ongoing motorized use for commercial purposes.

Gravel pits on Class B lands more than 0.25 mile from an open road will be restricted and regulated by allowable periods of use stated in the transportation plan, number of allowable pits (five total) as stated in commitment GB-ST2, and limitations on pit size. To provide flexibility for situations that may arise, one pit may be developed more than 0.25 mile from an open road on Class B lands, as long as additional distance minimization and pit closure constraints are followed. When this allowance is invoked, DNRC will minimize the distance of the necessary pit from an open road and cease activities on the remaining four pits (they will become temporarily inactive). DNRC will have the ability to limit its own activities on active pits; however, it may not be able to limit the actions of third parties with long-term permitted uses. The allowance is not intended to allow ongoing use of pits in conflict with the transportation plan. Projects requiring long-term, frequent activity (an average of more than one trip per week) will be addressed through the cooperative management response (CMR) process described in Chapter 4 (Monitoring and Adaptive Management).

2.1.1.7 Swan River State Forest Commitments

In addition to the program-wide, NROH, and recovery zone commitments, the following commitments would apply in the Swan River State Forest should the Swan Agreement be terminated.

Under its HCP, DNRC would continue to manage its lands in the Swan River State Forest in accordance with the Swan Agreement (Appendix C, Figure C-5). In the event that the current Swan Agreement is terminated, the program-wide, NROH, recovery zone, and Swan River State Forest commitments, described below, would be implemented as a pre-planned changed circumstance under the HCP. In the event the changed circumstance is invoked and DNRC adopts the Swan River State Forest commitments, DNRC would then be responsible for abiding by the complete set of conservation commitments identified here.

Should the Swan Agreement be terminated during the Permit term, under a worst-case scenario, the Swan River State Forest would not be able to rely on cooperative road access management, but would continue to implement similar measures and definitions contained in these commitments. DNRC recognizes that the ability of state trust lands alone to provide for linkage would be appreciably compromised if the Swan Agreement is terminated. The apparent increase in open roads noted in this strategy would not be the result of additional increases in newly created roads by DNRC for forest management activities, but rather would result from reduced control of access due to existing easements and loss of cooperative access management with Plum Creek and the USFS. This strategy assumes a worst-case scenario and would not necessarily preclude DNRC participation in future access management agreements. In the situation where the existing Swan Agreement is terminated, the land ownership patterns and access options on other ownerships are uncertain. The Swan River State Forest commitments would apply to DNRC's HCP project area and roads over which it has full control.

GB-SW1 Transportation Management

1. DNRC commits to transportation management in the Swan River State Forest as identified in Table 2-3 and the transportation plan maps (Appendix C, Figures C-6A and C-6B). The map identifies
   - Road miles by road class, activity category, and restriction type currently under the Swan Agreement (Table 2-3 and Figure C-6A), estimated under the future Swan Agreement (Table 2-3), and estimated under the HCP (Table 2-3 and Figure C-6B).
   - Permanent routes needed but not yet constructed by DNRC to fulfill agency responsibilities for the 50-year Permit term (see Proposed Roads in Table 2-3 and Figure C-6B).
2. If a road is encountered that is not in the transportation plan, and evidence suggests that the road existed prior to the signing of the HCP, DNRC will promptly notify the USFWS of the road being added to the transportation plan. The road would be considered part of the original baseline.
3. If a Swan River State Forest parcel is sold or traded, the numbers in Table 2-3 will be adjusted to accurately reflect baseline road amounts. The numbers will also be adjusted as needed if parcels are added to the Permit following exchange or purchase. Future open road needs on acquired parcels will be scrutinized, added to the table, and reported to the USFWS.
4. To minimize the risk of death or injury to bears, and to reduce displacement of bears due to the presence of roads, DNRC makes the following commitments.

   a. DNRC will limit new road construction to the approximate locations and lengths indicated on the transportation plan map (Appendix C, Figure C-6B). This includes approximately 70.3 miles of new road, which will become part of the permanent road system but not open for public use (Table 2-4). Some slight variation in precise road locations will be needed to better accommodate BMPs and logging system design.

Rationale: Over the course of the next 50 years, DNRC will need to build additional roads to access timber resources under either conservation approach (i.e., Swan Agreement or HCP). DNRC acknowledges that some displacement of grizzly bears is possible because of these new roads. However, DNRC commits to limiting the scope of new road building to those roads indicated on the transportation plan map. DNRC recognizes the importance of riparian areas to bear security, and the USFWS recognizes that DNRC needs to access its lands for management purposes. Accordingly, in developing the transportation plan, DNRC limited the construction of new roads in riparian areas and wetlands to those that had to occur within the RMZs and WMZs and that were essential to forest management. DNRC will construct minimal amounts of roads in the future that would be open to the public for general use, as depicted on the transportation plan map (Appendix C, Figure C-6B) and in Table 2-3.

TABLE 2-3. ROAD MILES BY ROAD CLASS, ACTIVITY CATEGORY, AND RESTRICTION TYPE FOR THE SWAN RIVER STATE FOREST CURRENTLY UNDER THE SWAN AGREEMENT, ESTIMATED UNDER THE FUTURE SWAN AGREEMENT, AND ESTIMATED UNDER THE HCP

	Activity Category			Road Miles		
Road Class[1]	**Motorized Public Access**	**Commercial Forest Management Activity**	**DNRC Low Intensity Forest Management Activity**	**Swan Agreement Current[2]**	**Swan Agreement Future**	**HCP[3]**
Existing Roads						
Open (Highway/ County) − 170	Open Year-Round	Open Year-Round	Open Year-Round	6.9	6.9	6.9
Open (Forest Road) − 190	Open Year-Round	Open Year-Round	Open Year-Round	38.1	38.1	66.3[4]
Restricted − 130	Restricted Seasonally	Restricted Seasonally	Open Year-Round	2.8†	2.8†	−
Restricted − 131	Restricted Seasonally	Restricted Seasonally	Restricted Seasonally	2.5†	2.5†	−
Restricted − 120,121	Restricted Year-Round	Open Year-Round	Open Year-Round	64.5	64.5	−
Restricted − 125, 126	Restricted Year-Round	Restricted Seasonally	Restricted Seasonally	99.7†	99.7†	141.1†
			Subtotal	**214.5**	**214.5**	**214.5**
Proposed Roads						
Proposed − 021	Restricted Year-Round	Open Year-Round	Open Year-Round	−	36.8	−
Proposed − 025	Restricted Year-Round	Restricted Seasonally	Restricted Seasonally	−	33.5†	70.3†
			Subtotal		**70.3**	**70.3**
			TOTAL	**214.5**	**284.8**	**284.8**

[1] Numbers reflect those used in DNRC road database and are shown in this table for organizational purposes.
[2] See Appendix C, Figure C-6A.
[3] See Appendix C, Figure C-6B.
[4] The estimated total of 66.3 miles of open road under the HCP strategy reflects worst-case scenario.
† Spring Restrictions − April 1 - June 15.
Source: DNRC (2008a).

TABLE 2-4. ESTIMATED MILES OF NEW ROAD CONSTRUCTION BY DECADE FOR THE SWAN RIVER STATE FOREST

Decade	Miles of New Road Construction[1]
2004–2007	8.9
2008–2017	18.6
2018–2027	11.0
2028–2037	15.7
2038–2047	9.1
2048–2057	7.0

[1] These estimates do not include temporary roads that may be constructed during the Permit term.

The estimated total of 66.3 miles of open road under the proposed HCP strategy reflects the worst-case scenario (see Table 2-3). ~~Included in t~~This total ~~are~~includes approximately 38 miles of existing open roads and approximately 28.4 miles of ~~originally~~existing restricted roads that could change from restricted (road classes 120, 121, 125, 126, 130, and 131) to open (road class 190) in the future due to circumstances beyond the control of DNRC. On these roads, DNRC has established all lawful purpose reciprocal access agreements with adjacent landowners. Under current ownership, these roads would remain restricted through time under the Swan Agreement. In the event that the Swan Agreement is terminated or neighboring lands change ownership within the 50-year HCP period, subsequent grantees of reciprocal access agreements could petition DNRC to change the status of these roads from restricted to open. Although cooperation from these grantees is not guaranteed under the HCP strategy, DNRC would work with appropriate parties in an effort to maintain these roads as restricted and to avoid or mitigate impacts to grizzly bears that would result from a status change on these roads.

Should the Swan Agreement be terminated, all existing road segments that do not have reciprocal access agreements would acquire greater restrictions under the HCP. Approximately 41.4 miles of existing road currently closed year-round to the public yet open year-round to commercial and DNRC forest management activities would offer grizzly bears more protection during the spring period (April 1 to June 15) (road class 125,126 increases from 99.7 to 141.1 miles). Proposed roads would remain closed to the public under the current management strategy (Swan Agreement) or the HCP. All proposed roads under the HCP would offer grizzly bears greater protection during the spring period by restricting DNRC commercial and some low-intensity activities during April 1 to June 15, unlike the Swan Agreement, which only applies the restriction on roads below 5,200 feet elevation in linkage zones.

b. In addition to roads indicated on the transportation plan map (Appendix C, Figure C-6B), total temporary roads will not exceed 5 miles in length in any given year. These roads will be built to a minimum standard and reclaimed within one operating season following completion of project-related activity.

Rationale: At times, short-term, low-standard roads are needed for individual projects, but there is no need to make them part of a permanent road system. These roads are expected to have minor, short-term displacement effects on grizzly bears in the immediate area. However, because they would be reclaimed following use, they would have little long-term displacement effect and pose no appreciable risk of additional mortality.

c. Except where commercial forest management activities are occurring, DNRC expects that all other road use on restricted roads it controls will conform to the "low use" (less than one vehicle per day) category of Mace et al. (1999).

d. Some roads that are currently restricted to the public under the Swan Agreement would not be under the sole jurisdiction of DNRC and therefore may receive more use than earlier envisioned. These roads may receive use by other adjacent landowners or those with access or ownership rights. These roads are indicated as open in the transportation plan map (Appendix C, Figure C-6B).

e. DNRC will limit the amount of new road construction on the Swan River State Forest to those approximate amounts estimated by decade in Table 2-4.

Rationale: The Swan Agreement provides a mechanism to control motorized access over multiple ownerships. In its absence, DNRC can only control roads it has sole jurisdiction over, and legal access rights by others cannot be denied by DNRC. Displacement caused by higher use levels is expected.

5. DNRC will install signs indicating bear presence on the main open roads (portal roads) entering the Swan River State Forest. DNRC will determine the exact number and locations of signs to post and will be responsible for keeping signs in good repair. Repairs will be integrated into the normal course of seasonal maintenance activities. DNRC will have 2 years from the issuance of the Permit to install the signs.

Rationale: The intent of posting signs is to inform people entering forested state lands of the presence of bears, and to raise public awareness as to the importance of avoiding bear-human interactions. An estimated 10 signs will be needed for the entire Swan River State Forest.

GB-SW2 Adjacent Landowners

DNRC will consider opportunities to work with adjacent landowners in a cooperative manner to support grizzly bear conservation efforts.

Rationale: The intent of this measure is to serve as a reminder that in some circumstances, the conservation value of a commitment for grizzly bears can be increased when it is applied in cooperation with adjacent landowners. DNRC would not be required to continue a cooperative agreement in the Swan River State Forest should the Swan Agreement be terminated, and both parties feel the HCP commitments provide adequate conservation for grizzly bears in the Swan River State Forest in the absence of a multi-party agreement. However, it is worth recognizing that for certain commitments, cooperating with adjacent landowners may provide additional value for bears. Two such examples from the current Swan Agreement include coordinated timing of commercial forest management activities and cooperative access management designed to control open road densities. Additional examples of cooperative management that are being implemented at this time include multi-party funding for ongoing research and multi-party funding for a grizzly bear outreach coordinator.

GB-SW3 Active Management Followed by Rest

1. **Active Management Followed by Rest.** The Swan River State Forest is divided into five geographic subzones, as depicted in the Appendix C, Figure C-7. In each subzone, DNRC may conduct commercial forest management activities, including salvage harvest for a maximum management period of 4 years, followed by a mandatory rest period of at least 8 years. Each subzone will have its own management/rest period schedule independent of the other subzones. The 4-year management period may be extended due to management delays beyond the control of DNRC, such as extreme weather events, fire events, area closures due to fire danger, and legal injunction. In such cases, DNRC will write an explanation of the extension and submit it to the USFWS at the time the extension is invoked. Contractor equipment failure and extensions to address market fluctuations are not considered allowable delays.

2. **Management Activities Allowed During Rest.** The following activities will be allowed in rested subzones.

   a. Rest is intended to be a mitigation measure for the period when bears are active. Therefore, the rest status does not apply during the winter period (November 16 through March 31), and commercial forest management activities are allowed in winter below 6,300 feet without limitation during rest periods.

   b. Low-intensity forest management activities will be allowed during the rest period, except for restrictions during the spring period, as described in commitment GB-NR3, Spring Management Restrictions.

   c. Commercial forest management activities for minor projects, including salvage, will be allowed for a limited number of days after the spring period. For the Swan River State Forest, a total of 30 operating days in aggregate are allowed per year, per rested subzone (days can only be used June 16 through September 15). DNRC will limit the allowable annual operating days to 30 in aggregate per inactive subzone to conduct minor projects. This 30-day allowance may also be applied to resting subzones that have exceeded rest beyond 8 years and are not are not yet ready for large-scale planned commercial harvest. When tracking the number of operating days allowed for minor projects:

      i. Two commercial operations within 0.5 mile of one another count as one operation for those days both are active. Operations more than 0.5 mile apart are considered distinct, and operating days must be considered additive and tallied separately.

      ii. Commercial forest management activities within 100 feet of an open road do not count toward the allowable operating day limits.

Rationale for rest/management: The rotation system under the Swan Agreement (i.e., incorporating federally defined active and inactive bear management unit [BMU] subunits) was designed to provide for substantial periods free of heavy commercial activity in any given area. DNRC owns substantial quantities of land in four of these federally defined subunits. However, in the absence of a cooperative agreement, three of these subunits consist of checkerboard ownership, in which it is impossible for DNRC alone to guarantee limits on commercial activity for specific periods, even if DNRC were to commit to such a plan itself. Only in the South Fork Lost Soup Subunit does DNRC have a land ownership pattern that enables the department to ensure a period free of major commercial activity in the absence of assistance from other cooperators.

The DNRC HCP's approach to rest lessens displacement and mortality risk for grizzly bears by incorporating five similarly sized subzones to provide for biologically meaningful rest periods for bears and operationally functional periods for DNRC. Each subzone could be activated independently of others or in conjunction with adjacent subzones to accomplish management objectives while still providing 8-year periods of rest. The Swan Agreement rotation system requires that subunits be rested 3 years for each 3 years of activity (i.e., 1:1 active to inactive period ratio). As currently agreed to by cooperators, the Agreement currently provides active periods of 3 years and inactive periods of 6 years (i.e., 1:2 active to inactive period ratio). The revision of this measure to 4 years active and 8 years inactive maintains the original rest ratio, but provides DNRC greater flexibility to concentrate on and complete projects, and provides grizzly bears a longer period free from the disturbance of major commercial activity in the subzones. The commitments pertaining to this subsection are not intended to restrict DNRC from conducting forest management activities on any roads open for use by the general public, including those crossing parcels in rest.

Rationale for extending the 4-year management period: Rationale for extending the management period is provided under commitment GB-ST2.

Rationale for minor projects: Rationale for minor projects is provided under commitment GB-ST2.

Rationale for two operations within 0.5 mile: Rationale for two operations is provided under commitment GB-ST2.

Rationale for activities within 100 feet of an open road: Rationale for activities within 100 feet is provided under commitment GB-ST2.

GB-SW4 Salvage on Rested Subzones

1. DNRC will conduct salvage harvest activities under the following order of preference, when economically and operationally practicable:
    a. Conduct salvage during the winter period
    b. For salvage harvest that must occur outside of the winter period, conduct the harvest in an expedient manner
    c. Days used for operating salvage harvest from June 16 through September 15 shall count toward the 30 days allowed for minor projects (described in commitment GB-SW3)
    d. DNRC will forgo unused annual operating days in other inactive subzones to compensate for the number of days required to complete such projects.
2. Salvage projects that cannot be accomplished using the four approaches above may be extended between 31 and 150 days during non-denning period. The following conditions would apply:
    a. Following a 31- to 150-day extension for salvage, DNRC would be required to restart the rest period. In this situation, a full uninterrupted 8-year rest period must be achieved before allowing another 31- to 150-day interruption. If a salvage harvest during the restarted rest period requires more than 30 days to complete, the action would be processed as a changed circumstance (see Chapter 6).
    ~~3~~b. DNRC will document the necessity for interrupting the rest period. A DNRC wildlife biologist will develop a site-specific mitigation plan addressing potential effects on grizzly bears through habitat considerations, timing restrictions, and transportation management and access. Examples of habitat considerations include important secure areas, berry fields, avalanche chutes, riparian areas, wetlands, white bark pine stands, and unique congregation or seasonal feeding areas. The DNRC project leader and DNRC decision maker will consider the input from the biologist. A copy of the mitigation documentation highlighting those measures implemented by the project leader and decision maker (Appendix B, Document B-1) will be submitted to the USFWS prior to a project decision.

Rationale for salvage projects: Rationale for salvage projects is provided under commitment GB-ST3.

GB-SW5 Gravel Operations

The following commitments supplement commitment GB-NR6:

1. DNRC will limit the number of active gravel pits on the Swan River State Forest: four specific pits may be considered active for a particular calendar year (no more than three may be large).
2. Gravel pits situated within 0.25 mile of an open road may be developed and operated without restrictions on season of use and duration of motorized activity.
3. During the 4-year window for commercial forest management in active subzones, gravel pits that are more than 0.25 mile from an open road may be developed and operated outside of the spring period without restriction on amount and duration of activity.
4. One gravel pit more than 0.25 mile from an open road may be operated in one selected resting subzone on the Swan Unit. When the pit is operated more than 0.25 mile from an open road in a resting subzone, DNRC will: (1) minimize the distance of the pit from an open road, and (2) to the extent possible, cease activities on all allowable remaining pits while the gravel pit is active. Purchasers or other licensed third parties will be allowed to continue to operate within the active pits that have legally defined operating periods by license or contract.

Rationale: Gravel pits in areas open for management and more than 0.25 mile from an open road are allowed, because disturbance in those areas will be in conjunction with other ongoing commercial forest management activities. Activities at gravel pits will likely not be discernable or additive to ongoing motorized use for commercial purposes.

To maintain the integrity of rested subzones, gravel pits more than 0.25 mile from an open road will not be allowed. However, DNRC needs flexibility for situations that may arise; therefore, one medium or large pit may be developed more than 0.25 mile from an open road in rested subzones under an allowance. This will provide for limited concentrated motorized use restricted to one localized area. When the allowance is invoked, DNRC will cease activities on the remaining three gravel pits (they will become temporarily inactive). Occasionally, there may be situations when DNRC is unable to temporarily inactivate one or more of these gravel pits due to long-term permitted uses.

2.1.1.8 Commitments for Scattered Parcels in Recovery Zones

In addition to the program-wide, NROH, and recovery zone commitments, the following commitments apply to scattered parcels in the HCP project area within recovery zones, including the NCDE and CYE. Scattered parcels are depicted in Appendix C, Figures C-2, C-3, C-5, and C-8 through C-16. Although DNRC manages some scattered parcels within the BE (see Table 2-1), the following commitments do not apply to these lands because this ecosystem is not currently occupied by grizzly bears. If the BE becomes occupied, as determined by the USFWS, an administrative changed circumstance would be triggered. Refer to Chapter 6 (Changed Circumstances) for additional information on how the USFWS and DNRC would proceed under changed circumstances.

GB-SC1 Open Roads

For projects on scattered parcels in recovery zones and for projects in the NROH associated with the CYE, this commitment supersedes commitment GB-NR1.

1. DNRC will evaluate each open road segment occurring within a forest management project to assess the potential to restrict access on that segment. DNRC will describe, through written rationale on a checklist form, why open roads were left open (Appendix B, Document B-2 – Open Road Reduction Checklist for Projects on Scattered Parcels in Grizzly Bear Recovery Zones).

2. DNRC will not exceed the HCP baseline open road amounts (total length), at the administrative unit level, for the purpose of conducting forest management activities. Accounting will be accomplished project by project, with open road densities being tallied at the unit level. HCP baseline data and maps and subsequent maps will be archived by the DNRC FMB.

   Allowance: Increases in open road densities at the project level to address road relocation considerations, when there are riparian areas or BMP concerns, would not count against the unit-level cap. These circumstances would be documented in the HCP implementation checklist (Appendix B, Document B-2).

3. To improve accuracy over time, the DNRC GIS road layer will be updated by project-level road assessments that consider road classifications, locations, and amounts.

Rationale: Additional open road for the 50-year HCP term is necessary for DNRC to (1) address access needs of other state, county, federal, and private entities on neighboring ownerships; (2) access parcels DNRC does not currently have access to through necessary granting of reciprocal easements; and (3) provide access within parcels in areas where new open roads are necessary or would be difficult to close effectively. DNRC must retain the ability to issue easements across state lands. Specific easement needs are not known at this time and are difficult to anticipate. To a limited extent, DNRC can maintain restricted roads that it has complete control over as restricted. DNRC can also restrict most newly constructed roads. However, there are situations where the amount of open road will increase because newly constructed roads are left open or currently restricted roads are opened. This is expected to be the exception rather than the rule and will be minimized while taking into account project, access management, and land management objectives.

Restricted and temporary roads in use for commercial forest management activities are not considered as open in the context of HCP commitments. They may, however, be considered as open by DNRC, at their discretion, for the purpose of quantifying resource effects in MEPA environmental analyses.

See also the rationale for commitment GB-NR1, New Open Road Construction, for background information regarding effects of roads on grizzly bears.

GB-SC2 Active Management Followed by Rest

1. **Active Management Followed by Rest.** For each scattered parcel in a recovery zone, DNRC may conduct commercial forest management activities and salvage harvest for a maximum management period of 4 years, followed by a mandatory rest period of at least 8 years. Each parcel will have its own management/rest schedule independent of other parcels. The 4-year management period may be extended due to management delays beyond the control of DNRC, such as extreme weather events, fire events, area closures due to fire danger, and legal injunction. In such cases, DNRC will write an explanation of the extension and submit it to USFWS at the time the extension is invoked. Contractor equipment failure is not considered an allowable delay.

2. **Management Activities Allowed During Rest.** The following activities will be allowed in rested subzones.
    a. Rest is intended to be a mitigation measure for the period when bears are active. Therefore, the rest status does not apply during the winter period (November 16 through March 31), and commercial forest management activities are allowed in winter below 6,300 feet without limitation during rest periods.
    b. Low-intensity forest management activities will be allowed during the rest period, except for restrictions during the spring period, as described in commitment GB-NR3, Spring Management Restrictions.
    c. Commercial forest management activities for minor projects, including salvage, will be allowed for a limited number of days after the spring period (i.e., useable between June 16 and November 15). For scattered parcels in recovery zones, each administrative unit has a specific maximum number of allowable operating days per year on rested parcels, as identified in Table 2-5. When tracking the number of operating days allowed for minor projects:
        i. Two commercial operations within 0.5 mile of one another count as one operation for those days both are active. Operations more than 0.5 mile apart are considered distinct, and operating days must be considered additive and tallied separately.
        ii. Commercial forest management activities within 100 feet of an open road do not count toward the allowable operating day limits.

Rationale: The unique way that scattered parcels are positioned on the landscape does not offer DNRC the opportunity to rest larger contiguous areas, such as the subzones delineated in the Stillwater Block and Swan River State Forest. However, rested parcels on a section-by-section basis, were considered to be more beneficial to bears than the same environment with none of the parcels in rest. See also rationale for scheduling rest and management periods in the subzones in the Stillwater Block and Swan River State Forest for further details regarding rest and road effects on bears (commitment GB-ST2). The commitments pertaining to this subsection are not intended to restrict DNRC from conducting forest management activities on any roads open for use by the general public, including those crossing parcels in rest.

TABLE 2-5. ANNUAL LIMITS FOR COMMERCIAL FOREST MANAGEMENT ACTIVITIES FOR MINOR PROJECTS IN 8-YEAR REST PERIODS ON SCATTERED PARCELS IN RECOVERY ZONES

Administrative Unit[1]	Annual Maximum Operating Days[2]
Clearwater	45
Helena	45
Kalispell	60
Missoula	45
Stillwater Unit	45

[1] The allowable operating days for the Libby and Plains Units are presented in Table 2-6 under commitment GB-CY1.
[2] Indicates days allowed for use after the spring period during the remainder of the non-denning season.

Rationale for extending the 4-year management period: Rationale for extending the management period is provided under commitment GB-ST2.

Rationale for minor projects: Rationale for minor projects is provided under commitment GB-ST2.

Rationale for two operations within 0.5 mile: Rationale for two operations is provided under commitment GB-ST2.

Rationale for activities within 100 feet of an open road: Rationale for activities within 100 feet is provided under commitment GB-ST2.

GB-SC3 Salvage Projects on Rested Parcels

The following commitments supplement commitment GB-NR6.

1. Prior to implementing a salvage harvest, DNRC will conduct salvage harvest activities under the following order of preference, when economically and operationally practicable:
    a. Conduct salvage during the winter period.
    b. For salvage harvest that must occur outside of the winter period, conduct the harvest in an expedient manner.
    c. Days used for operating salvage harvest from June 15 through November 15 shall count against the allowable days per administrative unit for minor projects (described in commitment GB-SC2 and Table 2-5, as well as Table 2-6 under commitment GB-CY1 below).
    d. DNRC will forgo unused annual allowable operating days usable in other inactive parcels to compensate for the number of days required to complete such larger projects.

2. Salvage harvest that cannot be accomplished using the four approaches listed above may be extended up to 150 days.

   a. DNRC is not required to restart the 8-year rest period on scattered parcels, but only one interruption is allowed per 8-year rest period per parcel for this purpose. Subsequent projects requiring more than the allowable days specified for each administrative unit to implement in an 8-year rest period would be addressed as a changed circumstance (see Chapter 6).

   ~~3~~b. DNRC will document the necessity for interrupting the rest period. A DNRC wildlife biologist will develop a site-specific mitigation plan addressing potential effects on grizzly bears through habitat considerations, timing restrictions, and transportation management and access. Examples of habitat considerations include important secure areas, berry fields, avalanche chutes, riparian areas, wetlands, white bark pine stands, and unique congregation or seasonal feeding areas. The DNRC project leader and DNRC decision maker will consider the input from the biologist. A copy of the mitigation documentation highlighting those measures implemented by the project leader and decision maker (Appendix B, Document B-1) will be submitted to the USFWS prior to a project decision.

Rationale for salvage in rested parcels: Rationale for salvage in rested parcels is provided under commitment GB-ST3.

GB-SC4 Gravel Operations on Rested Parcels

The following commitment supplements commitments GB-PR7 and GB-NR6.

One gravel pit per DNRC administrative unit may be operated more than 0.25 mile from an open road on a rested scattered parcel. In this situation, DNRC will: (1) minimize the distance of the pit from an open road, and (2) to the extent possible, cease activities on all allowable remaining pits in the administrative unit while the gravel pit is being operated. Purchasers or other licensed third parties will be allowed to continue to operate within the active pits that have legally defined operating periods by license or contract.

Rationale: To maintain the integrity of rested parcels, gravel pits more than 0.25 mile from an open road will not be allowed. However, DNRC needs flexibility for situations that may arise; therefore, one medium or large pit may be developed more than 0.25 mile from an open road in rested parcels. This will allow for concentrated motorized use in one localized area. When the allowance is invoked, DNRC will cease activities on the remaining two gravel pits (they will become temporarily inactive). Occasionally, there may be situations when DNRC is unable to temporarily inactivate one or more of these gravel pits due to long-term permitted uses.

2.1.1.9 Cabinet-Yaak Ecosystem Commitments

Grizzly bear population levels are currently low within the CYE, which raises the importance of conservation within that ecosystem at this time. In 1999, the USFWS determined that uplisting the combined Selkirk and CYE recovery zone populations from threatened to endangered status was warranted, but precluded due to higher conservation priorities. In this grizzly bear conservation strategy, DNRC considered the current higher level of risk associated with the CYE population, and applied greater levels of mitigation in the CYE to address this greater sensitivity. Greater protections in this area are a product of striking a difficult balance to provide mitigation measures for grizzly bears while maintaining management opportunities to allow the DNRC forest management program to remain viable in this area. DNRC agrees to apply this greater level of mitigation on this specific subset of lands, but considers this level of mitigation cost-prohibitive if applied across all of the HCP project area within recovery zones.

This set of commitments will apply to the HCP project area within the CYE recovery zone, and will be extended to the HCP project area outside the recovery zone, but within NROH (as defined by Wittinger 2002) associated with the CYE (west of Highway 28 and north of Highway 200) (Appendix C, Figures C-15 and C-16).

These commitments apply to the scattered parcels associated with the CYE subpopulation of grizzly bears. For projects in the CYE NROH and CYE recovery zone, the program-wide, NROH, recovery zone, and scattered parcels in recovery zones commitments also apply.

In the event that the USFWS determines that the CYE grizzly bear population no longer warrants endangered status, an administrative changed circumstance would be triggered, and the processes outlined in Sections 6.1.2 (Process for Administrative Changed Circumstances) and 6.3.1.2 (Change in Status of an HCP Species) would be implemented.

GB-CY1 Minor Projects during the 8-Year Rest Period

For parcels in both the CYE recovery zone and the CYE NROH, commercial forest management activities (including salvage harvests) are allowed after the spring period, but are limited to a set number of annual operating days per administrative unit, as identified in Table 2-6. Within the maximum operating days identified in Table 2-6, commercial forest management activities and salvage harvest on Libby and Plains Unit parcels are limited to a total of 10 parcels per non-denning season for each unit. In addition, the duration of such management is limited to 15 days in aggregate on each parcel for each unit.

TABLE 2-6. ANNUAL LIMITS FOR COMMERCIAL FOREST MANAGEMENT ACTIVITIES FOR MINOR PROJECTS IN 8-YEAR REST PERIODS ON SCATTERED PARCELS IN THE CYE RECOVERY ZONE AND CYE NROH

Administrative Unit	Annual Maximum Operating Days[1]
Libby	30 west and 60 east (90 total)
Plains	45

[1] Indicates days allowed for use after the spring period during the remainder of the non-denning season.

Rationale for minor projects in the CYE: The intent of these measures is to minimize disturbance potential for grizzly bears while allowing for minor levels of activity to occur to maintain a viable salvage program and timber permit operations in these sensitive areas. On the Libby Unit, the allowable maximum operating days were expanded to 90 because the acreage affected by restrictions on the Libby Unit is twice that of similar unit offices managing scattered parcels in grizzly bear habitat. Timber permits (up to 100 mbf green timber or up to 200 mbf emergency salvage as defined by ARM 36.11.450) are a considerable component of the timber program on the Libby Unit. The purpose of the 10-parcel/15-day aggregate restrictions is to further limit the scope and scale of any particular project to greatly reduce long-term displacement potential for bears.

On the Libby Unit, 90 days of total salvage activity is allowed on an annual basis during the non-denning season. Only 15 days can be spent on any given parcel, and operations can be conducted in a maximum of 10 parcels during any one non-denning season, to a maximum of 90 days (i.e., unit-specific). For example, managers on the Libby Unit would have the option to spend 9 days in each of 10 parcels, or 15 days in 6 parcels, up to the 90-day allowable quota. Of these 90 days, 30 would be allowed in the Troy area west of the Cabinet Mountains, and 60 would be allowed in the Fisher/Wolf Creek area east of the Cabinet Mountains. The Plains Unit would only have 45 total days to use in a similar manner. Under this commitment, the Libby and Plains Units would collectively have about 25 parcels on which commercial forest management activities could not occur during any calendar year.

GB-CY2 Salvage Projects in the CYE

This commitment applies to CYE recovery zone and CYE NROH. This commitment supplements commitment GB-SC3 item (3).

Following completion of a mitigation plan as required under commitment GB-SC3 item (3), DNRC will submit the mitigation plan to the USFWS for approval. The USFWS will have 30 days from the date a plan is submitted for review and approval. Within 30 days, the USFWS will respond with its concerns and proposed changes required for approval. If the USFWS does not respond within 30 days, DNRC may proceed with the project. The purpose of this review is to identify the USFWS' concerns and required remedies and subsequently approve the project once DNRC has addressed the USFWS' concerns.

GB-CY3 More Restrictive Management in the Spring Period

This commitment supersedes items (3) and (4) in commitment GB-NR3.

DNRC may conduct some motorized use associated with low-intensity forest management activities on up to 50 percent of the parcels in the CYE recovery zone and CYE NROH in spring habitat during the spring period. These uses include tree planting, prescribed burning, patrol of slash burns, and noxious weed management. Any combination of the aforementioned activities is limited to 10 days per parcel within the spring period each year.

Table 2-7 compares activities allowed during the spring period on other scattered parcels in the recovery zones and NROH with those activities allowed in the CYE recovery zone and CYE NROH.

TABLE 2-7. ACTIVITIES ALLOWED DURING THE SPRING PERIOD[1] IN SPRING HABITAT

	NROH and Recovery Zones outside the CYE	CYE Recovery Zone and CYE NROH
Sale preparation	Allowed	No motorized
Road location	Allowed	No motorized
Tree planting	Allowed	≤ 10 days aggregate per year per parcel
Prescribed burning	Allowed	≤ 10 days aggregate per year per parcel
Data collection/monitoring	Allowed	No motorized
Patrol of fall/winter slash burns	Allowed	≤ 10 days aggregate per year per parcel
Noxious weed management	Allowed	≤ 10 days aggregate per year per parcel
Slash treatment, non-heavy equipment (chainsaws)	Allowed	No
Road maintenance, mechanical site preparation, and bridge replacement	10 days total per year per unit	10 days total per year per unit

[1] **Spring period** – For the Stillwater Block, this is April 1 through June 15 for non-spring habitat and April 1 through June 30 for areas within spring habitat. For lands within the Swan River State Forest, DNRC scattered parcels in recovery zones, and NROH lands, this is April 1 through June 15.

Rationale: DNRC considers it important and useful to have the ability to allow motorized use associated with several low-intensity forest management activities in spring. Tree planting must occur in the spring, and there are evident cover benefits associated with reforestation, which are important for bears (see rationale for commitments GB-PR6, GB-NR4, and GB-RZ2). Planting is also of short duration and infrequently occurs on the same site year after year. Hazard reduction burning can also occur only during narrow temporal spring windows. Burning can benefit bears through ecosystem maintenance and promoting healthy native plant communities. Burning activities are also of short duration and infrequently occur on the same site year after year. Patrol of fall/winter slash burns is a necessary safety measure to reduce wildfire risk and liability that must be accomplished, and takes a short period of time to accomplish. Effective control of noxious weeds using herbicide applications must occur within narrow windows in the spring, and it promotes healthy native plant communities beneficial for bears. Weed control activities are expensive, relatively infrequent, and of short duration. The commitments pertaining to this subsection are not intended to restrict DNRC from conducting forest management activities on any roads open for use by the general public, including those crossing parcels in rest.

GB-CY4 Expedited Reduction of Open Road Densities for Recovery Zone Parcels

For parcels in the CYE recovery zone only (Appendix C, Figures C-15 and C-16), DNRC will expedite addressing open road densities, rather than doing it project-by-project as described in the scattered parcels commitments.

1. Within the first 5 years that the HCP and Permit are in effect, DNRC will analyze the road systems on each parcel in the CYE recovery zone and apply the Open Road Reduction Checklist for Projects on Scattered Parcels in Grizzly Bear Recovery Zones (Appendix B, Document B-2).
2. Where potential for closing roads is identified, implementation of closures will take place within the same 5-year period.

Rationale: The purpose of these measures is to expeditiously address open road densities and reduce them to the extent possible in the area of greatest concern for recovering grizzly bears in the CYE recovery zone. Net improvements, if possible, will be realized in the near future for this segment of the Montana grizzly bear population.

GB-CY5 Helicopter Use in the CYE

This commitment supplements commitment GB-PR8.

1. For scattered parcels in the CYE recovery zone only, DNRC will design helicopter operations less than 500 meters (1,640 feet) above ground level for commercial log yarding to avoid important areas for grizzly bears by requiring flight paths to be at least 1 mile from scattered parcels in rest or federally designated security core areas. Where practicable, flight paths will also be designed to avoid or minimize disturbance to any known seasonally important areas.
2. For scattered parcels in the CYE recovery zone and NROH only, DNRC will limit helicopter use associated with activities of short duration requiring few or multiple trips, such as, but not limited to, weed control, prescribed burning ignition and control actions, aerial seeding, and moving large pieces of equipment or materials to remote and/or rugged locations, to those requiring less than 48 hours to complete.

Rationale: See the rationale provided under commitment GB-PR8.

2.1.2 Lynx Conservation Strategy

Some of the forested trust lands managed by DNRC occur within the distribution of the lynx, which was listed as threatened in 2000 by the USFWS. This lynx conservation strategy incorporates many of the existing ARMs and describes additional commitments based on recent information and studies. This strategy minimizes impacts of forest management activities on lynx, while allowing management flexibility for DNRC to meet its fiduciary and stewardship trust responsibilities.

Although DNRC does not currently sit on any lynx working groups, it is committed to familiarizing itself with both state and federal conservation efforts and planning documents. DNRC has reviewed MFWP's comprehensive fish and wildlife conservation strategy (MFWP 2005) and has determined that the conservation strategies proposed in this HCP would complement Canada lynx conservation strategies set forth in MFWP's plan. The conservation strategy for lynx is also consistent with the Lynx Recovery Outline (USFWS 2005).

2.1.2.1 Goals and Objectives

The goal of the lynx conservation strategy is to support federal lynx conservation efforts by managing for habitat elements important for lynx and their prey that contribute to the landscape-scale occurrence of lynx, particularly in key locations for resident populations. Specific objectives developed to achieve this goal include the following:

- Minimize potential for disturbance to known active den sites.

- Within preferred habitat types (Pfister et al. 1977), map potential lynx (1) winter foraging, (2) ~~young~~summer foraging, (3) other suitable, and (4) temporary non-suitable habitats.
- Provide stand structures or attributes that provide habitat for prey species, particularly in winter.
- Retain coarse woody debris (CWD) and other denning attributes.
- Limit conversion of suitable lynx habitat to temporary non-suitable habitat per decade in key geographic areas of notable importance for lynx (termed lynx management areas or [LMAs] described further in Section 2.1.2.2, Geographic Scope).
- Ensure that adequate amounts of foraging habitat are maintained in defined LMAs.
- Provide for habitat connectivity on the landscape where vegetation and ownership patterns allow.
- Maintain suitable lynx habitat on DNRC scattered parcels outside LMAs.

2.1.2.2 Geographic Scope

The lynx conservation strategy consists of sets of commitments associated with two habitat areas: (1) lynx habitat within the HCP project area and (2) LMAs, which are specific subsets of lands encompassing select portions of the HCP project area where resident lynx populations are known to occur or where there is a high probability of periodic lynx occupancy over time. A total of six LMAs occur in the HCP project area on the NWLO and SWLO. These LMAs include the Garnet and Seeley Lake LMAs in the SWLO, and the Stillwater East, Stillwater West, Coal Creek, and Swan LMAs in the NWLO (Appendix C, Figure C-17). The concept of LMAs and rationale for their establishment is contained in Section 2.1.2.4 (Lynx Management Area Commitments), below.

2.1.2.3 Lynx Habitat Commitments

LY-HB1 Lynx Habitat Map

DNRC will establish and maintain a lynx habitat map following habitat definitions, protocols and modeling procedures identified in the DNRC HCP lynx habitat mapping protocols (Appendix B, Document B-3 – DNRC Canada Lynx Habitat Mapping Protocols for Implementation of the HCP). Mapped habitat includes portions of the NWLO, SWLO, and CLO. DNRC mapping protocols closely follow information contained in the *Lynx Conservation Assessment and Strategy* (LCAS) (Ruediger et al. 2000). Protocol revisions may be made by DNRC through consultation with the USFWS. The NWLO and SWLO maps will depict structural habitat conditions, including winter foraging habitat, ~~young~~summer foraging habitat, other suitable habitat, and temporary non-suitable habitat. The CLO maps will depict suitable lynx habitat and temporary non-suitable habitat. Maps depicting lynx habitat in western Montana and on each DNRC administrative unit following current mapping protocols are displayed in (Appendix C, Figures C-18 through C-31).

Stands will be added or removed from consideration as lynx habitat following field review and justification by DNRC. DNRC will submit these corrections to the USFWS prior to updating the maps. Changes to lynx habitat maps will be discussed at annual meetings. Gravel pits greater than 5 acres will be tracked and accounted for under normal SLI data collection procedures and updates. As gravel pits are developed, the acres cleared will be subtracted from mapped lynx habitat until future SLI data collection identifies them as forested.

Rationale: Edits to habitat maps are expected to happen periodically due to ongoing stand level inventory work, stand structural changes occurring through natural succession, stand structural changes due to natural or man-caused disturbance events, and refinement of stand boundaries. Edits would primarily be identification of errors in typing lynx habitats and stand boundary refinements during inventory or timber sale projects. Mapped lynx habitat acres would not be reduced or increased over time without notifying the USFWS. For the CLO, only suitable lynx habitat and temporary non-suitable habitat are modeled and depicted due to limitations of the SLI data for that land office.

~~LY-HB2 Den Site Attributes~~

~~To provide attributes important for potential lynx den sites, DNRC will commit to the following project-level measures in the HCP project area in mapped lynx habitat.~~

1. ~~DNRC will retain a minimum of two potential den sites per square mile. Natural or manmade piles at least 8 feet in diameter of slash and downed logs, which are at least 3 feet tall at their highest point, will be considered as potential den sites. Potential den sites must be situated more than 300 feet from open or restricted roads.~~

   ~~**Allowance:** This commitment does not apply to blowdown salvage harvest units.~~

~~**Rationale:** The intent of this measure is to provide for a reasonable distribution and abundance of potential lynx den sites on DNRC lands within identified lynx habitat. Providing two potential den sites per square mile accomplishes this objective (WADNR 2005:44). This measure only applies to lynx habitat within the HCP project area, and does not require that potential den sites be retained in non-lynx habitat. Situating these sites away from open and restricted roads reduces risk of losing the sites over time to firewood cutting, and reduces risk of disturbing denning lynx, should they be used at some time in the future.~~

2. ~~On blowdown salvage projects, 1 percent of the blowdown area will be left unsalvaged. The material will preferably be retained in a nonlinear patch or patches.~~

~~**Rationale:** The intent of this commitment is to provide for naturally created potential lynx den sites consisting of downed wood. This is accomplished by retaining some concentrations of naturally piled CWD and/or large downed material in areas where blowdown events occur.~~

3. ~~During timber sale layout, DNRC will position the retained den sites in topographically concave or drainage-basin areas within, and adjacent to, suitable lynx habitat where conditions allow.~~

~~**Rationale:** Most den sites in western Montana have been detected in mature stands with high horizontal forest cover (Squires et al. 2008). They have also been documented in a range of habitats including areas with root wads, large logs, slash piles, boulders, and concentrations of blown-down trees. In Montana, lynx select den sites in topographically concave or drainage-like areas that are distant from forest edges (Squires et al. 2008). Planning to retain potential denning structures in or near suitable lynx habitat with high levels of existing cover (e.g., where harvest units abut existing moderate- to well-stocked pole or mature forest stands) may increase the desirability of the sites~~

~~and/or the length of time they might be useable by denning lynx. Retaining slash piles and other potential den sites away from open and restricted roads helps ensure that piles may receive future use and will be resistant to loss due to firewood cutting over the long term. Slash and downed wood pile dimensions for potential den sites contained in this commitment were developed by qualitatively describing 10 den sites (seven natal and three maternal) used by five individual lynx in western Montana (Squires et al. 2001). DNRC anticipates that these measures will provide habitat attributes in addition to those structures and potential den sites occurring naturally on DNRC lands and on other ownerships at the landscape scale (e.g., root wads, large logs, slash piles, boulders, and concentrations of trees blown down that DNRC managers may be unaware of or cannot access). DNRC may conduct timber harvest in stands that are surrounded by non-lynx habitat. In these circumstances, it would not be able to retain den sites near adjacent stands that are suitable habitat.~~

LY-HB2 Coarse Woody Debris

To provide downed woody structure for lynx escape cover, habitat for prey species, and structure that may provide some potential den sites in the future, DNRC commits to the following project-level measures in the HCP project area in mapped lynx habitat.

1. To provide for CWD retention, DNRC will follow Graham et al. (1994) or other publications as mutually agreed to by the USFWS and DNRC. DNRC will emphasize the retention of downed logs of 15-inch diameter or larger where they occur.

   Allowance: DNRC's ability to retain CWD may be superseded in special management situations where other goals must be considered, such as:

   - Fuels management and aesthetic considerations in the urban interface
   - Projects near recreational areas, where downed wood is collected and burned
   - Harvest units adjacent to open roads
   - Broadcast burning
   - Meeting mandated hazard reduction requirements.

   The impracticability of implementing this commitment would occur on no more than 10 percent of those DNRC projects within a 5-year period occurring in lynx habitat ~~over the Permit term~~in the HCP project area.

2. For CWD recruitment, DNRC will retain an average of two snags and two live snag recruitment trees of greater than 21 inches diameter at breast height (dbh) per acre on the warm and moist habitat type group and the wet habitat type group (Green et al. 1992; Pfister et al. 1977). DNRC will retain an average of one snag and one live snag recruitment tree of greater than 21 inches dbh per acre on all other habitat type groups. If snags or snag recruitment trees of greater than 21 inches dbh are not present, then the largest snags or snag recruitment trees available will be retained. Snags may be evenly distributed or clumped. If there is an absence of sufficient snags or recruits, some substitution between the two may occur.

3. On blowdown salvage projects, 1 percent of the blowdown area will be left unsalvaged. The material will preferably be retained in a nonlinear patch or patches.

Rationale: CWD is an essential component of lynx denning habitat, and retaining CWD and overhead canopy may maintain or augment habitat suitability for denning lynx (Aubry et al. 1999; Ruediger et al. 2000). Overhead cover provides the kittens protection from avian predators and the weather (Ruediger et al. 2000). Lynx with kittens may be especially vulnerable to disturbance while the kittens are young, and lynx have been known to abandon kittens as a result of disturbance (Claar et al. 1999; Ruediger et al. 2000). Although CWD is an important habitat structure for lynx, it appears not to be a limiting factor currently in western Montana (Squires 2004, personal communication, 2009, personal communication). By retaining CWD amounts applicable for Montana following Graham et al. (1994), DNRC ensures that material that may provide potential den sites will be retained within DNRC forest management ~~project areas~~harvest units occurring in the HCP project area. CWD is also an important structural component of snowshoe hare habitat. The USFWS and DNRC recognize that Graham et al. (1994) does not specifically prescribe woody debris amounts or distributions for the purpose of creating potential den sites. However, by providing woody debris using these guidelines, DNRC will ensure that legacy material important for escape cover for lynx, structure important for snowshoe hares, possible future den sites, and other ecological purposes and functions will be retained. DNRC anticipates that the measures to provide for (1) ~~two den sites per square mile~~retention of blowdown salvage, (2) snags and recruitment trees and CWD, and (3) many other naturally occurring concentrations at the landscape scale will more than offset any minor losses of woody material due to the allowances listed above.

Other effects of timber harvest activities that result in woody material useful to lynx as denning habitat include (1) concentrations of logging debris around the perimeter of regeneration harvest units; and (2) wind damage along the edges of adjacent unharvested stands, resulting in downed trees, root wads, and broken-out tops.

While standing snags and large trees are not forest attributes specifically known to provide for lynx life requisites, large snags and snag recruitment trees do provide the raw materials for future large CWD, as do root wads when they blow down or fall over through time. Both large logs and root wads are often important structures at lynx den sites (Squires et al. 2001). Thus, by committing to retain large snags and snag recruitment trees, DNRC ensures that the types of structures used by denning lynx will be provided through the Permit term and will not be limited on the landscape.

DNRC's CWD commitments also provide assurances that quality winter foraging habitat will be retained within LMAs. These stands are mature sawtimber stands of varied stocking that will have large live trees, snags, and CWD present, albeit in varying amounts over time. The maintained presence of these mature stands within LMAs further ensures that structural attributes important for den sites will be maintained throughout the term of the HCP. Managed stands that would continue to meet the definition of winter foraging habitat following harvest will be required to meet snag and CWD commitments within LMAs.

This approach provides for retention of raw materials (i.e., snags and large recruitment trees) necessary to maintain attributes over time. It is suitable for minimizing take associated with denning lynx and forest management activities for the following reasons:

- Structures commonly found at den sites are not likely to be limiting for lynx at the landscape scale (Squires 2004, personal communication).

- Scale is an important consideration, and lynx are known to travel widely throughout home ranges (68 FR 40076-40101, July 3, 2003, p. 40084). They must be able to identify and take advantage of suitable den sites when they are encountered.
- In western Montana, lynx have primarily been found to use mature forests for denning, but there is considerable latitude in the stand age classes and site structure where lynx den (Squires 2005a, personal communication; Squires et al. 2001).
- Large downed logs and woody material can persist for many years. As previously harvested stands develop and mature, individual large woody structures may become more desirable periodically over time concurrent with increases in forest canopy and structure.

LY-HB3 Den Site Protection

DNRC will prohibit motorized forest management activities and prescribed burning associated with forest management activities within 0.25 mile of known active lynx den sites from May 1 through July 15. DNRC will verify the active den sites where this restriction would apply.

~~**Allowance:**~~ If DNRC confirms that lynx have vacated the den site vicinity prior to July 15, DNRC may proceed with the suspended activities. Documented evidence that lynx have fully vacated the den site will be required prior to resuming activities. A DNRC biologist will provide the documentation and will confer with local lynx researchers or experts, as needed.

Rationale: This measure is meant to protect known lynx den sites from disturbance during a specific time of year. Lynx kittens are especially vulnerable to disturbance while they are young, and female lynx have been known to abandon kittens as a result of disturbance (Claar et al. 1999; Ruediger et al. 2000). Research suggests that by mid-July, kittens are better able to tolerate being moved by the mother and are less dependent on a secure den site (Squires 2004, personal communication). In Washington, the critical breeding and denning season has also been described as May 1 through July 15 (WADNR 2005:47). In an attempt to establish consistency between lynx management plans and because there is no data available for Montana, the 0.25-mile distance was adopted from recommendations from the Washington State Department of Fish and Wildlife (WDFW) (1996), as referenced in the WADNR *Lynx Habitat Management Plan for DNR-Managed Lands* (WADNR 2005). Regarding the allowance, to avoid displacement of lynx from active den sites, confirmation that they have left an active den site is an important consideration prior to startup of forest management activities. Confirmation that lynx have vacated a den site would typically involve radio-collared individuals that are known to have traveled several miles away, concentrating their activities in a different area. Allowing forest management activities near an active den site prior to July 15 would require sound, documented evidence that lynx have moved an appreciable distance from the denning area in question.

LY-HB4 Foraging Habitat Attribute Retention

To facilitate the development of multi-storied forest canopies, DNRC makes the following commitments.

1. In thinned portions of pre-commercial thinning units within mapped lynx habitat, DNRC will retain small, shade-tolerant trees (species such as grand fir [*Abies grandis*], subalpine fir [*Abies lasiocarpa*], and Englemann spruce [*Picea engelmanii*]) that do not pose substantial competition risks to desired crop trees.

Rationale: When conducting pre-commercial thinning activities, DNRC will leave some small trees, typically those less than approximately one-quarter the size of retained crop trees. In some situations it may be necessary to remove these smaller trees as part of thinning operations. Some of the situations in which it may be necessary to remove some of the smaller trees include when (1) they are obstacles to cutting target trees, (2) they are dense and competing substantially with crop trees, (3) they have poor form, and/or (4) they are diseased or show signs of insect infestation. Generally, retained small trees will be shade-tolerant species that grow slowly relative to the retained crop trees. In time, these trees will grow to form a potentially dense understory below the faster-growing crop trees. While these trees do compete with the desired crop trees for limited site resources, retaining some of these smaller shade-tolerant trees would provide potential habitat structure for snowshoe hares by increasing the levels of horizontal cover and accelerating the development of multi-storied stands.

This commitment ensures that some of the tree species that provide horizontal cover consisting of tree boughs near the snow surface would be retained in stands receiving pre-commercial thinning treatments. The duration that forest stands would provide these habitat characteristics would be variable. However, given the slower growth rates expected from understory species, it is likely that such two-storied or multi-storied stands will provide decades of foraging habitat for hares and lynx.

2. DNRC will retain patches of advanced regeneration of shade-tolerant trees (grand fir, subalpine fir, and spruce), as a component of commercial harvest prescriptions in winter foraging habitat. DNRC anticipates that canopy cover of the retained patches would not exceed 10 percent of the stand area through implementation of this measure.

Rationale: Patches of shade-tolerant trees will break up site distances, provide horizontal cover, and ensure that forest structural attributes preferred by snowshoe hares remain when mature stands are commercially harvested. Stands where patches of shade-tolerant trees are retained are expected to maintain higher snowshoe hare densities and provide greater foraging opportunities for lynx compared to stands where all the shade-tolerant tree species are removed.

LY-HB5 Habitat Connectivity

At the project level, DNRC will design harvest units to maintain a connected network of suitable lynx habitat along ~~riparian areas~~RMZs, ridge tops, and saddles.

~~**Allowance:**~~ There are situations where maintaining habitat connectivity and leaving travel corridors along ridge tops and saddles are not practicable. Examples of this would be on non-forested ridges; on non-forested saddles; on harvest units where cable systems are used; where habitat associated with scattered parcels is isolated by management on surrounding ownerships; where lynx habitat polygons are isolated within a parcel; where forest types not preferred by lynx bisect lynx habitat; or where silvicultural, fiduciary, or access objectives cannot be met (e.g., presence of lodgepole pine [*Pinus contorta*] stands requiring stand-replacement harvest, locations with high potential for blowdown, limited access, etc.). ~~If this allowance is invoked~~In instances of impracticability, DNRC will document the circumstances in the MEPA environmental analysis.

The following measures in other DNRC HCP conservation strategies will also support lynx habitat connectivity.

- **Riparian cover and connectivity**. DNRC will provide visual screening cover in ~~riparian zones~~ RMZs through the implementation of the HCP aquatic riparian timber harvest conservation strategy, and in WMZs through implementation of the Forest Management ARMs ~~pertaining to WMZs~~ (ARM 36.11.426).
- **Forest openings**. DNRC will be implementing the grizzly bear conservation strategy within grizzly bear recovery zones and NROH, which includes a 600-foot distance to visual screening commitment (GB-NR4). Where lynx habitat occurs within grizzly bear recovery zones and NROH, this commitment will limit the size of forest openings that can be created through timber harvesting, thereby supporting habitat connectivity.
- **Gravel pits**. DNRC will restrict gravel pit development in SMZs and RMZs (commitment AQ-SD5). This will facilitate use of riparian corridors as cover for secure movements. Additionally, commitments GB-PR7, GB-NR6, GB-ST5, GB-SW5, and GB-SC4 would limit the number, size, and location of gravel pits in the HCP project area. These commitments will minimize lynx habitat loss and contribute to habitat connectivity.

Rationale: Lynx are highly mobile and have relatively large average home ranges; they are capable of moving long distances to find abundant prey (68 FR 40076-40101, July 3, 2003, p. 40083). Lynx are thought to frequently travel along linear features such as ridges, saddles, and riparian areas (Ruediger et al. 2000:1-4). While it is assumed that lynx would prefer to travel where there is forested cover, the literature contains many examples of lynx crossing large, unforested openings (Roe et al. 2000 as referenced in 68 FR 40076-40101, July 3, 2003, p. 40079). Connectivity of appropriate habitat types and cover types provides habitat connectivity and may increase the likelihood of successful dispersal of lynx (Ruediger et al. 2000; 68 FR 40076-40101, July 3, 2003, p. 40097). There is little evidence to suggest that forest roads pose a threat to lynx (68 FR 40076-40101, July 3, 2003, p. 40083).

In this strategy, cover and habitat connectivity are provided for lynx near riparian areas and ~~WMZs~~wetlands by implementing the aquatic conservation strategies (Section 2.2.3, HCP Conservation Strategies), ARMs, and the SMZ Law. Connectivity is also provided along ridge tops and saddles where practicable, and by implementing the grizzly bear conservation strategy, which contains constraints on opening sizes of even-aged harvest units. In designing and managing for habitat connectivity for lynx across the landscape, DNRC will consider land uses and conditions on ownerships adjacent to HCP project area lands containing lynx habitat. Considering that the lynx is a highly mobile species capable of long-distance movements across non-forested openings, and given the context of DNRC ownership patterns and amounts, the measures in this strategy provide assurances that successful movement and dispersal of lynx can continue within and across DNRC ownership.

By following the aquatic conservation strategies, DNRC is committing to a series of conservation commitments that would provide important cover and habitat connectivity for lynx (see Section 2.2.3, HCP Conservation Strategies).

DNRC will also provide visual screening for lynx in WMZs through implementation of the Forest Management ARM pertaining to WMZs (ARM 36.11.426). The WMZ ARM applies mitigation measures that provide protections to WMZs.

LY-HB6 Habitat Suitability

Of the total potential lynx habitat in the HCP project area on scattered parcels outside the LMAs, DNRC will maintain at least 65 percent of the area as suitable lynx habitat and no more than 35 percent as temporary non-suitable habitat at the land office scale, as shown in Table 2-8.

LMAs are defined and described in the section below.

TABLE 2-8. ESTIMATED ACRES OF LYNX HABITAT OUTSIDE THE LMAs BY LAND OFFICE TO BE RETAINED UNDER THE HABITAT SUITABILITY COMMITMENT

Land Office	Total Potential Lynx Habitat	Required Suitable Lynx Habitat at 65 Percent	~~Required~~ Temporary Non-Suitable Lynx Habitat Limit at 35 Percent
CLO	37,039	24,075	12,964
NWLO	63,816	41,480	22,336
SWLO	27,186	17,671	9,515

Note: Commitments are based on percentages and not on acreage amounts. Acreage amounts in the above table are approximate only and will vary over time as SLI information is updated.
Source: Acreages based on a query of the 2005 SLI database (DNRC 2008a).

Rationale: The intent of this commitment is to provide assurances that suitable lynx habitat will be maintained on scattered DNRC lands over the Permit term. This commitment is made at the land office scale because (1) it is impracticable to implement it at the individual parcel level, which varies in size from 20 acres to a full section (about 640 acres); and (2) many variables affect management decisions at the individual parcel level, such as access, ownership patterns, and disturbance scales. This measure ensures that each DNRC land office will maintain a diversity of structures needed by lynx, and that portions of lynx home ranges are maintained as suitable lynx habitat.

2.1.2.4 Lynx Management Area Commitments

The conservation commitments that apply specifically to LMAs are contained in this portion of the conservation strategy. The six LMAs, Coal Creek, Garnet, Seeley, Stillwater East, Stillwater West, and Swan, are shown in detail in Appendix C, Figures C-29, C-30, and C-31.

Lands within the LMAs either currently support lynx populations or are likely to periodically provide habitat for dispersing lynx, and they are likely to remain high-priority areas to promote lynx conservation into the future (Squires 2005a, personal communication). By placing additional conservation emphasis in these geographic locations, DNRC will help ensure the persistence of lynx populations associated with them or maintain habitat amounts and attributes that make them desirable for potential future use by lynx. The areas identified to receive this mitigation are DNRC lands within the Stillwater, Coal Creek, and Swan River State Forests; a group of scattered parcels in the Garnet Mountain Range; and a group of scattered parcels surrounding Seeley Lake. These lands occur in primary lynx habitat types, and are thus likely to provide snow depths and species compositions necessary to provide preferred winter foraging conditions.

LY-LM1 Habitat Suitability

Total potential lynx habitat includes the habitat subsets of suitable lynx habitat and temporary non-suitable habitat. In the identified LMAs, DNRC will maintain at least 65 percent of total potential lynx habitat as suitable lynx habitat, and no more than 35 percent as temporary non-suitable habitat (referred to as 65/35 percent habitat ratio), as shown in Table 2-9.

TABLE 2-9. ESTIMATED ACRES OF LYNX HABITAT THAT WOULD BE RETAINED IN EACH LMA UNDER THE HABITAT SUITABILITY COMMITMENT

Lynx Management Area	Total Potential Lynx Habitat Acres	Suitable Lynx Habitat Acres at 65 Percent	Temporary Non-Suitable Lynx Habitat Acres at 35 Percent Limit
Stillwater East	34,468	22,404	12,064
Stillwater West	35,582	23,128	12,454
Coal Creek[1]	14,188	9,222	4,966
Swan	36,654	23,825	12,829
Seeley Lake	4,466	2,903	1,563
Garnet	3,923	2,550	1,373
TOTAL	**129,281**	**84,033**	**45,248**

[1] In the Coal Creek LMA, the percent suitable/non-suitable habitat ratio requirement will be 60 percent suitable/40 percent non-suitable for the first 10 years that the HCP and Permit are in effect. Refer to the rationale below for additional information.

Note: Commitments are based on percentages and not on acreage amounts. Acreage amounts in the above table are approximate only and will vary over time as stand level inventory information is updated.

Source: Acreages based on a query of the 2005 SLI database (DNRC 2008a).

Rationale: This commitment ensures that adequate amounts of suitable lynx habitat are retained within the key geographic areas of notable importance for lynx, and it applies in places where DNRC manages several thousand acres of habitat within areas approximating the size of lynx home ranges. The 65/35 percent habitat ratio is important to reflect the habitat needs of lynx, to adhere to the scales and frequency of natural disturbance regimes, and to meet DNRC's operational needs.

DNRC's intent under this measure is to maintain a range of stands possessing varied structural complexity that would all meet or exceed the minimum definition for suitable lynx habitat, but not necessarily to manage all suitable lynx habitat down to the minimum defined level. DNRC anticipates that some stands will be managed to minimum structural levels, while many others will not. DNRC also recognizes that clear, precise definitions incorporating detailed information about vegetative and structural habitat parameters beyond a minimum suitable crown closure amount (such as the one contained in this strategy) currently do not exist.

The numerical parameters used in the DNRC definition for suitable lynx habitat were derived from several sources that all attempt to describe minimum stand structural conditions providing similar function for lynx. (See Appendix B, Document B-3 for details). The greater than 40 percent total stand crown closure parameter was considered to be the best minimum metric by DNRC to describe habitat with greater structural complexity and forest canopy than that defined in the LCAS (Ruediger et al. 2000) as "Lynx Habitat Currently in Unsuitable Condition" utilizing DNRC's existing SLI data and attribute categories. The greater than 40 percent total stand crown closure metric also falls well within the range of stand conditions where lynx use has been observed in western Montana (Squires 2005b, personal communication). This metric in the suitable lynx habitat definition will generally apply to identifying and categorizing mature stands. The minimum stand density metric of 180 stems per acre of trees 6 feet tall or greater was adopted from research conducted by Koehler and Brittell (1990), who observed lynx use of pre-commercially thinned sapling stands possessing trees greater than 6 feet tall. The WADNR (2005) lynx habitat management plan similarly defines forested habitat as maintaining at least 180 trees per acre greater than or equal to 8 feet tall (445 trees per hectare and 2.5 meters tall). If there are fewer trees per acre, the trees must have greater than or equal to 40 percent horizontal cover for 3.3 feet (1 meter) above average snow level. For reference, 180 saplings per acre (with non-touching crowns) having crown diameters that average 5 to 6 feet will provide from 8 to 12 percent crown closure immediately post-thinning.

The 65/35 percent habitat ratio threshold requirement for suitable/temporary non-suitable habitat is incorporated into this strategy based on the natural disturbance regimes DNRC attempts to emulate on the landscape, and on the LCAS concept of 70/30 percent suitable habitat/non-suitable habitat that is required of federal agencies. The reasons DNRC committed to a 65/35 percent rather than the 70/30 percent habitat ratio are as follows.

- **Alignment with the management philosophy and objectives of the SFLMP.** In the SFLMP, DNRC identifies the desired future conditions of trust lands to be the proportion and distribution of forest types and structures that were historically present on the landscape. Under historical conditions in western Montana within cover types that were likely to support lynx, approximately 38 percent of the landscape was in non-stocked and seedling/sapling stands (weighted average derived from Losensky 1997). This represents long-term average conditions. Some amount of non-stocked and seedling/sapling habitat would not be suitable at any point in time. Periodic large disturbances were likely (Barrett et al. 1991) that shifted broad landscape mosaics supporting conditions for lynx and would exceed 30 percent and even 35 percent periodically, if not frequently. DNRC believes that committing to retention of greater than 65 percent of suitable habitat on HCP project area lands runs contrary to the current understanding of natural disturbance regimes, which would result in promoting forest conditions that deviate from the SFLMP intent.
- **The size of fire events typical within lynx habitat types found in western Montana.** The LCAS provides direction that "…at least 10 mile^2 (6,400 acres) of primary vegetation should be present within each LAU (lynx analysis unit) to support survival and reproduction" of lynx. In an LAU supporting about 6,400 acres of habitat, a stand-replacement disturbance of 1,955 acres would exceed a 30 percent non-suitable habitat threshold LAU allowance. Large disturbances of this sort would have been likely under historical disturbance regimes. On three study areas totaling 395,367 acres associated with Glacier National Park, Barrett et al. (1991:1716) observed that about 154,190 acres (39 percent) burned within a 26-year period. In 1910, approximately 33 percent (5,051 acres) of the Coal Creek State Forest burned. In 2001, approximately 45 percent (6,913 acres) of the Coal Creek State Forest burned in the Moose Fire, of which about 3,690 acres burned at stand-replacement intensity. In these large burns, it is likely that considerable proportions of suitable habitat would have been rendered unsuitable at the LAU scale.
- **Sustainable Yield Study and SFLMP considerations.** Emulation of natural disturbance processes is at the core of the management philosophy presented in the SFLMP and ARMs. The intention is to maintain biodiversity on DNRC lands based on conditions expected to

develop naturally. Different cover types display different age class distributions, reflecting predominant disturbance regimes. Stand-replacement disturbance regimes have higher estimated proportions of early successional stands as stated in ARM 36.11.408(5)(c) and as indicated in Losensky (1997). Mixed-severity regimes are intermediate between the stand-replacement and the non-lethal regimes in the amounts of early- and late-successional stands. The SFLMP directs DNRC to consider estimates of historical conditions, or conditions expected to develop under natural processes when managing for desirable landscape patterns, age class distributions, and cover types.

In 2004, DNRC completed a sustainable yield calculation predicated on implementing the SFLMP and ARMs. That calculation partitioned harvesting into even-aged or uneven-aged treatments as per the SFLMP. The average proportion of even-aged treatments across all DNRC lands was set at 40 percent as presented in the SFLMP Final EIS appendices (DNRC 1996:SCN-20). Differing proportions were identified for different geographic regions to reflect predominant disturbance regimes. In the NWLO (where a preponderance of lynx habitat exists), even-aged harvest proportions were set at amounts presented in Table 2-10. Totals of even-aged treatments are greater than the statewide percentage of 40 percent for the NWLO, the Swan Unit, and the Stillwater Unit, due to the greater representation of forests with cool and moist habitat types, which are more abundant in the northwest portion of the state. Because more intense, but less frequent, natural disturbances are associated with these habitat types, greater levels of harvest treatments that emulate stand-replacement and mixed-severity disturbances are appropriate.

DNRC built a succession model to examine the effects of harvesting and succession on suitable and non-suitable lynx habitat over time and by geographic area. Using the proportions of even-aged harvesting indicated in Table 2-10, results from the model suggest that all of the geographically defined areas, except the Garnet area, would exceed 35 percent non-suitable habitat, with the Stillwater and Swan Units registering about 37 percent non-suitable and the Seeley Lake area showing 42 percent non-suitable. Thus, adopting the LCAS (Ruediger et al. 2000) threshold for a suitable/non-suitable commitment at the ratio of 70/30 percent would require that additional constraints beyond those needed to achieve 65/35 percent be applied to the amount of allowable harvest under even-aged systems, which would negatively affect future harvest volume and returns to state trust beneficiaries.

TABLE 2-10. PERCENTAGE OF ANTICIPATED EVEN-AGED HARVESTING BY HABITAT TYPE GROUP UNDER THE SFLMP FOR THE NWLO, SWAN UNIT, AND STILLWATER UNIT (INCLUDING THE COAL CREEK STATE FOREST)

Habitat Type Group	NWLO (%)	Swan Unit (%)	Stillwater Unit (%)
Dry	17	6	2
Moist	61	78	62
Cool	22	16	36
TOTAL[1]	**48**	**51**	**57**

[1] The total percentage of all acres on the area or unit that will receive even-aged treatments.

Note: Percentages represent all even-aged harvesting that occurs on the various disturbance regimes (example: 17 percent of NWLO even-aged harvesting would occur on dry sites, most of which have a non-lethal disturbance regime).

Source: Acreages based on a query of the 2005 SLI database (DNRC 2008a).

- **DNRC's mandates and management objectives differ from those of the agencies bound to the LCAS.** The LCAS is designed for lands that are subject to the operating guidelines and principles of federal land management agencies, specifically the USFS and BLM, and takes into consideration the management and operational issues and mandates relevant to those federal land managers. Considerations in managing those federal lands often emphasize federal recovery goals, recreation, and other less-intensive actions, rather than commercial forest management activities. For this reason, the exact federal management measures in the LCAS are not directly applicable to trust lands or the uses of those trust lands (in this case, forest management). Management objectives for forested trust lands include revenue generation for the trust beneficiaries through a sustainable yield of timber. While DNRC has adopted the LCAS' conceptual approach of guaranteeing a portion of the landscape in suitable condition, DNRC requires the extra 5 percent flexibility of the 65/35 percent habitat ratio based on the different mandates and the different set of management and operational issues under which forested trust lands are managed.

The suitable/non-suitable habitat proportions that would be required on the Coal Creek LMA for the first 10 years that the HCP and Permit are in effect would require that suitable habitat not drop below 60 percent during that period. This number differs from the 65 percent retention requirement for the other LMAs due to recent reductions in forest cover on the Coal Creek State Forest attributable to a large wildfire that occurred in 2001. In that year, 6,900 acres (45 percent) of the ~~15,363~~15,236-acre Coal Creek State Forest burned in the Moose Fire, including 3,680 acres (24 percent) burned at stand-replacement intensity and 3,070 acres (20 percent) burned at mixed severity. The baseline conditions are such that a maximum of ~~66~~63 percent of the lynx habitat is currently in suitable condition in the Coal Creek LMA. Thus, if the 65 percent suitable habitat requirement were adopted for this LMA immediately upon HCP implementation, DNRC would be prohibited from harvesting in green stands in a manner that would convert these stands from suitable lynx habitat. This is because required habitat amounts ~~would immediately drop below the minimum~~are currently below the 65 percent suitable lynx habitat threshold~~ upon HCP implementation~~.

By establishing the 60 percent interim suitable habitat threshold for the first 10 years of that the HCP and Permit are in effect, DNRC will provide assurances that suitable habitat conditions will not drop below that level; however, it will allow DNRC to harvest a limited amount of green-tree volume during this period of post-fire recovery. Within 10 years, DNRC anticipates that a large proportion of the stands that burned at stand-replacement severity will have regenerated into ~~young foraging habitat and other suitable~~ habitat that would meet the other suitable lynx habitat definition and will become part of the overall pool of suitable lynx habitat acres on which the habitat percentage commitment is based. Ten years following Permit issuance and HCP implementation, DNRC managers would be required to meet the 65/35 percent habitat ratio commitment on the Coal Creek LMA, consistent with the requirement for all other LMAs.

Given recent indications of successful forest regeneration within the burn, 10 years is a reasonable period to allow for recovery from this large-scale natural event, at which time the 65/35 percent habitat ratio commitment for suitable/temporary non-suitable lynx habitat can be successfully applied. DNRC must depend on some green-tree harvest volume existing on the Coal Creek State Forest to meet sustainable yield objectives. However, no timber sales are planned for the Coal Creek block until 2010 and 2011. By design, in the habitat commitments for this LMA, harvest in mature green forest must be conservative during the

10-year implementation period, or meeting the 60/40 percent habitat ratio thresholds will not be achievable. Allowing a minor amount of green-tree volume removal is necessary and reasonable given DNRC's harvest target and the current vegetative conditions on the Coal Creek State Forest.

<<< The following rationale was moved from the end of this section. >>>

Rationale for the Size of the DNRC LMAs: ~~Federal m~~Measures from the LCAS require federal agencies to define and incorporate LAUs into lynx conservation procedures. LAUs (1) provide a logical scale of analysis for describing effects of projects, (2) help ensure that a good distribution of lynx habitat is maintained across multiple home-range-sized areas, and (3) provide the base analysis unit for applying suitable habitat (70 percent) and non-suitable habitat (30 percent) thresholds (Ruediger et al. 2000:7-3). DNRC adopted the LAU concept in the form of LMAs for the purpose of applying suitable/non-suitable habitat thresholds for lynx habitat. The larger LMAs adopted by DNRC are due to DNRC's day-to-day operational constraints imposed by a wide variety of factors. Some of these factors include the HCP grizzly bear conservation strategy and the associated timing restrictions, natural disturbance regimes of the Stillwater and Coal Creek State Forests, temporal forest succession considerations, hydrological constraints, and other factors.

When assessing risk to lynx in such environments, it is important to consider that lynx are highly mobile and have evolved to adapt to ever-changing forest conditions of varied ages and structures (68 FR 40076-40101, July 3, 2003, p. 40084), and the scale at which habitat elements occur and shift is an important consideration. In its 2003 finding, the USFWS noted that "In order to affect the suitability of lynx habitat, and in particular, a local lynx population to the extent of putting the population at risk of extinction, an activity would likely have to occur across a very large area (at a minimum the size of several home ranges) and (1) cumulatively result in the conversion of lynx habitat into non-lynx habitat, (2) result in a homogeneous forest that does not provide the various stand ages and species composition, and structure that are good snowshoe hare and lynx habitat, or (3) effectively preclude dispersal."

The chance that any one of these items or several in combination would occur on DNRC lands in the context of the established LMAs is extremely unlikely for the following reasons:

- Due to hydrological constraints under current operating standards and laws, it is very unlikely that DNRC would exceed 30 percent equivalent clearcut area in any sixth-order hydrologic unit code (HUC) (average size of approximately 15,000 acres) or other approximately 20,000-acre block.

- The predominant natural disturbance process in this area is large wildfires, which currently often burns on the order of many tens of thousands of acres (Barrett 1996; Gruell 1983:15,16; Barrett et al. 1991). More recent examples of these large fires include the Roberts, Moose, and Red Bench Fires. Historically, under natural conditions, thousands of acres at a time across multiple ownerships were likely rendered unsuitable periodically in this geographic area.

- DNRC operates under a sustainable yield concept that limits harvest and the ability to overharvest forest stands on the Stillwater and Swan Units at scales meaningful for lynx.

- The grizzly bear conservation strategy has provisions for patch configuration that cannot exceed 600 feet to visual screening (commitment GB-NR4). This requires forest cover be retained relatively close to other forested stands that would meet the suitable lynx habitat definition.

The grizzly bear conservation strategy has provisions on Class A lands in the Stillwater Block and throughout the Swan River State Forest that require 8-year rest periods following management during 4-year active periods (commitments GB-ST2, GB-ST3, GB-SW3, and GB-SW4). This provides for limited active windows and requires rest, which would encourage successional development of stands in these areas. Under the most intensive harvest approaches that could be envisioned, the aquatic conservation strategies and the lynx conservation strategy ensure that connectivity across third-order drainages would serve to maintain networks of cover through non-stocked and young-aged forest.

LY-LM2 Habitat Conversion Rate

DNRC will not convert more than 15 percent of the total potential lynx habitat to temporary non-suitable habitat per decade within each LMA.

Rationale: The purpose of this measure is to ensure that ample amounts of suitable lynx habitat are present through time at scales meaningful for lynx (i.e., areas approximating the size of lynx home ranges). Total potential lynx habitat is comprised of the total habitat acres within habitat types considered preferable for lynx. Preferred habitat structure may or may not be present on some acreage that is included under this designation. Total potential habitat includes the habitat subsets of suitable lynx habitat and temporary non-suitable habitat. Temporary non-suitable habitat includes recently harvested or naturally disturbed (e.g., burned) areas that have fewer than 180 trees per acre, or less than 40 percent canopy cover, but have the potential to be forested suitable lynx habitat again over time.

LY-LM3 Foraging Habitat

1. In lynx habitat within the LMAs identified in Appendix C, Figures C-29 through C-31, DNRC will maintain at least 20 percent of the total potential lynx habitat as winter foraging habitat, as shown in Table 2-11. ~~Foraging habitat includes any combination of both winter foraging and young foraging habitat components.~~

   Winter foraging habitat will be identified using the DNRC lynx habitat model incorporating SLI filters. Winter foraging habitat is defined as stands exhibiting the following minimum structural characteristics:

   - The stand must occur on preferred habitat types (Pfister et al. 1977; DNRC 2008c; Appendix B, Document B-3).
   - The stand must have one or more of the following species present: sub-alpine fir, grand fir, or spruce.
   - The stand must have at least 10 percent crown closure in trees of 9 inches dbh or greater (i.e., sawtimber category in the SLI).
   - The stand must have a minimum of 40 percent total stand crown closure in understory and overstory combined.

- ~~The stand must not occur in big game winter range.~~

~~Young foraging habitat is defined as conifer seedling and sapling stands within lynx habitat with an average height greater than or equal to 6 feet and density greater than 2,000 acres per stem.~~

TABLE 2-11. ESTIMATED ACRES OF FORAGING HABITAT RETAINED IN EACH LMA UNDER THE FORAGING HABITAT COMMITMENT

Lynx Management Area	Approximate Winter Foraging Habitat Retention Acres (20% of Mapped Lynx Habitat)[1]
Stillwater East	6,894
Stillwater West	7,116
Coal Creek	2,838
Swan River	7,331
Seeley Lake	893
Garnet	785

[1] Commitments are based on percentages and not on acreage amounts. Acreage amounts in the above table are approximate only, and will vary over time as SLI information is updated.
Source: Acreages based on a query of the 2005 SLI database (DNRC 2008a).

Rationale: The intent of maintaining threshold levels of lynx foraging habitat within identified LMAs is to provide assurances on HCP project area lands that appreciable amounts of habitat likely to provide relatively high densities of snowshoe hares will be maintained through time. Habitat conditions and food availability, particularly in winter, are likely primary limiting factors for lynx in western Montana (Squires 2005b, personal communication). For this reason, identifying and maintaining habitat in areas occupied by lynx that provides high levels of horizontal cover preferred by snowshoe hares and lynx in winter~~,~~ is considered important. Such habitat consists of sub-mature and mature moist forest, typically at elevations greater than 4,000 feet, which possesses multiple forest canopies and horizontal cover provided by conifer limbs near the snow surface. Lynx appear to prefer using and foraging within stands in winter that exhibit these characteristics (Squires 2005b, personal communication). Squires (2009, personal communication) confirmed that foraging habitat in winter is likely limiting for lynx. Therefore, DNRC will retain 20 percent winter foraging habitat in LMAs. ~~The LCAS focuses on describing the important attributes that provide quality foraging habitat and not on the proportion of young versus mature foraging habitat (which in this HCP is termed "winter foraging habitat"), which varies across the landscape and by region of the country. This approach is also supported by the WADNR *Lynx Habitat Management Plan for DNR-Managed Lands* (WADNR 2005), which describes foraging habitat as a combination of young and mature foraging habitat. Because the young foraging habitat stand condition is relatively ephemeral and persists for relatively short periods (i.e., several decades), and a proportion of these stands will be pre-commercially thinned, DNRC anticipates that the majority of foraging habitat acreage retained to meet HCP commitments will be predominantly in the winter foraging habitat condition.~~ The habitat definitions provided in Appendix B, Document B-3 describe stands with the lowest level of structural attributes deemed acceptable as habitat. Stands with considerably greater structural density, complexity, and amounts would also be present and meet the definitions.

Precise amounts ~~required~~ of various successional forest stages required to sustain lynx are poorly understood, but are likely a function of site productivity and suitability for snowshoe hares. The WADNR *Lynx Habitat Management Plan for DNR-Managed Lands* (WADNR 2005) describes foraging habitat similarly and requires acreage retention of 20 percent at scales comparable to federal LAUs in Montana. The WADNR plan was developed to avoid take in response to the ESA listing of lynx as a threatened species.

~~Habitat conditions and food availability in winter are likely primary limiting factors for lynx in western Montana (Squires 2005b). Thus, identifying and maintaining habitat that provides particular cover characteristics preferred by snowshoe hares and lynx in winter, in areas occupied by lynx, is important. Such habitat consists of sub-mature and mature moist forest, typically at elevations greater than 4,000 feet, which possesses multiple forest canopies and horizontal cover provided by conifer limbs near the snow surface. Lynx appear to prefer using and foraging within stands in winter that exhibit these characteristics (Squires 2005b).~~

2. Within pre-commercial thinning projects targeting saplings in lynx habitat in LMAs, identify and retain unthinned 20 percent of the thinning project area. Retained patches should maintain a density of greater than 2,000 stems per acre. In stands where a density of 2,000 stems per acre is not present, retain an area(s) with the greatest density available. To facilitate tracking and promote habitat function, (1) design retention patches to be at least 5 acres when possible, (2) emphasize retention of subalpine fir and Engelmann spruce or grand fir, and (3) locate retention areas adjacent to other suitable lynx habitat. Patches retained for this purpose may not be entered for pre-commercial thinning or commercial harvest until they can structurally meet the minimum DNRC SLI definition of sawtimber (i.e., stands must possess at least 10 percent canopy closure in the overstory in trees at least 9 inches dbh).

Rationale: Dense, young sapling stands (greater than 2,000 trees per acre) can provide habitat for concentrations of hares as well in western Montana (Griffin 2004:48,59). By providing limits on how much habitat could be rendered unsuitable, DNRC provides assurances that ample amounts of habitat will be maintained on the landscape in the context of DNRC ownership amounts and patterns. ~~Pre-commercially thinned stands will typically be classified as other suitable habitat after thinning, rather than temporary non-suitable habitat. Those stands have the potential to continue providing connectivity and denning habitat and marginal foraging habitat.~~ This commitment provides greater assurances that dense sapling stands important for hares, and slightly more mature summer habitat used by lynx (provided over time as dense sapling stands age and grow), would be prevalent on DNRC lands within landscapes known to be important for lynx (i.e., LMAs). Considering a range of likely growth estimates and sapling sizes at the time of thinning within retention patches, the retained portions would likely provide dense habitat conditions favorable for hares and lynx for about 10 to 30 years beyond the time the remainder of the stand was pre-commercially thinned (assuming an average radial growth range of 0.125 to 0.375 inch per year). This commitment would also promote a diversity of dense patches and thinned patches, which is consistent with the philosophy of the SFLMP and natural disturbance patterns. Under this approach, DNRC will also incorporate a summer habitat definition using improved parameters from Squires et al. (2010, in press) for the purpose of monitoring under the HCP and conducting impacts analyses for individual timber sale environmental reviews. However, under this commitment, no specific acreage commitment for summer habitat would be required in LMAs.

<<< The rationale for the size of the DNRC LMAs was moved to LY-LM1. >>>

2.2 AQUATIC CONSERVATION STRATEGIES

The aquatic conservation strategies were developed DNRC with the technical assistance of the USFWS. The process was initiated by identifying a specific biological goal applicable to the three HCP fish species. The identified biological goal was to protect bull trout, westslope cutthroat trout, and Columbia redband trout populations and their habitat and to contribute to habitat restoration or rehabilitation, as appropriate, which may have been affected by past DNRC forest management activities.

Conservation commitments are defined within conservation strategies and are supported by scientific data and rationale. The commitments were developed and formulated to address both known scientific information and uncertainties in scientific knowledge, as well as existing data gaps. The commitments are designed to provide a conservation benefit for each of the three fish species, and to ensure that future timber harvest levels continue to offer a predictable and long-term income to state trusts. In addition, other native cold-water fish species (that share similar habitat requirements) should benefit from the commitments, and may also aid in discouraging the establishment or spread of non-native fish.

The process of developing an HCP and obtaining a Permit through Section 10 of the ESA is a continuation of DNRC's high level of commitment to the conservation of Montana's native fish populations. DNRC will continue to collaborate with resource agencies and other stakeholders through participation in conservation agreements, such as the *Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat and Yellowstone Cutthroat Trout in Montana* (MFWP 2007) and the *Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin, Montana* (Montana Bull Trout Restoration Team [MBTRT] 2000).

Part of DNRC's commitment to collaborating with other resource agencies includes being familiar with their conservation efforts and planning documents. DNRC has reviewed MFWP's comprehensive fish and wildlife conservation strategy (MFWP 2005) and has determined that the conservation strategies proposed in this HCP would complement conservation strategies set forth in MFWP's plan for bull trout, westlope cutthroat trout, and Columbia redband trout.

2.2.1 Objectives

Five target objectives were formulated to achieve the biological goal identified for the three HCP fish species. These management objectives were based on best available science and support the basic habitat requirements of the HCP fish species by providing for cold, connected, complex, and clean water habitat. The five management objectives for HCP fish species are:

- Manage for suitable stream temperature regimes
- Manage for suitable in-stream sedimentation levels
- Manage for suitable levels of in-stream habitat complexity
- Maintain stream channel stability and channel form and function
- Provide for connectivity among sub-populations of bull trout, westslope cutthroat trout, and Columbia redband trout where appropriate on HCP project area lands.

Individual conservation strategies and commitments for the HCP fish species were then formulated based on the biological goal and management objectives. Due to the complex ecological interactions of aquatic ecosystems, the conservation strategies and commitments were categorized by impact type. The five aquatic habitat conservation strategies address riparian conditions (including large woody debris [LWD], shade and stream temperature), sediment, connectivity, grazing, and cumulative watershed effects. In combination, the five conservation strategies address all five of the management objectives (Table 2-12).

TABLE 2-12. CONSERVATION STRATEGIES MEETING MANAGEMENT OBJECTIVES

Management Objective	Conservation Strategy					
	Riparian	Sediment	Connectivity	Grazing	Cumulative Watershed Effects	Combined Strategies
Temperature	X	X		X	X	X
Sedimentation	X	X		X	X	X
Habitat Complexity	X	X		X	X	X
Channel Stability, Form and Function	X	X	X	X	X	X
Connectivity			X		X	X

Monitoring is a critical step in assessing the success of the conservation commitments in meeting the stated management objectives. A meaningful monitoring strategy, which addresses both the implementation and effectiveness of the various conservation strategies, also provides DNRC with the information required to effectively use an adaptive management approach (see Chapter 4, Monitoring and Adaptive Management). If the conservation strategies are determined to not be effective, adaptive management would initiate measures to provide higher levels of protection. Conversely, if strategies are determined to be effective, adaptive management may allow reallocation of resources to areas where effectiveness has not been achieved.

2.2.2 Geographic Scope

DNRC carefully evaluated the known or suspected distribution of the HCP fish species to determine which lands to include in the HCP project area. Appendix C, Figure C-32 portrays the distribution of HCP fish species within the HCP project area and on other DNRC lands. Appendix C, Figure C-33 shows the location of the 14 aquatic analysis units in the HCP project area used for tracking allowances to commitments and for analyzing effects at a watershed scale in the associated EIS analysis. The presence or assumed presence of these species, along with the habitat characteristics of the streams (i.e., temperature, flow, etc.) in the HCP project area, determine the appropriate levels of protection required for the various forest management activities conducted by DNRC. The aquatic conservation strategies are formulated to provide greater protection to streams supporting or likely to support the HCP fish species.

2.2.3 HCP Conservation Strategies

The following subsections describe the five aquatic conservation strategies and their associated commitments for the HCP fish species:

- Riparian timber harvest
- Sediment delivery reduction
- Fish connectivity
- Grazing
- Cumulative watershed effects.

Each section first explains existing DNRC practices implemented to comply with applicable laws, ARMs, and agreements. The sections then describe how the HCP conservation strategy will add to, enhance, and improve upon the existing approach. The discussion of each HCP conservation strategy includes descriptions of each specific, numbered conservation commitment and the rationale behind the development of each.

2.2.3.1 Riparian Timber Harvest Conservation Strategy

Existing DNRC Riparian Timber Harvest Practices

The SMZ Law (MCA 77-5-301 through 307) and ARMs (36.11.302 through 313) regulate commercial timber harvest conducted immediately adjacent to streams, lakes, and other bodies of water on all ownerships, including DNRC. The law designates Class 1 streams as all streams supporting fish, or that contribute flow for 6 months of the year or more to another stream, lake, or other body of water. Other streams are considered either Class 2 or Class 3 streams. Class 2 streams are those stream segments that contribute surface flow to another stream, lake, or other body of water for less than 6 months of the year, or have surface flow for 6 months of the year or more, but do not contribute surface flow to another stream, lake, or other body of water. Class 3 streams are those stream segments that rarely contribute surface flow to other streams or other bodies of water, and normally do not have surface flow for 6 months of the year or more. Class 3 stream segments are typically not connected to other streams.

The minimum SMZ width on all stream classes is 50 feet. When slopes are greater than 35 percent, the SMZ width on both Class 1 and Class 2 streams and lakes is extended to 100 feet. The minimum SMZ width for Class 3 streams and other bodies of water is always 50 feet regardless of the SMZ slope. The SMZ width on all three stream classes and lakes must be extended to incorporate adjacent wetlands that intercept the normal SMZ boundary. Clearcutting within the SMZ (regardless of stream class) is prohibited. Harvest within a Class 1 SMZ must retain at least 50 percent of trees greater than or equal to 8 inches dbh, or 10 trees greater than or equal to 8 inches dbh for every 100 feet, on both sides of a stream, whichever is greater. Harvest within a Class 2 SMZ must retain at least 50 percent of trees greater than or equal to 8 inches dbh, or 5 trees greater than or equal to 8 inches dbh for every 100 feet, on both sides of a stream, whichever is greater. Harvest within the SMZ of a Class 3 stream and other body of water must retain sub-merchantable trees and shrubs.

The trees retained in a Class 1 or Class 2 SMZ must be representative of the pre-harvest stand in species and size; bank edge trees, as well as trees leaning toward the stream, are to be favored for retention. Where a Class 1 or Class 2 SMZ has been extended to 100 feet, the retained trees are to be concentrated within the first 50 feet directly adjacent to the stream. When salvage logging in the

SMZ, the minimum tree retention requirements are met by standing live trees, or by dead or fallen trees where sufficient standing live trees are not available.

The 100-foot extended SMZ width applies primarily to ground-disturbing activities (ground-based equipment operation and road construction) and can be considered largely a sediment filtration buffer. In addition, ARM 36.11.425 requires DNRC to extend equipment restriction zones beyond the normal SMZ requirements on sites with high erosion risk. Sites with high erosion risks are those located on highly erodible soils or subject to conditions that result in higher risk of eroision (severely burned areas or areas susceptable to landslides). Extension of the 50-foot minimum SMZ to 100 feet and extended equipment restriction zones do~~es~~ not substantially affect the level of riparian harvest and does not necessarily provide greater levels of conservation for the riparian functions of shade and LWD.

ARM 36.11.425 requires DNRC to establish an RMZ, in addition to the SMZ, when forest management activities (including timber harvest) are proposed on sites that are adjacent to fish-bearing streams. The total RMZ width is determined such that the total combined width of SMZ and RMZ is equal to the average site potential tree height (SPTH) at stand age 100 years. Tree height at 100 years is determined using site index curves developed by the USFS Rocky Mountain and Intermountain Research Stations (USFS 1980). The site index of a stand is determined by measuring tree height and age directly from suitable index trees located within the SMZ. The RMZ width is never less than the minimum 50 feet required under the SMZ Law.

Harvest conducted within the combined SMZ and RMZ must retain all bank edge trees and retain enough other trees to ensure adequate levels of shade and potential LWD recruitment to the stream. Adequate levels of shade are defined under the ARMs (36.11.425 and 426) as those that maintain natural temperature ranges. Adequate LWD recruitment levels are defined under the ARMs as those that maintain channel form and function. Target levels of LWD and shade, and the adequacy of proposed prescriptions in meeting target levels, are currently determined on a site-specific project-level basis.

DNRC also provides conservation to adjacent wetlands under the existing requirements of both the SMZ Law and the Forest Management ARMs (36.11.421 through 427). Under the SMZ Law, SMZ boundaries are extended to include wetlands that intercept the normal SMZ boundary. These wetlands are commonly referred to as adjacent wetlands. There is no limit to the distance that the SMZ must be extended to include the entire adjacent wetland. Under the SMZ Law, a 50-foot buffer strip is not required around the wetland. The retention tree requirements for adjacent wetlands are the same as required for the SMZ throughout the adjacent wetland, and sub-merchantable trees and shrubs within the wetland must also be retained and protected. Under the DNRC Forest Management ARMs (36.11.421 through 427), a 50-foot wide equipment restriction buffer has been added to the adjacent wetland boundary to provide greater levels of protection from site disturbance, erosion, and sediment delivery. Harvest conducted within WMZs is also required to protect and retain shrubs and sub-merchantable trees.

The watershed analysis conducted under ARM 36.11.423 (Cumulative Effects) may influence RMZ design, including, but not limited to, increased RMZ width, additional tree retention, and an expanded no-harvest zone. Additionally, ARMs 36.11.427(2)(a)(i) and 36.11.427(3) ~~also~~ require DNRC to design forest management activities to protect and maintain bull trout and westslope cutthroat trout and all other sensitive fish and aquatic species. The FMB maintains its own list of species considered sensitive under the ARMs (36.11.436(6)).

The ARMs also require DNRC to minimize impacts to fish populations and habitat by making reasonable efforts, in its sole discretion, to cooperate in the implementation of conservation strategies developed by the:

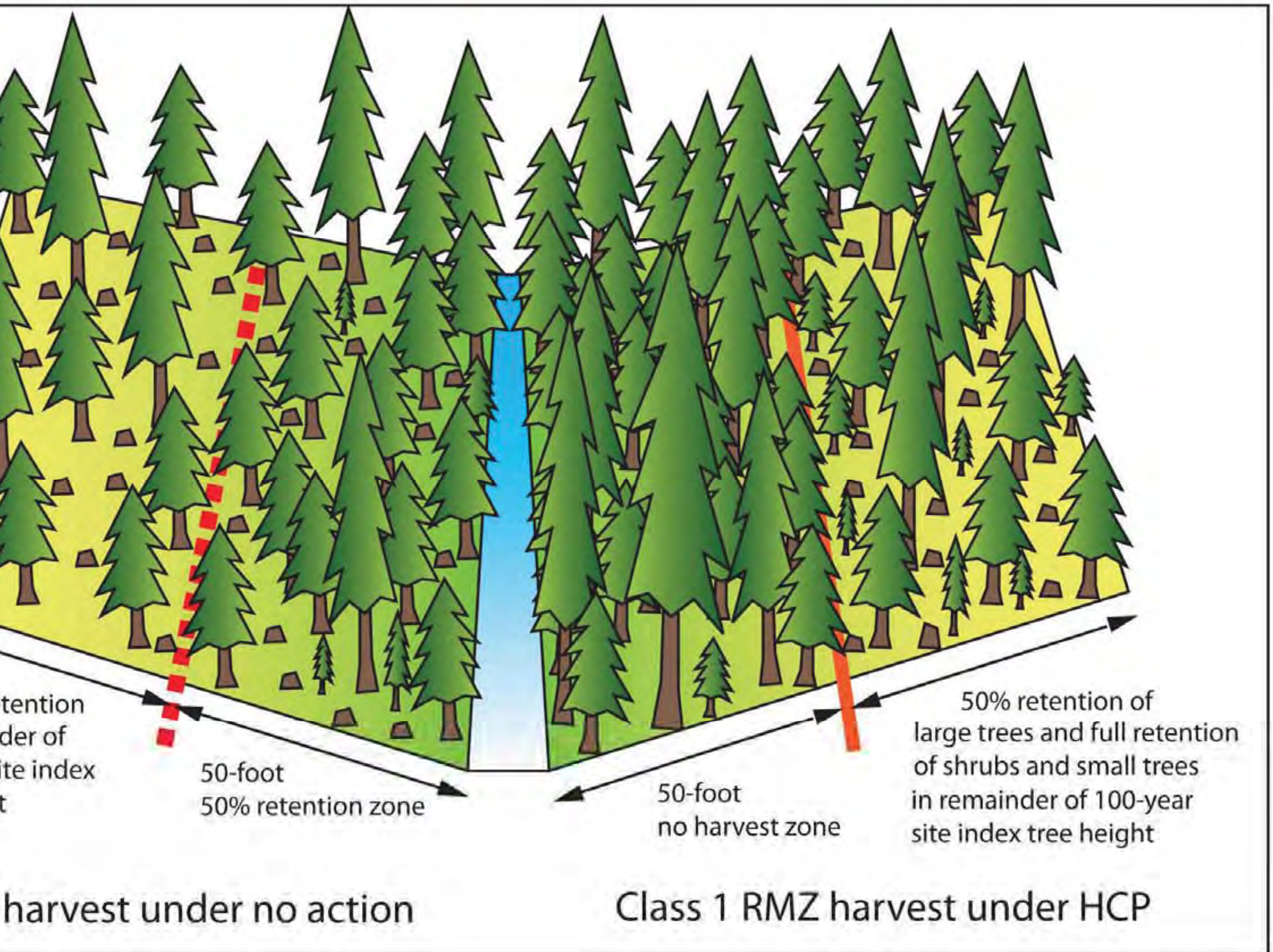
- *Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin, Montana* (MBTRT 2000)
- *Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat and Yellowstone Cutthroat Trout in Montana* (MFWP 2007)
- *Bull Trout Draft Recovery Plan* (USFWS 2002).

HCP Riparian Timber Harvest Conservation Strategy

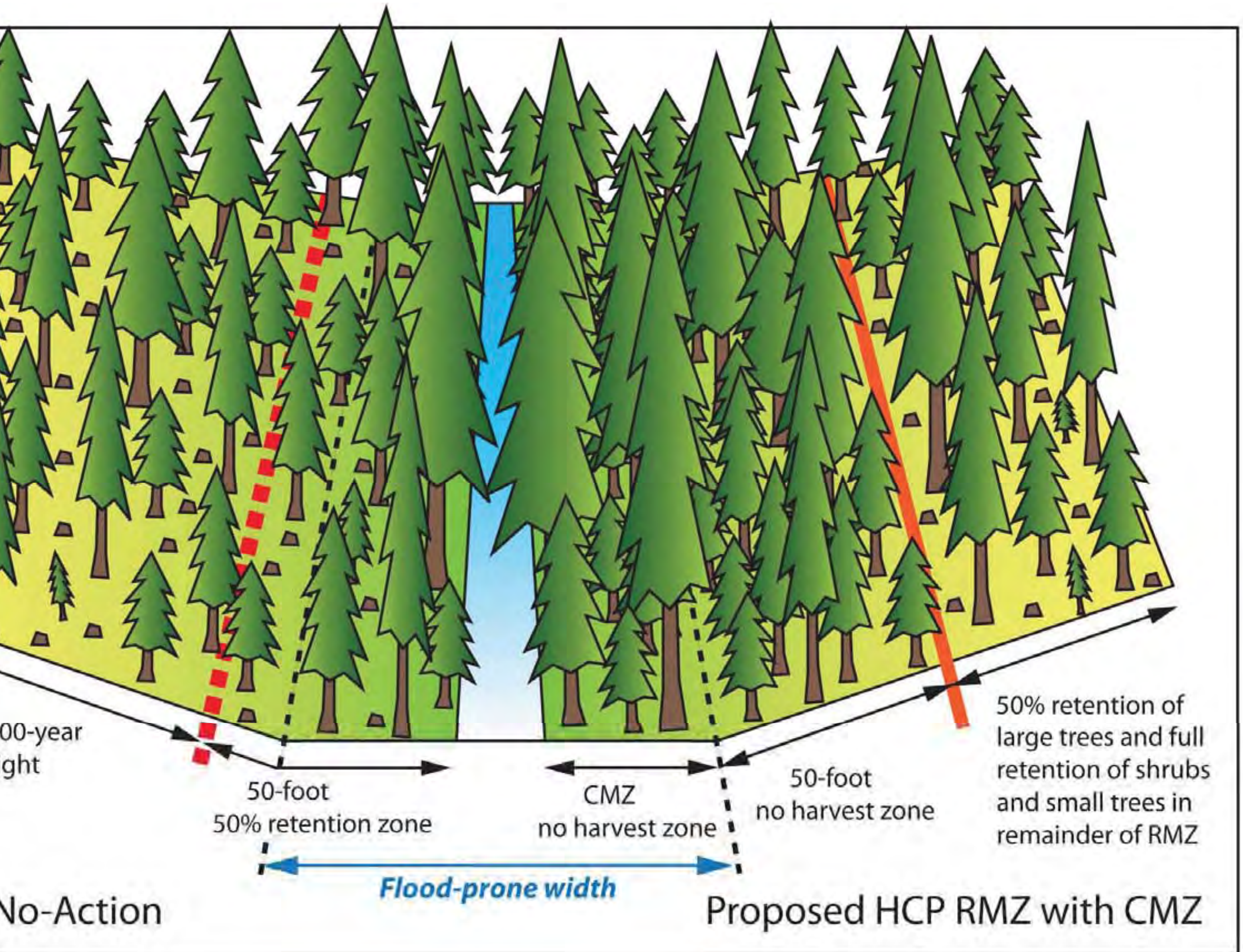
The commitments comprising the HCP riparian timber harvest conservation strategy were designed to help ensure that important riparian functions are maintained at levels necessary to provide suitable habitat for HCP fish species. Important riparian functions specifically addressed in this strategy are LWD recruitment, stream shading, and streambank stability. Sediment filtration is another important riparian function that is addressed under the HCP sediment delivery reduction conservation strategy (see Section 2.2.3.2).

~~Under this strategy, DNRC will establish Tier 1 RMZs when timber harvests are conducted adjacent to streams and lakes, potentially affecting HCP fish species. DNRC currently establishes SMZs and RMZs when timber harvests are proposed adjacent to streams supporting a fishery. Under the Forest Management ARMs (36.11.425), the combined width of an SMZ and RMZ on fish-bearing streams is equal to the average SPTH of the proposed harvest stand at age 100 years. For the purposes of this strategy, the combined SMZ and RMZ specified under ARM 26.11.425 will be referred to as an RMZ.~~

~~Under this strategy, DNRC will use a tiered approach for designing and conducting riparian timber harvest. A stream or lake supporting an HCP fish species will be classified as a Tier 1 body of water. A~~Under this strategy, an RMZ equal to the 100-year site index tree height will be established when timber harvest is planned within a slope distance equal to or less than the 100-year site index tree height from a Class 1 ~~body of water~~stream or lake (as defined in ARM 36.11.312). Timber harvests conducted within an RMZ ~~established~~ on a Class 1 ~~body of water~~stream or lake will maintain a 50-foot no-harvest buffer zone immediately adjacent to the affected ~~body of water~~stream or lake. Harvest within the remainder of a Class 1 RMZ outside of the no-harvest buffer will be limited to prescriptions that retain shrubs, sub-merchantable trees, and a minimum of 50 percent of the trees greater than or equal to 8 inches dbh. Figure 2-1 shows an RMZ harvest under existing practices compared to an RMZ harvest under the proposed HCP strategy for Class 1 streams. In addition, it is likely that a majority of timber harvests in the RMZ will retain a higher concentration of trees adjacent to the no-harvest buffer, subsequently the potential for microclimate impacts would be reduced. The Class 1 RMZ strategy also addresses the potential for stream channel migration by establishing a designated channel migration zone (CMZ) on HCP fish-bearing streams. Under this strategy, the RMZ will be extended in situations where the potential for channel migration within a CMZ on an HCP fish-bearing stream might substantially influence riparian functions beyond the area represented by ~~one SPTH~~100-year site index tree height. Figure 2-2 shows an RMZ harvest under existing practices compared to that of a harvest under the proposed HCP strategy for a Class 1 RMZ with a CMZ on an HCP fish-bearing stream. Based on outputs and assumptions used ~~in the *2004 Sustained Yield Calculation* (DNRC 2004c)~~to determine the annual sustainable yield under the proposed HCP, DNRC anticipates conducting approximately ~~45~~32 to ~~90~~64 acres of RMZ harvest adjacent to Class 1 streams on an annual basis out of the approximately 7,000 acres of total annual harvest within the HCP project area.



MBER HARVEST UNDER EXISTING PRACTICES COMPARED TO HARVEST UNDER THE PROPOSED HCP
1 RMZ



MBER HARVEST UNDER EXISTING PRACTICES COMPARED TO HARVEST UNDER THE PROPOSED HCP
N A CLASS 1 STREAM SUPPORTING HCP FISH SPECIES ~~RMZ WITH A CMZ~~

~~Under this strategy, streams and lakes supporting non-HCP fish species will be considered Tier 2, and those waters with no fisheries present will be considered Tier 3. T~~Under this strategy, timber harvest conducted within an SMZ established for a Class 2 or 3 stream or other body of water ~~RMZ established adjacent to a Tier 2 body of water~~ will implement the existing DNRC riparian timber harvest practices (current measures and practices implemented under Montana Forestry BMPs [DNRC 2004a], ARMs 36.11.425 and 426, and the SMZ Law). ~~Timber harvest conducted within an RMZ established adjacent to a Tier 3 body of water will implement the existing DNRC riparian timber harvest practices (current measures and practices implemented under Montana Forestry BMPs for Forestry in Montana, ARMs 36.11.425 and 426, and the SMZ Law).~~

Th~~is~~e Class 1 RMZ commitments ~~strategy~~ also include~~s~~ several allowances addressing insect and disease infestations~~, and~~ fire salvage, and situations where silvicultural objectives include re-establishing early seral forest types by emulating natural disturbances. In rare cases, RMZ harvest prescriptions may need to be modified when they are proposed in areas located on unstable slopes that are prone to mass failure. This concern is addressed in the HCP sediment delivery reduction conservation strategy (see Section 2.2.3.2).

By designing riparian harvest practices within Class 1 RMZs, the strategy will ensure that post-harvest riparian stand conditions are adequate to maintain the riparian functions most important to HCP fish species habitat. This strategy is based on scientific research on riparian buffer widths required to maintain adequate levels of buffer function, including LWD recruitment potential, retaining adequate levels of shade, and maintaining streambank stability necessary to provide habitat suitable for supporting HCP fish species (Brown and Krygier 1971; Martin et al. 1985; FEMAT 1993; Davies and Nelson 1994; Gomi et al. 2003; Sugden and Steiner 2003). The term adequate is defined by the range of natural conditions (within a physiographic context) that exist for each aquatic function. These concepts are consistent with the DNRC HCP aquatic biological goal and objectives and provide a firm foundation for an HCP riparian harvest conservation strategy. The HCP riparian harvest conservation strategy is expected to meet or contribute to Montana DNRC HCP management objectives for temperature; sedimentation; habitat complexity; and channel form, function, and stability (see Table 2-12).

This strategy focuses on those critical riparian functions most likely to be affected by timber harvest and, at the same time, the most influential on the habitat of the HCP fish species. Riparian functions specifically addressed in this strategy are LWD recruitment, stream shading (used as a surrogate for stream temperature), and streambank stability.

The HCP sediment delivery reduction conservation strategy (see Section 2.2.3.2) specifically addresses a set of conservation commitments designed to prevent potential sediment delivery associated with road construction, abandonment, maintenance, and use, as well as non-road timber harvest activities such as felling, yarding, and landing of logs; site preparation; and slash disposal.

Site index tree height at age 100 years for a given site was selected as the most practical and effective indicator for identifying the area where forest practices are most likely to affect riparian functions and biological objectives addressed under this strategy. The site index tree height at age 100 years in most DNRC streamside riparian stands generally ranges from approximately 80 to 120 feet. The actual site index is largely dependent on the soil and climate of the landscape and other factors affecting the specific productivity of an individual site, but it is measurable at each site.

Streamside riparian timber harvest can reduce the supply of LWD available for potential recruitment to a stream. LWD is described as organic material recruited to the stream channel from the riparian zone and generally of sufficient size to have a measurable effect on one or more stream hydraulic process, such as sediment storage and pool formation. For the purposes of this HCP, LWD is defined as a piece (of LWD) at least 3 meters (9.8 feet) in length or of a length equal to or greater than two-thirds the wetted width of the stream and at least 0.1 meter (0.3 foot) in diameter one-third of the way up from the base (Overton et al. 1997).

LWD contributes to habitat complexity by adding wood cover to streams and influencing channel form and function by facilitating the creation and maintenance of hydrologic features such as pools, gravel bars, and backwater areas. A reduction in LWD input to a stream may affect fisheries habitat by causing or contributing to channel instability, reducing in-stream habitat complexity, and influencing channel form and function. LWD also provides nutrients to streams, as well as substrate for aquatic invertebrate production.

The potential recruitment of LWD to stream channels from adjacent forest stands is generally limited to an area located within a width equal to or less than the 100-year site index tree height as measured from the edge of the stream channel. This conclusion is well documented in the literature and is commonly used to delineate the width of SMZs or RMZs. In a study of streams in southeast Alaska, Murphy and Koski (1989) found that almost all (99 percent) identified sources of woody debris in streams were within 100 feet of the stream bank. Nearly half of the woody debris came from trees located on the lower bank (less than 3 feet away) and 95 percent was from trees within 66 feet of the stream. McGreer (1994) reported a study by Andrus and Froehlich in the Oregon Coast Range in 1992 in which 70 to 90 percent of all LWD recruitment was found to occur within 100 feet of streams. McDade et al. (1990) reported that 85 to 90 percent of LWD recruitment comes from within 100 feet of stream channels in western Oregon. Robison and Beschta (1990) concluded that the probability of recruitment was primarily a function of tree distance from the stream and effective tree height. Effective tree height was defined as that part of the tree height that would provide woody debris of a minimum diameter to a stream.

Harvest of trees near a stream may also reduce the amount of canopy cover and subsequent shade provided to a stream by that canopy. The principle source of heat for small mountain streams is direct solar radiation striking the surface of the water. Therefore, streamside canopy cover and shading have a primary influence on stream water temperatures.

The effectiveness of various widths of riparian forest in providing shade to streams is also closely tied to 100-year site index tree heights. Studies have shown that approximately 80 percent of shade effectiveness occurs within 0.5 SPTH, and 90 percent effectiveness occurs within 0.7 SPTH (Oregon Forest Industries Council 1999). A review of the available literature by Castelle and Johnson (2000) concluded that maximum shade produced in forest stands located adjacent to a stream was achieved within 17 to 30 meters (56 to 98 feet) of the stream channel. Steinblums et al. (1984) evaluated the effectiveness of 40 different streamside buffer widths in western Oregon and concluded that 90 percent of maximum angular canopy density (a measure of the density of canopy actually capable of shading the stream) could be obtained within a 17-meter (56-foot) buffer. The values reported in the literature are all well within the range of 100-year site index tree heights occurring adjacent to streams supporting HCP fish species on forested trust lands.

In addition, canopy loss can affect winter stream temperatures. Feller (1981) found short-lived, modest increases in winter stream temperatures following logging, but decreases following logging and slash burning. However, there was no clear explanation for these divergent patterns. Post-harvest stream temperature differences between clearcut Needle Branch and Flynn Creek (the control) were positive during winter, though smaller than the positive summer differences (Brown and Krygier 1971). In rain-dominated drainage basins, smaller effects would be expected in winter than in summer, based on the lower energy inputs and higher discharges. In small snowmelt-fed basins, particularly at high elevation or northern sites, ice formation and snow cover within the channel should reduce temperatures to near 0º Celsius (32° Farenheit) regardless of canopy cover (e.g., Mellina et al. 2002; Macdonald et al. 2003), except possibly in groundwater discharge areas.

Rates of LWD recruitment and stream shading to a stream channel are also a function of riparian stand type, riparian stand structure, channel incision angles, side slope gradients, channel processes, disturbance regimes, and climatic or elevation factors associated with different physiographic regions. Therefore, the expected amounts of functional LWD and shading found within stream networks throughout western Montana vary considerably.

Riparian function and diversity in western Montana is dependent on several different disturbance regimes, including wind; disease; mass wasting; and especially periodic, variable-intensity fire. Western Montana has undergone extensive fire suppression during the last century, and levels of streamside harvest have been relatively low on forested trust lands. Therefore existing ranges of LWD recruitment and stream shading found throughout forested trust lands are thought to be higher than those that would otherwise occur naturally.

The root systems of trees located near stream banks provide channel stability. Harvest and removal of trees near stream banks may increase the potential for bank erosion and decrease channel stability.

Along with the critical riparian functions described above, several other secondary functions are considered as potential components for achieving the overall conservation objectives of adequate stream temperature regimes, in-stream habitat complexity, channel stability, and channel form and function. These secondary functions include nutrient loading, chemical filtering, and microclimate. While secondary riparian functions are not specifically addressed in the overall conservation strategy objectives, they are provided indirectly through the commitments contained in this strategy.

Nutrient loading. Nutrient loading to aquatic systems is an important role of riparian areas. Fish-bearing and non-fish-bearing streams are interconnected systems that have evolved to incorporate a range of site-specific nutrient inputs for primary production and macroinvertebrate food sources. This nutrient pathway is primarily through inputs of organic material in the form of LWD and litter fall. Rates of nutrient loading have been known to exceed or fall short of site-specific ranges following extensive riparian management, such as clearcutting. As the bulk of organic nutrients tend to be input from an area within approximately one-half the SPTH (Oregon Forest Industries Council 1999; Castelle and Johnson 2000), the HCP riparian timber harvest conservation strategy should provide an adequate mechanism for the range of nutrient loading rates that would be expected to occur in the different regions of forested western Montana.

Chemical. Chemical filtering to aquatic systems is another important role of riparian areas. Chemical filtering involves the removal or dissipation of various natural and manmade pollutants.

Fish-bearing and non-fish-bearing streams are interconnected systems that depend on this process for clean water. Chemical filtering occurs primarily through a riparian zone's ability to filter sub-surface soil moisture and overland flows. The capacity of a riparian zone to conduct this process has been known to be suppressed following extensive riparian management or disturbance. Because most chemical filtering by a riparian zone occurs within a width equal to approximately a 100-year site index tree height, the HCP riparian timber harvest conservation strategy will help to provide the range of chemical filtering rates that would be expected to occur in the different regions of forested western Montana (Castelle and Johnson 2000).

Microclimate. Microclimate represents the combined characteristics of site-specific humidity, wind speed, air temperature, and soil moisture and temperature regimes. A few studies suggest that upland harvest can modify riparian zone microclimate, but these studies primarily evaluate microclimate variables within the relatively dense stand conditions of old-growth, western Cascade Douglas-fir (*Pseudotsuga menziesii*), and western hemlock (*Tsuga heterophylla*) forests in Washington and Oregon (Chen 1991; Brosofske et al. 1997). Such forests typically exhibit canopy closures of 70 to 80 percent (Chen 1991; Brosofske et al. 1997) and dominant tree heights of 105 to 250 feet (Uchytil 1991; Brosofske et al. 1997). Basal area, which is an indicator of productivity and tree density, is known to range from 362 to 444 square feet per acre in old-growth Douglas-fir forests of the western Cascades (Franklin et al. 1981). The extent of vegetation growth in these old-growth forest conditions, described by canopy closure, tree heights, and basal area, tends to regulate to some degree the different microclimate characteristics within old-growth western Cascade Douglas-fir and western hemlock forests after adjacent clearcut timber harvest (Chen 1991; Brosofske et al. 1997). These studies consequently suggest that changes to microclimate within the riparian area as a result of adjacent timber harvest can adversely affect the aquatic ecosystem of streams.

Alternatively, the level of microclimate regulation by riparian forests in western Montana is likely quite different than that found in the studies mentioned above because riparian forests in the HCP project area are exceedingly different and variable compared to old-growth western Cascade Douglas-fir and western hemlock forests. Two of the fundamental differences between the areas are (1) forest development in western Montana is driven by disturbances such as fire, which creates a mosaic of stand types of highly variable age and basal area; and (2) western Montana riparian forests also have lower general productivity, primarily due to lower annual precipitation. Riparian stand types within the HCP project area range widely from poorly-stocked sapling stands to well-stocked mature forests, and these stands also range from dry ponderosa pine forests to high-precipitation western redcedar (*Thuja plicata*) forests (DNRC 2004c). For instance, only 1.3 percent of all riparian areas adjacent to perennial streams in the HCP project area include well-stocked, mature Douglas-fir stand types most closely resembling those stand types studied by Chen (1991) and Brosofske et al. (1997).

The dominant trees of well-stocked, mature Douglas-fir stands in the HCP project area typically never exceed 110 feet in height (DNRC 2008a), and the average basal area is 165 square feet per acre (DNRC 2004c). Furthermore, in respect to all riparian stand types in the HCP project area, DNRC technical surveys (1999 to 2005) indicate that canopy closures generally range from 0 to 60 percent. The substantial differences between old-growth western Cascade Douglas-fir and the western hemlock forests found in the HCP project area suggest a similar level of variability in microclimate characteristics in western Montana. Because the levels of average existing vegetation growth within the riparian zones of the HCP project area likely have a highly variable and limited effect on microclimate characteristics, the selective harvest regimes used by DNRC are not expected to have a detectable adverse effect on the range of riparian microclimates found throughout the HCP project area or on aquatic ecosystems.

Soil moisture and temperature are important characteristics of microclimate, which in some instances may affect adjacent stream temperatures. Direct solar radiation on riparian soils as a result of selective riparian harvest can hypothetically increase soil temperature within one SPTH, which could lead to increased stream temperatures during flow interception with the hyporheic water table. However, Heithecker and Halpern (2006) found no significant changes in soil temperature (depth = 15 centimeters [6 inches]) after 40 percent retention harvests in the Pacific Northwest. Brosofske et al. (1997) also found no significant changes in soil temperature (depth = 5 centimeters [2 inches]) within 100 percent retention riparian buffers after adjacent clearcut harvests, and Davies-Colley et al. (2000) found an abrupt soil temperature gradient break (depth = 10 centimeters [4 inches]) at forest and pasture interfaces. Moore et al. (2005) suggest that increases in stream temperature may occur after implementing both unthinned and partial retention buffers, although the buffer effects can be highly variable. The HCP riparian timber harvest strategy will result in the retention of all trees and shrubs within 50 feet of a stream, and nearly all shrubs, sub-merchantable trees, and at least 50 percent of the trees greater than or equal to 8 inches dbh from within the remaining RMZ. Therefore, it is expected that on average, ~~more than~~approximately 80 percent of ~~all trees, shrubs, and other ground cover~~the basal area will be retained within the RMZ following this prescription. Thus, stream temperature is not expected to measurably increase due to indirect effects of microclimate soil temperature under the selective harvest regimes used by DNRC.

~~DNRC Tiered Approach~~

~~DNRC has developed a three-tiered approach for addressing potential impacts of timber harvest on riparian functions. This approach provides varying levels of riparian habitat protection depending on the potential to influence HCP fish species' habitat. Levels of protection are based on the likelihood of HCP fish species' habitat being directly or indirectly affected by streamside harvest activities.~~

~~A Tier 1 RMZ is established immediately adjacent to streams segments and lakes supporting bull trout, westslope cutthroat trout, or Columbia redband trout. A lake (as defined in ARM 36.11.312(12)) is a body of water where the surface water is retained by either natural or artificial means, where the natural flow of water is substantially impeded, and that supports fish. Tier 1 RMZs apply to stream segments designated under the SMZ Law as Class 1 streams that support HCP fish species.~~

~~A Tier 2 RMZ is established immediately adjacent to a stream or lake supporting a non-HCP fish species, including cold-water fish species other than bull trout, westslope cutthroat trout, and Columbia redband trout. Tier 2 RMZs apply to stream segments designated under the SMZ Law as Class 1 streams that do not support HCP fish species as designated under the SMZ Law.~~

~~A Tier 3 RMZ is established immediately adjacent to a stream, lake, or other body of water that does not support a fishery. Tier 3 stream segments are classified under the SMZ Law as Class 2 and Class 3 streams, as well as Class 1 streams that do not support fish, but normally have surface flow during 6 or more months of the year and contribute surface flow to another stream, lake, or other body of water. Class 2 streams are those stream segments that (1) contribute surface flow to another stream, lake, or other body of water for less than 6 months of the year; or (2) have surface flow for~~

~~6 months or more of the year, but do not contribute surface flow to another stream, lake, or other body of water. Class 3 streams are those stream segments that rarely contribute surface flow to other streams or other body of water, and normally do not have surface flow surface flow for 6 or more months of the year.~~

The HCP uses the definition of stream contained in MCA 77-5-302(7). In the definition, a -stream is a natural watercourse of perceptible extent that has a generally sandy or rocky bottom or definite bank that confines and conducts continuously or intermittently flowing water. The HCP also uses the stream classification system established under the SMZ Law (MCA 77-5-301 and ARM 36.11.312). Under the SMZ Law, all segments of stream, lakes, and other bodies of water are classified as follows:

- Class 1 stream segments are those portions of streams that support fish, or a portion of a stream that normally has surface flow during 6 months of the year or more, and that contributes surface flow to another stream, lake, or other body of water.
- Class 2 stream segments are neither Class 1 nor Class 3 streams. They are typically those portions of streams that (1) do not support fish, normally have surface flow during less than 6 months of the year, and contribute surface flow to another stream, lake, or other body of water; or (2) do not support fish, normally have surface flow during 6 months of the year or more, and do not contribute surface flow to another stream, lake, or other body of water.
- Class 3 stream segments are those portions of streams that do not support fish, normally have surface flow during less than 6 months of the year, and rarely contribute surface flow to another stream, lake, or other body of water.
- Lakes are those bodies of water where the surface water is retained by either natural or artificial means, where the natural flow of water is substantially impeded, and that support fish.
- Other bodies of water are ponds and reservoirs greater than 0.1 acre that do not support fish, as well as irrigation and drainage systems discharging directly into streams, lakes, ponds, reservoirs, or other surface water. Waterbodies used solely for treating, transporting, or impounding pollutants are not considered surface water.

The primary basis for determining HCP stream class is fish presence or absence and flow regime. ~~f~~Fish ~~species~~ presence will be primarily based on fish population surveys completed by MFWP, the USFWS, DNRC, or other land management agencies and entities. Currently, MFWP maintains this information in the Montana Natural Resource Information System (NRIS) internet database and associated GIS. DNRC will use this information, personal communications with local fisheries biologists (e.g., biologists from the USFWS, MFWP, Plum Creek, and Tribes), and other information systems that may become readily available in the future to determine known presence of HCP fish species. This information is generally obtained by DNRC on a site-specific basis during individual project-level scoping, design, and assessment.

Fisheries surveys have not yet been completed for many of the streams occurring on forested trust lands. Whenever practicable and when funding is available and/or survey objectives are consistent with DNRC monitoring objectives, DNRC will collect or cooperate with MFWP to collect fish presence/absence data on these unsurveyed stream reaches. However, given time, personnel, and budget constraints, it is not reasonable to assume that surveys can be completed for all unsurveyed areas. Therefore, DNRC will apply ~~Tier 1~~RMZ commitments for Class 1 streams whenever survey data are not available and it is reasonable to ~~believe that an HCP fish species is likely present~~presume that fish could otherwise occur or that the stream normally contributes surface flow to another stream, lake, or other body of water for 6 months of the year or more.

DNRC will consider several factors when determining whether the presence of ~~an HCP~~ fish ~~species~~ in perennial and intermittent streams is likely. These factors will include, but are not limited to, flow regime, stream gradient, channel forms, physical man-made barriers, and other habitat features. The likelihood of ~~HCP~~ fish ~~species~~ presence will be determined on a site-specific and project-level basis by a DNRC fisheries biologist or water resource specialist.

AQ-RM1 Class 1 Stream and Lake Riparian Management Zone Commitments

These commitments apply to timber harvests ~~within a Tier 1 RMZ, which are those RMZs established~~conducted immediately adjacent to Class 1 stream segments and lakes ~~supporting bull trout, westslope cutthroat trout, or Columbia redband trout. In certain cases (described below) the RMZ established on streams will be extended to include a CMZ~~. For the purposes of this commitment, the combined SMZ and RMZ specified under ARM 36.11.425 will be referred to as an RMZ.

DNRC will implement the following commitments for timber harvest within ~~Tier 1~~ RMZs for Class 1 streams and lakes:

1. DNRC will establish an RMZ with a minimum width equal to the 100-year site index tree height for timber harvests immediately adjacent to Class 1 steams and lakes. The 100-year site index tree height will be determined at the project level by field sampling the age and height of several site trees within the stand and comparing those values to locally or regionally developed site index curves.

Rationale: The 100-year site index tree height in most DNRC streamside riparian stands generally ranges from approximately 80 to 120 feet. The actual site index is largely dependent on the soil and climate of the landscape and other factors affecting the specific productivity of an individual site. For most tree species in Montana forests, the first 100 years of a trees' life is generally when the majority of growth contributing to tree height has occurred. DNRC believes that the width of an RMZ as identified by the 100-year site index tree height is a practicable and effective way to establish an area where forest practices are most likely to affect the riparian functions being addressed under the HCP riparian timber harvest strategy.

2. DNRC will maintain a 50-foot-wide no-harvest buffer within Class 1 RMZs. This buffer will start at the edge of the ordinary high water mark (OHWM) and extend across the RMZ to a slope distance of 50 feet when measured perpendicular to the stream or lake. Within the 50-foot-wide no-harvest buffer, it may be necessary to allow corridors associated with cable logging systems used to fully suspend logs across streams. In these situations, the minimum corridor spacing will be 150 feet with no more than 15 percent of the 50-foot buffer affected.
3. Harvest prescriptions within the remainder of the RMZ (from 50 feet to a distance equal to the 100-year site index tree height) will retain shrubs and sub-merchantable trees to the fullest extent possible, and a minimum of 50 percent of the trees greater than or equal to 8 inches dbh.

4. Multiple harvest entries into a specific RMZ stand will only occur if (1) the existing RMZ forest stand is classified as a medium- to well-stocked poletimber or sawtimber size class (as defined by standard DNRC SLI procedures), and (2) the proposed harvest would meet the SMZ Law minimum tree retention requirements.

Rationale: On some sites, the deflection of skyline cable system may not provide adequate clearance to yard a log above the canopy of trees located within the 50-foot no-harvest buffer. In these cases, corridors may have to be established within the no-harvest buffer to accommodate cable systems and to prevent excessive damage to residual trees remaining in the 50-foot no-harvest buffer. Use of this allowance would be limited to those sites where it was absolutely necessary to achieve silvicultural objectives and where alternative yarding methods are not practicable or economically feasible. Under this allowance, the portion of a cable corridor located within the 50-foot no-harvest buffer would not be clearcut. This allowance simply recognizes that some overstory trees may need to be removed to provide clearance for the cable system so that transported logs can be fully suspended over the stream. Only those trees are necessary to provide safe operation of the logging system and full suspension in order to protect the stream will be removed.

Beyond the 50-foot minimum SMZ width, DNRC needs to maintain the flexibility to manage the remainder of RMZ (out to the 100-year site index tree height) to promote specific tree species and age classes for meeting desired future conditions. The retention tree commitments were designed to provide both short- and long-term riparian functions.

5. To ensure protection of native fish species from increased stream temperatures, DNRC will monitor stream temperatures as described in Chapter 4, Monitoring and Adaptive Management. Additionally, DNRC will classify specific ~~areas~~stream segments as temperature-sensitive reaches and provide additional protections during riparian harvest. This will be achieved by committing to no statistically significant (p >≥ 0.05) increase in stream temperature attributable to DNRC timber harvest activities in temperature-sensitive reaches.

Rationale: DNRC also recognizes that there are conditions where ~~a harvest-induced~~any significant in-stream temperature increase ~~of less than 1° Celsius (1.8° Farenheit)~~ may not be acceptable. In reaches where in-stream temperatures are already elevated due to human-caused disturbance or activities, even a small increase in stream temperature may have an adverse effect on fish. For example, bull trout may not tolerate a change from 19° to 20° Celsius (66° to 68° Farenheit) because these temperatures are at or near their temperature tolerance range. At these high baseline temperatures, even a small increase may cause physiological and behavioral effects, disrupt rearing activities, and/or cause a barrier to migration. Therefore, DNRC has committed to identifying reaches affected by elevated stream temperatures. DNRC believes that ~~total maximum daily loads (TMDLs) for temperature approved by the EPA)~~the most current EPA-approved 303(d) list ~~are the best available~~is the most appropriate source of information for ~~sufficient, credible data on in-stream impairments, and will therefore use this information to define~~identifying temperature-sensitive stream reaches.

6. DNRC will extend SMZs to include adjacent wetlands~~,~~ where the normal SMZ boundary intercepts a wetland (ARM 36.11.302). Retention tree requirements for the adjacent wetland are the same as the requirements for the first 50 feet of the SMZ (ARM 36.11.305).

Rationale: DNRC currently uses a broader definition than federal regulations under Section 404 of the federal Water Pollution Control Act, or Clean Water Act (CWA), to identify and delineate adjacent wetlands (wet areas adjacent to streams). Under the SMZ Law and ARMs (36.11.302 through 313) and Forest Management ARMs (36.11.421 through 427), DNRC uses a functional approach that primarily relies on vegetation for identification of both adjacent and isolated wetlands. Due to this approach, DNRC already provides protection and conservation to many more acres of relatively wet areas than would be provided using a Section 404 jurisdictional approach.

7. DNRC will extend RMZs on Class 1 streams supporting HCP fish species in situations where channel migration is likely to influence riparian functions ~~-~~that are potentially affected by a timber harvest. DNRC has identified several types of CMZs where this potential is more likely. A CMZ is defined as the width of the floodprone area at an elevation twice the maximum bankfull depth. CMZs usually influenced by forest management activities are limited to those that occur on streams with an entrenchment ratio of greater than 1.4 and with valley slopes of less than 8 percent gradient that exhibit unstable channel conditions or potential for relatively high rates of lateral channel erosion and lateral migration. Entrenchment ratio is the floodprone width of a stream divided by the bankfull width of the stream. The floodprone width is equal to two times the maximum depth of the stream at bankfull flows (Rosgen 1994). CMZs will not be established when entrenchment ratios are less than 1.4, because such channels are highly confined and have little or no potential for channel migration. Application of CMZs will be determined on a site-specific basis by a DNRC fisheries biologist or water~~shed~~ resource specialist.

~~8. CMZs usually influenced by forest management activities are limited to those that occur on streams with an entrenchment ratio of greater than 1.4 and with valley slopes of less than 8 percent gradient that exhibit unstable channel conditions or potential for relatively high rates of lateral channel erosion and lateral migration. Entrenchment ratio is the floodprone width of a stream divided by the bankfull width of the stream. The floodprone width is equal to two times the maximum depth of the stream at bankfull flows (Rosgen 1994). CMZs will not be established when entrenchment ratios are less than 1.4, because such channels are highly confined and have little or no potential for channel migration.~~ Two types of CMZs are recognized under this strategy, and they are classified using the following approach:

a. **Type 1 CMZ** - A Type 1 CMZ corresponds to the floodprone area of streams exhibiting both valley bottom characteristics and alluvial processes. Valley bottom characteristics include channel slopes that are typically less than 1.5 percent and channel patterns that are meandering or braided. Alluvial processes mean that the stream is both eroding and depositing sediment throughout different parts of the channel. An example of an alluvial process would be a bend in the channel of a valley bottom stream, where the outside bend exhibits a deep channel eroding into the stream bank and the inside bend exhibits a shallow channel where eroded sediments are deposited. Streams with Type 1 CMZs typically migrate across valley bottoms rather slowly. Occasionally though, these streams are susceptible to very rapid migration to new or previously abandoned channels during major flood events. Type 1 CMZs are generally associated with Rosgen C, D, DA, and E channel types.

b. **Type 2 CMZ** - A Type 2 CMZ corresponds to the floodprone area of unstable streams exhibiting sudden erosion and deposition processes. Unstable streams are not able to efficiently transport sediment due to a variety of reasons, which can lead to increased rates of sediment deposition and channel migration. Unstable streams with Type 2 CMZs are uncommon, but where they occur, stream gradients typically range from 1 to 8 percent. Sudden erosion and deposition processes can occur on a Type 2 CMZ when a stream is forced out of its stream banks and into the floodprone area. Examples of sudden erosion and deposition are: (1) a moderately contained stream with evidence of recent sediment deposition on the forest floor outside of the stream channel, (2) alluvial fans, and (3) debris flows or torrents.

9. A CMZ will be established when harvest activities are immediately adjacent to streams supporting HCP fish species that are exhibiting these types of channel migration processes. The level of conservation applied within the CMZ will be determined by the type of CMZ present.

   a. On Type 1 CMZs, the portion of RMZ restricted to 50 percent retention will be extended when necessary to incorporate the entire floodprone area. In the event the width of the floodprone area does not extend beyond the normal RMZ, the standard RMZ harvest restrictions will be applied. The 50-foot no-harvest buffer will not be extended.

   b. Type 1 CMZ established on a stream with an unstable stream channel or stream bank exhibiting evidence of recent lateral migration will receive the same level of protection as designated for a Type 2 CMZ (see item 9(c) below).

   c. On Type 2 CMZs, the no-harvest buffer is a combination of the floodprone width plus an additional 25 feet within the RMZ. No timber harvest will occur within the entire floodprone width. Additionally, the delineation of the normal RMZ width (based on 100-year site index tree height) will begin at the edge of the floodprone width, and an additional 25-foot no-harvest buffer will be applied within the RMZ.

   d. Allowances for the restrictions listed in items 9(a) through 9(c) include those listed under Allowances for Class 1 RMZs ~~Commitments, A through C~~, below.

10. A DNRC water resource specialist will review all sites where harvest greater than 1 acre is proposed within an RMZ established for a Class 1 stream or lake.

Rationale: A Type 1 CMZ with a relatively stable stream channel or stream banks is more likely to withstand limited harvest without substantial risk of a loss of riparian functions because the typically gradual erosion rates would generally allow enough time for regeneration.

Allowances within Class 1 RMZs.

As part of the HCP riparian timber harvest strategy, allowances associated with the 50-foot no-harvest and 50 percent retention portions of the RMZ (including those extended to incorporate CMZs) may be required in certain cases where harvest is necessary to address specific situations or circumstances that would include fire, insect, and disease salvage and ~~a~~the ~~limited ability~~need to emulate natural disturbance through non-salvage-related harvest.~~ In these cases, the minimum requirements of the SMZ Law must still be met.~~

1. The following allowances may be invoked under this commitment:
   - A. In forest stands within an RMZ being impacted by disease or insect infestations (e.g., dwarf mistletoe [*Arceuthobium* spp.], mountain pine beetle [*Dendroctonus ponderosae*], or Douglas-fir beetle [*Dendroctonus pseudotsugae*]), harvest of diseased or insect-infested trees may occur within the 50-foot no-harvest buffer. However, harvest of diseased or insect-infested trees from within the first 50 feet of the RMZ will ~~retain a minimum of 10 trees greater than or equal to 8 inches dbh (or largest diameter available) per 100 feet of stream channel~~still meet the minimum retention tree requirements of the SMZ Law. Retained trees will include all streambank trees and downed trees lying within the stream channel or embedded in the stream bank. To help control disease or insect infestations, harvest of diseased or insect-infested trees from within the remaining RMZ may exceed those levels necessary to meet the normal 50 percent retention requirement.

~~**Rationale:** Harvest of diseased or insect-infested trees from within the 25-foot no-harvest buffer may be necessary to prevent the spread of disease and insect infestations. In many cases, removing trees with insect and disease symptoms can help improve riparian stand health and maintain long-term riparian functions by reducing the population of a detrimental organism. Removing infected or infested trees creates more growing space for the remaining healthy trees, helping them grow more vigorously and making them less vulnerable to insects and disease. Harvest occurring under this commitment would be limited to individual tree selection and group selection harvest from within individually affected stands. Harvest of this type would not occur across a landscape or watershed scale.~~

   - B. In areas within an RMZ that have been subjected to severe or stand-replacement wildfires, salvage harvest of dead trees may exceed the normal 50 percent retention requirement in that portion of the RMZ outside of the 50-foot no-harvest buffer. No salvage harvest of fire-killed trees will occur within the 50-foot no-harvest buffer. Downed trees lying within the stream channel or embedded in the stream bank will not be removed. These harvests will still meet the minimum retention tree requirements of the SMZ Law.

~~**Rationale:** Following severe wildfires in streamside riparian areas, the standing dead trees located within the 25-foot no-harvest buffer may still provide important riparian functions. In most cases, this buffer will provide a majority of the trees that have the highest potential for recruitment to the stream (DNRC 2002a). When severe fires burn through riparian stands, the subsequent reduction of forest canopy and vegetation along streams may result in increased solar radiation input and ultimately increase stream temperatures. Following severe fires, the remaining charred tree boles~~

~~and branches within a riparian stand may provide most of the remaining levels of shade on already stressed stream systems (Amaranthus et al. 1989). The majority of the shade provided by standing dead trees is likely to be provided by those trees located within the first 25 feet of the stream (DNRC 2002a). Due to these important considerations, DNRC has committed to retaining all trees within the first 25 feet of stream during post-fire salvage operations. Standing dead trees located outside of the 25-foot no-harvest buffer are less likely to provide important riparian functions. Therefore, to capture some of the economic value of the trees killed by wildfire in a riparian stand, DNRC may opt to salvage some of the dead trees located within the remaining RMZ but outside of the first 25 feet.~~

~~C. Salvage harvests in a Tier 1 RMZ may trigger a changed circumstance. The triggers and process for addressing changed circumstances are discussed in Chapter 6 (Changed Circumstances).~~

~~D~~C. DNRC ~~will~~may manage a portion of the total Class 1 RMZ acreage on forested trust lands using harvest prescriptions designed to meet the minimum retention tree requirements of the ARMs adopted under the SMZ Law (ARM 36.11.305). These requirements include retention of at least 50 percent of the trees greater than or equal to 8 inches dbh on each side of the stream, or 10 trees per 100-foot segment of stream (equal to approximately 86 trees per acre), whichever is greater. Tree retention will be based on the number of trees within the first 50 feet of the RMZ on both sides of a stream. A 50-foot-wide no-harvest buffer would not be required in these situations. The RMZ stands targeted to be managed in this manner will be those stand types where shade-tolerant species exist and regeneration or maintenance of shade-intolerant tree species is necessary to achieve or maintain desired future stand types or provide long-term riparian functions. ~~The amount of forested trust land RMZ managed under this prescription will be limited to the extent that the total RMZ area treated in this manner when combined with the existing RMZ area in non-stocked or seed/sapling size class within each DNRC administrative unit office does not exceed 15 percent.~~

~~DNRC will evaluate the level of RMZ area existing in non-stocked or younger size classes on forested trust land for each administrative unit office on a 5-year basis. DNRC will adjust the amount of RMZ area that could be treated in this manner to ensure that the target levels (15 percent) are not exceeded. If the target level is reached or exceeded on any individual administrative unit office, no additional non-salvage harvest using this specific allowance will be conducted on that administrative unit land area until the amount of non-stocked and/or seed/sapling size class acres drops below the 15 percent maximum allowable.~~

~~E. Removal of individual hazard trees within the no-harvest buffer is allowed. A hazard tree is any tree that poses a risk to public safety, roads, structures, property, and other improvements. Public safety refers to situations that pose a foreseeable risk of injury or death to a person.~~

2. When an allowance is invoked, the following conditions will apply:

a. The minimum requirements of the SMZ Law must still be met.

b. A DNRC water resource specialist will review all sites where an allowance is proposed regardless of the number of RMZ acres affected.

c. Salvage harvest in a Class 1 RMZ where HCP fish species are present may trigger a changed circumstance. In those instances, DNRC will follow the changed circumstances process for addressing salvage harvest (see Chapter 6, Changed Circumstances).

d. Removal of individual hazard trees within the no-harvest buffer is allowed. A hazard tree is any tree that poses a risk to public safety, roads, structures, property, and other improvements. Public safety refers to situations that pose a foreseeable risk of injury or death to a person.

e. Within each aquatic analysis unit identified in the HCP project area, the amount of Class 1 RMZ managed under these allowances will be limited so that the total RMZ area treated under these allowances, when combined with the amount of existing RMZ area in a non-stocked or seedling/sapling size class, does not exceed 20 percent of the total Class 1 RMZ acres occurring on forested trust lands in that unit.

Rationale: Harvest of diseased or insect-infested trees from within the 50-foot no-harvest buffer may be necessary to prevent the spread of disease and insect infestations. In many cases, removing trees with insect and disease symptoms can help improve riparian stand health and maintain long-term riparian functions by reducing the population of a detrimental organism. Removing infected or infested trees creates more growing space for the remaining healthy trees, helping them grow more vigorously and making them less vulnerable to insects and disease. Harvest occurring under this commitment would be limited to individual tree selection and group selection harvest from within individually affected stands. Harvest of this type would not occur across a landscape or watershed scale.

Following severe wildfires in streamside riparian areas, the standing dead trees located within the 50-foot no-harvest buffer may still provide important riparian functions. In most cases, this buffer will provide a majority of the trees that have the highest potential for recruitment to the stream (DNRC 2002a). When severe fires burn through riparian stands, the subsequent reduction of forest canopy and vegetation along streams may result in increased solar radiation input and ultimately increase stream temperatures. Following severe fires, the remaining charred tree boles and branches within a riparian stand may provide most of the remaining levels of shade on already stressed stream systems (Amaranthus et al. 1989). Extensive monitoring conducted by DNRC during fire salvage efforts on the Sula State Forest in 2001 found that a designed 50 foot no-harvest buffer retained between 84 and 96 percent of the trees with a 10 percent or greater probability of recruitment to a stream. The same studies also showed that 92 percent of the total available shade to streams following a stand replacement fire was provided by standing dead trees and a designed 50 foot no-harvest buffer retained 86 percent of the standing dead trees that provided shade to the streams. Due to these important considerations, DNRC has committed to retaining all trees within the first 50 feet of stream during post-fire salvage operations. Standing dead trees located beyond the 50-foot no-harvest buffer are less likely to provide important riparian functions. Therefore, to capture some of the economic value of the trees killed by wildfire in a riparian stand, DNRC may opt to salvage some of the dead trees located within the remaining RMZ but outside of the first 50 feet.

The~~se~~ allowance~~s~~ for management of stand types where shade-tolerant species exist and regeneration or maintenance of shade-intolerant tree species is necessary to achieve or maintain desired future stand types or provide long-term riparian functions provides DNRC an opportunity to continue implementing the overall forest management philosophy committed to in the SFLMP and ARMs of emulating natural disturbance regimes to maintain a healthy and biologically diverse forest. Wildfire is the predominant natural disturbance agent affecting the HCP project area. Riparian ecosystems and the associated riparian functions contributing to cold-water fisheries habitat (LWD, shade, and nutrient cycling) are to a certain extent provided and maintained by these disturbance regimes. Prior to the 1900s, riparian and adjacent upland forests were subject to more frequent wildfire than has been observed over the last century, largely due to fire suppression efforts (Barrett et al. 1997; Barrett 1998).

Riparian strategies that focus solely on unmanaged buffers or limit prescriptions to thinning are likely to alter the inherent disturbance regimes and patch dynamics of riparian ecosystems, and could adversely affect the long-term integrity of these ecosystems. Several studies, including Everett et al. (2003), have suggested the need to integrate disturbance events into riparian areas to maintain ecosystem functions by recognizing the dynamics of these systems. For example, seral riparian stands that include very large western larch trees (300 years of age or older) perpetuated by frequent light burns are gradually disappearing from the landscape due to the lack of management and the competitive advantage fire suppression provides to shade-tolerant species. Without management, these stand types, which commonly include 300-year-old or older larch trees, will eventually be eliminated from riparian zones as a result of fire exclusion (Agee 1994).

It has been estimated that in 1900 approximately 39 percent of the forested landscape in western Montana occurred in non-stocked and seedling/sapling age classes largely due to natural fire disturbance regimes (Losensky 1997). It is widely accepted that wildfires are more numerous in upland rather than riparian forest. DNRC recognizes that the generalized fire regimes summarized in this study might differ between riparian areas and uplands. In fact, several studies have found a lower frequency and severity of fires in forested riparian areas than in adjacent uplands. For example, studies conducted on the east slope of the Cascade Mountains in Washington and Oregon found that riparian forests had 25 to 42 percent less total fire disturbance events than upland forests (Everett et al. 2003). However, other researchers have noted that, while a riparian zone may burn less frequently than uplands, this zone type occasionally burns more intensely than the surrounding slopes (Agee 1994).

In other regions and riparian types, fire regimes have been found to be comparable to uplands (Dwire and Kauffman 2003). A study conducted in the Upper Swan Valley concluded that mixed-severity fires occurred with comparable frequency in both streamside riparian areas and uplands prior to 1920 (Barrett 1998).

Disturbance is an integral and natural component of riparian areas that contributes to important aquatic habitat functions and ecosystem integrity. Approaches to riparian protection that do not account for disturbance are unlikely to be successful. The ~~15~~20 percent ~~target level~~limit used for the allowances included in this commitment is based on a conservative estimate of the average amount of RMZ area that would be expected in younger size classes under the naturally occurring range of disturbance regimes. This flexibility is needed to treat and manage stands where regeneration or maintenance of shade-intolerant tree species is necessary to achieve or maintain desired future stand types and maintain riparian function over the long term.

~~AQ-RM2 Tier 2 Riparian Management Zone Commitments~~

~~These commitments apply to timber harvests within an established Tier 2 RMZ, which are those RMZs immediately adjacent to a stream or lake supporting a non-HCP fish species including cold-water fish species other than bull trout, westslope cutthroat trout, and Columbia redband trout. For the purposes of this commitment, the combined SMZ and RMZ specified under ARM 26.11.425 will be referred to as an RMZ.~~

1. ~~Timber harvest conducted within a Tier 2 RMZ will implement the existing DNRC riparian timber harvest practices, which are comprised of measures implemented under Montana Forestry BMPs, Forest Management ARMs 36.11.425 and 426, and the SMZ Law (ARMs 36.11.302 through 313).~~
2. ~~Tier 2 stream segments and lakes are Class 1 streams that do not support HCP fish species under the SMZ Law. Timber harvest conducted in a Tier 2 RMZ will comply with all applicable SMZ requirements for Class 1 streams regarding harvest prescriptions and tree retention including:~~
    - ~~Clearcutting will be prohibited in the SMZ.~~
    - ~~Timber harvests conducted in a Class 1 SMZ will retain at least 50 percent of the trees greater than or equal to 8 inches dbh on each side of a stream or 10 trees per 100-foot segment, whichever is greater.~~
    - ~~Retention trees will be representative of species and sizes in the pre-harvest stand.~~
    - ~~SMZs will be extended to include adjacent wetlands, where the normal SMZ boundary intercepts a wetland. Retention tree requirements for the adjacent wetland are the same as the requirements for the normal SMZ.~~
    - ~~For SMZs extended to 100 feet for slopes greater than or equal to 35 percent, most of the retention trees will be selected from within 50 feet of the stream. The remaining retention trees may be left anywhere in the SMZ.~~
    - ~~Sub-merchantable trees and shrubs in the SMZ will be protected and retained to the fullest extent possible.~~
3. ~~Timber harvest conducted within a Tier 2 RMZ will also use practices implemented under the ARMs for fish-bearing streams. Under ARM 36.11.425, additional buffer width will be added to SMZ width when the 100-year site index tree height exceeds the minimum requirement of the SMZ ARMs. The combined width of an SMZ and RMZ on fish-bearing streams is equal to a 100-year site index tree height.~~

AQ-RM2 ~~Tier~~ Class 2 and 3 Riparian Management Zone Commitments

~~These commitments apply to timber harvests within a Tier 3 RMZ, which is an SMZ or RMZ established immediately adjacent to a stream, lake, or other body of water that does not support a fishery. For the purposes of this commitment, the combined SMZ and RMZ specified under ARM 36.11.425 will be referred to as an RMZ.~~

DNRC will implement the following commitments for timber harvest ~~within Tier 3 RMZs~~ conducted immediately adjacent to Class 2 streams, Class 3 streams, and other bodies of water as defined by the SMZ Law (ARM 36.11. 312):

1. Timber harvest conducted within ~~a Tier 3 RMZ~~an SMZ established for a -Class 2 stream, Class 3 stream, or other body of water will implement DNRC's existing timber harvest practices, which include the Montana Forestry BMPs, Forest Management ARMs 36.11.425 and 426, and the SMZ Law (ARMs 36.11.302 through 313).
2. Timber harvest conducted in ~~Tier 3 RMZs~~an SMZ established for a Class 2 stream, Class 3 stream, or other body of water will comply with all applicable requirements regarding harvest prescriptions and tree retention requirements, including:
    a. Clearcutting will be prohibited in the SMZ of a Class 2 stream~~s~~, Class 3 stream, or other body of water.
    b. Timber harvests within Class 2 SMZs will retain at least 50 percent of the trees greater than or equal to 8 inches dbh on each side of a stream or 5 trees per 100-foot segment, whichever is greater. Timber harvest conducted within ~~both~~SMZs of Class 2 streams,~~and~~ Class 3 ~~SMZs~~streams, or other bodies of water will protect and retain sub-merchantable trees and shrubs to the fullest extent possible.
    c. Retention trees within Class 2 SMZs will be representative of species and sizes in the pre-harvest stand.
    d. SMZs of Class 2 and 3 streams and other bodies of water will be extended to include adjacent wetlands, where the normal SMZ boundary intercepts a wetland. Retention tree requirements for the adjacent wetland are the same as the requirements for the normal SMZ.
    e. For Class 2 streams, the SMZ will be extended to 100 feet when SMZ slopes are greater than or equal to 35 percent. When the SMZ is extended, most retention will be selected within 50 feet of the stream. The remaining retention trees may be left anywhere in the SMZ.
3. On Class 2 or 3 streams with high erosion risk, an RMZ will also be established in accordance with ARM 36.11.425.

2.2.3.2 Sediment Delivery Reduction Conservation Strategy

Background

The HCP sediment delivery reduction conservation strategy was designed to reduce potential sediment delivery to streams with HCP fish species and to help ensure that DNRC forest management activities do not contribute to a level of in-stream sedimentation that would adversely affect HCP fish species. The strategy was designed to meet three specific management objectives for HCP fish species: (1) reduce the potential for in-stream sedimentation levels, (2) manage for levels of in-stream habitat complexity, and (3) maintain stream channel stability and channel form and function (see Table 2-12).

This strategy evolved from an assessment of existing DNRC conservation strategies, identified gaps in the existing strategies, and new commitments that address the needs of HCP fish species. The overall HCP strategy consists of four separate but closely related components that address the potential for sediment delivery from different types of forest management activities. Under this strategy, DNRC will continue to use existing practices, measures, and programs to achieve the stated conservation objectives, and will supplement this effort with conservation commitments that clarify existing DNRC operational procedures. DNRC will commit to specific timelines for addressing existing sediment problems related to DNRC roads.

Based on the biological goal and specific management objectives of the strategy, DNRC will adhere to specific conservation commitments designed to:

- Minimize the number of roads to those necessary to meet near- and long-term forest management needs.
- Reduce potential sediment delivery from existing road sources to streams supporting HCP fish species.
- Construct, reconstruct, maintain, abandon, reclaim, and use roads with practices and measures that reduce the risk of sediment delivery to streams supporting HCP fish species.
- Conduct timber harvest and associated operations (site preparation, slash treatment, reforestation) with practices and measures that reduce the risk of sediment delivery to streams supporting HCP fish species.
- Conduct gravel excavation, processing, hauling, and use for DNRC forest management projects with practices and measures that reduce the risk of sediment delivery to streams supporting HCP fish species.

Existing DNRC Sediment Delivery Reduction Practices

Under the existing ARMs (36.11.421 through 427), DNRC is required to ensure that forest management activities conducted on trust lands maintain high-quality water that meets or exceeds state water quality standards and protects designated beneficial uses. Beneficial uses include protection of HCP fish species and their habitat. In addition, DNRC currently uses information from many different sources (including the Flathead Basin Commission monitoring committee, Plum Creek, the USFS, and MFWP). Information from these sources is used as part of a suite of decision tools for planning and implementation of sediment reduction activities.

It is generally recognized that one of the greatest potential effects of forest management activities on aquatic habitat is accelerated rate of erosion and subsequent sediment delivery to streams. Over time, the DNRC forest management program has developed a comprehensive approach to evaluate erosion and sediment delivery risk and reduce the risk of erosion and sediment delivery. This approach incorporates various formal operational requirements contained in the SMZ Law and ARMs (36.11.302 through 313), the Forest Management ARMs (specifically, 36.11.421 through 427), and all applicable Montana Forestry BMPs (DNRC 2004a).

Montana Forestry BMPs are designed to ensure that forestry activities meet state water quality standards. In fact, under the *State of Montana: Nonpoint Source Management Plan* (Montana Department of Health and Environmental Sciences [MDHES] 1991 and MDEQ 2006), Montana Forestry BMPs are recognized as the primary mechanism to achieve water quality standards. For non-point source activities, implementation of state-approved forestry BMPs will normally constitute compliance with the CWA. Proper installation, operation, and maintenance of state-approved BMPs are presumed to meet a landowner's or manager's obligation for compliance with applicable water quality standards.

However, EPA guidance also requires that BMP effectiveness be demonstrated. Properly installed or applied BMPs must be monitored to determine their effectiveness in attaining or maintaining water quality standards and other water quality goals. If monitoring indicates that properly implemented BMPs are not achieving water quality standards, MDEQ is required to take steps to revise the BMPs, evaluate the water quality standards for appropriateness, or re-evaluate the activity. Through this adaptive management process of monitoring and adjusting BMPs and/or water quality standards, it is anticipated that BMPs will lead to meeting the water quality standards.

DNRC has participated in monitoring the implementation and effectiveness of Montana Forestry BMPs since 1988. DNRC participates in state-wide forestry BMP audits conducted by interdisciplinary teams with representatives from federal and state agencies, private landowners, and conservation groups. The state-wide BMP audits use on-site inspections and evaluations to assess both BMP implementation and effectiveness at preventing erosion and/or sediment delivery to streams or ephemeral drainage features. These audits are conducted every 2 years under the direction of the Montana Environmental Quality Council (MEQC), and results are presented in a written report to the MEQC and Montana Legislature.

DNRC also conducts internal BMP audits on ongoing and recently completed DNRC timber sales. Water resource specialists from both the FMB and DNRC area land offices conduct these audits. The DNRC internal BMP audits use the same methods and rating systems used for the state-wide BMP audits.

The results of the DNRC internal BMP audits are comparable with the results from DNRC timber sales evaluated in the most recent state-wide forestry BMP audit, showing that BMP applications met or exceeded standards on 97 percent of the practices rated. Ninety-eight percent of the practices rated were determined to be effectively protecting soils and water resources (DNRC 2006b). In addition, DNRC internal BMP audits conducted on 83 DNRC timber sales over a 6-year period show that BMPs were properly applied by DNRC on approximately 97 percent of the practices rated. The DNRC internal BMP audits also found an effectiveness rate of approximately 98 percent of practices determined to be adequately protecting soils and water resources (DNRC 2005b).

DNRC also conducts other site-specific monitoring projects designed to quantitatively determine the effectiveness of BMPs and other mitigation measures in reducing erosion and non-point source pollution. Several ongoing monitoring projects are evaluating the effectiveness of BMPs commonly used at stream and ephemeral draw road crossings. DNRC is also monitoring the effects of DNRC timber harvest on forest soils for approximately five different timber sales per year. The objectives of these soils monitoring projects include determining whether BMPs and recommended soil conservation practices were applied, and if so, how effective they were. To date, soils monitoring studies have been completed on 74 timber sale projects since 1988 (DNRC 2004d). DNRC also completed two other specific soils monitoring projects following the 2000 wildfire and salvage operations in the Sula State Forest and the 2001 wildfire and salvage harvest in the Coal Creek State Forest (DNRC 2002b, 2003b). All of these monitoring efforts are summarized in the *DNRC State*

Forest Land Management Plan: Implementation Monitoring Report (Fiscal Years 2001 to 2005) (DNRC 2005b). DNRC adaptively incorporates findings from these monitoring efforts into future projects to continually improve soil resource protection.

The following subsections outline the regulatory requirements, other policies, and operational practices used by DNRC for forest management activities to reduce the risk of erosion and sediment delivery to streams.

Minimization of Forest Management Roads

The current approach DNRC uses to minimize the number of roads necessary to conduct forest management activities is to limit roads to those necessary to meet near- and long-term forest management needs. This approach is best described in ARM 36.11.421, addressing road management and applicable Montana Forestry BMPs.

Where possible, DNRC uses existing roads, unless use of such roads would cause or aggravate an erosion problem or threaten water quality and associated beneficial uses. DNRC also considers closing or abandoning roads that are non-essential to near-term management plans, or where unrestricted access would cause excessive resource damage. The term “near-term” generally refers to a period of time between 15 to 20 years and is based on consideration of several factors, including planned activities, desired future conditions, silvicultural objectives, infrastructure needs, costs, and available human resources.

Comprehensive road management planning, including determining which roads to build, improve, maintain, close, abandon, or obliterate, is usually completed during project-level analysis. When planning the location, design, construction, and maintenance of all roads, DNRC complies with BMPs necessary to avoid unacceptable adverse impacts and, as funding is available, implements improvements to existing roads. Abandoned and reclaimed roads are left in a condition providing adequate drainage and stabilization without requiring periodic maintenance.

Where possible and feasible, DNRC plans road systems cooperatively with adjacent landowners and considers yarding systems that minimize road needs. DNRC also attempts to minimize the number of stream crossings necessary for project objectives.

Reduction of Sediment Delivery from Existing Road Sources

The current approach DNRC uses to reduce sediment delivery from existing road sources is best described in ARM 36.11.421, addressing road management and all applicable Montana Forestry BMPs.

DNRC estimates there are approximately 2,646 miles of existing road located on forested trust lands within in the HCP project area. These roads include road segments that DNRC has sole ownership of and road segments that are under shared ownership such as cost-share and reciprocal access agreements. Roads have the potential to affect HCP fish species, particularly those segments of road located within 300 feet of a stream. Of those roads located on forested trust lands within the HCP project area, approximately 700 miles (26 percent) are located within 300 feet of a stream.

DNRC is currently required to assess and prioritize road maintenance needs by inspecting the condition of both open and closed roads every 5 years (ARM 36.11.421(12)). Road inspections and other road inventory activities are the primary mechanism used to identify existing and potential sources of road erosion and sediment delivery to streams. DNRC uses several different approaches to conduct these road assessments on forested trust lands, including watershed monitoring and timber sale planning; however, not all roads are inspected every year.

Under the watershed monitoring program (ARM 36.11.424), DNRC has been conducting a systematic inventory of watershed conditions of forested trust lands since 1998. These inventories are conducted statewide and are coordinated by the FMB. The inventories include comprehensive evaluations of existing road systems, stream crossing structures, and other potential sources of erosion and subsequent sediment delivery to streams. This information is used to characterize existing road conditions, determine maintenance needs, and prioritize necessary improvements. To date, watershed inventories have been completed for 127,116 acres of forested trust land that include approximately 763 miles (15 percent) of existing road.

In addition to the road inventories conducted under the watershed monitoring program, the NWLO and SWLO also have ongoing road monitoring programs in place for inventories of existing roads on forested trust lands. These inventories include information on stream crossings and relief drainage structures, problem areas, general maintenance needs, and assessments of the status of road closure structures. DNRC has appropriated approximately $20,000 annually to both the NWLO and SWLO for contract services to help complete these road inventories and assessments. To date, approximately 703 miles (14 percent) of existing road occurring on forested trust lands have been evaluated under these programs.

Additional road inventories and assessments are completed during DNRC timber sale planning, design, and environmental assessment. Almost all DNRC timber sales include various aspects of transportation planning. Watershed assessment and analysis completed for timber sale projects typically include a similar level of comprehensive road evaluation, specifically for existing road conditions and maintenance needs within the project planning area.

During these assessments, road erosion sources and road segments at risk of sediment delivery are identified. On average, approximately 114 miles of existing road are evaluated annually through timber sale project planning. Other road improvement needs are identified through casual observations or reports made by DNRC field staff during the normal course of carrying out their administrative duties.

DNRC typically implements actions aimed at reducing or eliminating identified or potential sources of sediment from existing roads at the project level. These actions usually consist of various road improvements, road maintenance activities, and road upgrades that have been identified within the project area. These actions are generally intended to bring the existing roads up to a standard that complies with BMPs.

BMPs are incorporated into the project design and implementation of forest management activities. The proper application of appropriate BMPs has been repeatedly demonstrated to minimize sediment transport and delivery from roads (Burroughs and King 1989; Cook and King 1983; DNRC 2006b; Rothwell 1983; Seyedbagheri 1996). BMPs applicable to a given project or situation are determined during project development and environmental analysis. DNRC complies with BMPs as necessary to avoid unacceptable adverse impacts or, as funding is available, to implement improvements to existing roads.

In some cases, a particular road or segment of road cannot be brought up to acceptable standards due to location, road conditions, or other factors. DNRC also avoids the use of existing roads in SMZs where potential water quality impacts cannot be adequately mitigated. In those cases, the road or portion of the road may be relocated, abandoned, or obliterated. DNRC generally determines which roads to close, abandon, or reclaim during project-level analysis.

Existing roads are often relocated if reconstruction, maintenance, and/or use of the road would produce greater undesirable impacts than new construction at a more appropriate location. Additionally, roads are considered for closure, abandonment, or reclamation when they are non-essential to near-term future management plans or where unrestricted access would cause excessive resource damage. Abandoned and reclaimed roads are left in a condition that provides adequate drainage and stabilization without maintenance.

Road improvements, maintenance, and upgrades are typically implemented under timber sale contracts associated with a project. DNRC timber sale contracts active between 2001 and 2003 accounted for improvement of 121 miles of existing road and maintenance activities on approximately 172 miles of existing road.

During timber sale contract development, individual BMPs are designed, customized, or enhanced for site-specific locations to reduce or eliminate the risk of erosion and subsequent sediment delivery. If road construction, road improvements, or road maintenance are part of a timber sale, the timber sale contract will contain road construction, road improvement, and road maintenance specifications; specification drawings; and detailed road logs to ensure that road activities are completed as designed and meet resource protection requirements. This information is contained in Attachment B of the timber sale contract. The Attachment B road specifications not only include road engineering and construction standards, but also contain specifications for the installation of drainage structures, sediment control fences, seeding and revegetation, surface reshaping, cleaning of drain ditches and culverts, snow plowing, and dust abatement. The drawings included in Attachment B may include specifications for road cross sections, clear limits, slash filter windrows, and other design features included in the project road plan. Contracts also include provisions to ensure that road maintenance is commensurate with the expected road use.

DNRC administers all road improvement projects to ensure that activities are conducted as specified in contracts and that resource protection requirements are being met. Adjustments are made in cases where operations fail to meet requirements, unforeseen circumstances are encountered, or when operating conditions may require design modifications. Projects are typically monitored through weekly inspections. Results of contract inspections are documented through the completion of written contract inspection reports. Every 5 years, DNRC compiles the results of all contract inspection reports and includes a summary of the information in a monitoring report completed for the Land Board.

DNRC currently enters into cooperative road management agreements with the USFS, the BLM, and Plum Creek. Under these agreements, responsibilities for road maintenance are determined as part of the agreement, and maintenance is typically completed proportional and commensurate with use. When DNRC issues a right-of-way or easement to a federal agency, it relinquishes control of that road, and the federal agency assumes maintenance responsibilities.

A portion of the forest improvement funds collected under each timber sale is set aside for road maintenance needs. These funds are allocated annually to each administrative land office for implementation. The land office selects and prioritizes individual road maintenance projects to be implemented with these funds. On average, DNRC has used forest improvement funds to complete approximately 46 miles of road improvements on an annual basis.

Reduction of Potential Sediment Delivery from New Road Construction, Road Reconstruction, Maintenance, Abandonment, Reclamation, and Road Use

The current approach DNRC uses to minimize the amount of potential sediment delivery from new road construction, reconstruction, maintenance, abandonment, reclamation, and use is best described in the SMZ Law (MCA 77-5-301 through 307) and in the ARMs (36.11.421) addressing road management and applicable Montana Forestry BMPs. The measures and practices described above under Reduction of Sediment Delivery from Existing Road Sources also apply to new road construction activities, reconstruction, abandonment, reclamation, and road use activities.

The SMZ Law and ARMs 36.11.302 through 313 regulate timber harvest, including road-related activities conducted immediately adjacent to streams, lakes, and other bodies of water. One of the primary objectives of the SMZ Law is to provide effective sediment filtration to maintain high water quality.

The SMZ Law designates all streams supporting fish or streams that contribute surface flow for at least 6 months of the year to a stream supporting fish as Class 1 streams. The minimum SMZ width on Class 1 streams is 50 feet. When slopes are greater than 35 percent, the minimum SMZ width is extended to 100 feet on Class 1 streams. Exceptions to this ARM include established roads within 50 and 100 feet and benches (topographic features) where the slope of the SMZ decreases to 15 percent or less for at least 30 feet. The SMZ boundary is also extended to include wetlands adjacent to Class 1 streams.

The SMZ Law prohibits the construction of roads in an SMZ except when necessary to cross a stream. The SMZ Law also prohibits road fill material from being deposited within an SMZ during road construction, except as necessary to construct a stream crossing. The SMZ Law does not determine when it is necessary to construct a stream crossing. However, DNRC-sponsored stream crossings of Class 1, 2, and 3 streams are subject to regulation under the Montana Stream Protection Act (MCA 87-5-501 through 87-5-509). The SMZ Law also prohibits the side-casting of road material during maintenance into a stream, lake, wetland, or other body of water.

Under the Montana Stream Protection Act, DNRC is required to apply for and obtain a 124 permit from MFWP before initiating any activities that may alter the bed or banks of any stream in the state. These permits are obtained for all installations and removals of stream crossing structures. A 124 permit may require specific designs, operating restrictions, or other mitigation measures. The 124 permit may also require DNRC to obtain a short-term exemption from Montana water quality standards. These permits are called 318 authorizations and are obtained from MDEQ. A 318 authorization may also require specific designs, operating restrictions, or other mitigation measures.

Montana Forestry BMPs contain a broad range of specific practices addressing road planning and location, road drainage, road construction, road maintenance, stream crossing design, and stream crossing installation. The proper application of appropriate BMPs has been repeatedly demonstrated to minimize sediment transport and delivery from roads (Burroughs and King 1989; Cook and King 1983; DNRC 2006b; Rothwell 1983; Seyedbagheri 1996). All road construction, reconstruction, maintenance, use, abandonment, and reclamation associated with DNRC forest management activities are designed to implement appropriate and applicable BMPs (ARMs 36.11.421(3) and 36.11.422(2)). DNRC complies with BMPs as necessary to avoid unacceptable adverse impacts. BMPs appropriate for a given project or situation are generally determined during project development and MEPA environmental analysis. DNRC roads are built to the minimum standard necessary to best meet current and future management needs and objectives and to minimize necessary maintenance. DNRC avoids use of existing roads in SMZs when potential water quality impacts cannot be adequately mitigated. DNRC considers relocation of an existing road when reconstruction, maintenance, and/or use of the existing road would produce greater undesirable impacts than relocation.

A DNRC water resource specialist and/or soil scientist review most DNRC timber sales and timber permits involving substantial levels of new road construction or reconstruction. General and site-specific BMP designs and other mitigations recommended by specialists are incorporated into timber sale environmental assessments (EAs) and contracts.

DNRC timber sale contracts include detailed information, standards, and specifications for implementation of site-specific BMPs, mitigations, and other resource protection measures. The timber sale contracts also contain road construction, road improvement, and road maintenance specifications, specification drawings, and detailed road logs. This information is contained in Attachment B of all timber sale contracts.

Road specifications not only include road engineering and construction standards, but also contain specifications for the installation of drainage structures and sediment control fences, seeding and revegetation, surface reshaping, cleaning of drain ditches and culverts, snow plowing, and dust abatement. The drawings included in DNRC's Road Inventory Procedures may include specifications for road cross sections, clear limits, slash filter windrows, and other design features included in the project road plan. The road logs include detailed instructions for site-specific road construction and BMP design.

DNRC administers road construction projects to ensure that roads are built as designed and meet resource protection requirements. Road maintenance is commensurate with expected road use. DNRC maintains drainage structures and other resource protection measures on both restricted and open roads.

DNRC abandons or reclaims roads that are deemed non-essential to near-term future management plans or where unrestricted access would cause excessive resource damage. DNRC determines which roads to abandon or reclaim during project-level analysis. Both abandoned roads and reclaimed roads are left in a condition that is stable and provides for adequate drainage. Abandoned roads are inventoried to ensure they are stable and providing adequate drainage.

Reduction of Potential Sediment Delivery from Timber Harvest, Site Preparation, Slash Treatment, and Reforestation

The existing DNRC approach for reducing the risk of sediment delivery from timber harvest activities focuses on reducing the levels of soil disturbance and subsequent risk of erosion, and providing buffer zones for effective filtration of sediment. This approach is best described in the SMZ Law, ARMs 36.11.422 through 426, and Montana Forestry BMPs applicable to timber harvest, site preparation, slash treatment, and reforestation.

The SMZ Law (MCA 77-5-301 through 307) and ARMs 36.11.302 through 313 regulate timber harvest activities conducted immediately adjacent to streams, lakes, and other bodies of water. One of the primary objectives of the SMZ Law is to provide effective sediment filtration to maintain high water quality. Other riparian functions related to sediment addressed under the SMZ Law and the ARMs are protection of stream channels and banks and promotion of floodplain stability.

The SMZ Law designates all streams supporting fish or streams that contribute surface flow for at least 6 months of the year to a stream supporting fish as Class 1 streams. The minimum SMZ width on Class 1 streams is 50 feet. When slopes are greater than 35 percent, the minimum SMZ width is extended to 100 feet on Class 1 streams. The SMZ boundary is also extended to include wetlands located adjacent to Class 1 streams.

The operation of wheeled or tracked equipment (including ground-based harvest, yarding, site preparation, and slash treatment systems) is prohibited within SMZs, except on established roads. As an exception to the ARM, equipment may be operated inside an SMZ on the side of an established road away from the stream whenever the toe of the road fill is 25 feet or more from the OHWM. Skid trails are to be located approximately 200 feet apart and are to be reclaimed through the installation of erosion control features and reestablishment of vegetative cover.

Under another exception, equipment may also operate within an adjacent wetland when the ground is frozen or there is adequate snow, as long as the equipment does not come within 50 feet of the OHWM (or 100 feet when extended for slopes of greater than 35 percent) and as long as the operation does not cause rutting and displacement of the soil.

When logs are winched or cable-yarded across a Class 1 or Class 2 stream by equipment located outside of an SMZ, the logs must be fully suspended over the stream or stream bank unless approved by a site-specific alternative practice and unless otherwise authorized pursuant to the Natural Streambed and Land Preservation Act (MCA 75-7-101 through 75-7-125).

Broadcast burning is also prohibited in SMZs. Under the SMZ Law, a landowner may apply for and obtain an alternative practice designed for site-specific conditions. Alternative practices are only granted if DNRC determines with reasonable certainty that the proposed alternative practice would conserve the integrity of the SMZ and not significantly diminish the function of the SMZ.

ARM 36.11.425 requires DNRC to establish an RMZ beyond the SMZ when forest management activities are conducted on sites adjacent to streams determined to have high erosion risk. Sites with high erosion risk are those sites with highly erodible soils or subject to conditions that result in higher risk of erosion. On these sites, the combined width of the SMZ and the RMZ is a minimum of (a) 100 feet for slopes greater than 25 percent to less than 35 percent, (b) 150 feet for slopes greater than or equal to 35 percent to less than 50 percent, and (c) 200 feet for slopes greater than or equal to 50 percent.

Ground-based equipment operations within an RMZ established for sites with high erosion risk are not allowed on slopes greater than 35 percent and are restricted on slopes less than 35 percent to those operations and conditions that do not cause excessive compaction or displacement of the soil. Equipment operations are allowed in the RMZ above established roads pursuant to the SMZ Law. Cable yarding is restricted to systems and operations that do not cause excessive ground disturbance within SMZs or RMZs.

Under ARM 36.11.426, DNRC establishes WMZs when forest management activities are conducted within or adjacent to wetlands located within an SMZ. The minimum WMZ boundary for wetlands located within an SMZ is 50 feet. Equipment operations within the WMZ are limited to low-impact harvest systems and operations that do not cause excessive compaction, displacement, or erosion of the soil. Ground-based harvest operations are also limited to periods of low soil moisture, frozen soil, or snow-covered ground conditions. Ground-based harvest operations are also required to minimize the number of skidding routes and passes through the WMZ. Cable yarding systems are restricted to full suspension or partial suspension during periods of low soil moisture, frozen soil, or snow-covered ground conditions.

DNRC timber harvest, yarding, landing, site preparation, and slash treatment operations are designed to implement all appropriate BMPs (ARMs 36.11.421(3) and 36.11.422(2)). The proper application of appropriate BMPs has been repeatedly demonstrated to minimize sediment transport and delivery from timber-harvest-related activities (DNRC 2002b, 2003b, 2004d, 2004e; NCASI 1979, 1994a,b; Rashin et al. 2006; Seyedbagheri 1996). DNRC complies with BMPs as necessary to avoid unacceptable adverse impacts. BMPs appropriate for a given project or situation are generally determined during project development and MEPA environmental analysis.

Montana Forestry BMPs address the selection of proper logging systems. When ground-based harvest and skidding systems are used, BMPs will address trail design, location, construction, drainage, and erosion control. Ground-based operations are to be avoided on unstable, wet, and easily compacted soils or slopes that exceed 40 percent. Similar BMPs address practices for ground-based site preparation and slash treatment operations.

All DNRC timber sales and permits that have the potential to cause substantial levels of soil disturbance or projects determined to have potential risk to soil and water resources are reviewed by DNRC water resource and/or soil resource specialists. The level of assessment varies with the size of the project, the sensitivity of the resource, and the types of issues or concerns associated with the project. General and site-specific BMP design and other mitigation measures recommended by specialists are incorporated into timber sale environmental assessments and contracts. General mitigation measures are developed during the EAs. Site-specific mitigation measures and customized BMPs are developed during the design of the timber sale contract.

All DNRC timber sale contracts include Standard Resource Protection and General Logging Requirement Clauses. These contracts also contain standards and specifications for the implementation of site-specific BMPs, mitigations, and other resource protection measures. Timber sale contracts commonly contain special operating requirements that can be used for unique or special situations requiring customized, enhanced BMPs or other necessary mitigation measures.

Proper implementation of contract specifications is monitored through field administration of contractors and their employees. DNRC conducts frequent field inspections of timber sales contract operations (usually weekly at a minimum). Areas in need of improvement or in direct violation of the contract are documented during these inspections and immediately addressed. Inspection reports are prepared to document the implementation of contractual requirements.

Most DNRC timber sales undergo BMP audits that evaluate and document the implementation and effectiveness of BMPs used on the project. DNRC soil, water, and fisheries resource specialists from both the Forest Management Bureau and administrative land offices complete internal BMP audits. Internal BMP audits are conducted during any phase of timber sale operations on both active and recently completed timber harvests. State-wide audits are completed biannually by interdisciplinary teams consisting of representatives from various forest landowner groups throughout Montana. Four to five DNRC harvest sites are typically completed in each BMP audit cycle. BMP audits provide an important feedback mechanism to DNRC on the implementation and effectiveness of BMPs. Approximately 90 internal and 25 state-wide BMP audits have been completed on DNRC timber sales since 1998.

Since the inception of the state-wide BMP audits in 1990, DNRC has consistently ranked among the highest of all ownership groups in both BMP application and effectiveness (DNRC 1988, 2000b, 2002c, 2004e). The results of the DNRC internal BMP audits are comparable with the results of the state-wide audits (DNRC 2000a, 2005b). The results of all BMP audits conducted on DNRC sites since 1998 through both of these processes are summarized in the Table 2-13.

TABLE 2-13. BMP AUDIT IMPLEMENTATION AND EFFECTIVENESS MONITORING

	Percent (%) Practices Rated					
	BMP Application			BMP Effectiveness		
Audit Cycle	Meet or Exceed	Minor Departures	Major Departures	Adequate Protection	Minor or Temporary Impacts	Major Impacts
Statewide 1998	96	4	0	99	1	0
Statewide 2000	97	2.7	<1	98	1.8	<1
Statewide 2002	98	2	<1	99	1	0
Statewide 2004	97	3	0	98	<1	<1
Statewide 2006	98	2	0	98	2	0
Internal 1998-2004	97	2.9	<1	98	2	<1

Sources: DNRC (1998a, 2000b, 2002c, 2004e, 2005b, 2006b).

Reduction of Potential Sediment Delivery from Gravel Excavation, Processing, Hauling and Use

The current approach DNRC uses to minimize the amount of potential sediment delivery from gravel excavation, processing, hauling, and use for forest management projects is best described in the SMZ Law (MCA 77-5-301 through 307) and ARMs (ARM 36.11.421) addressing road management and applicable Montana Forestry BMPs. The measures and practices described under new road construction activities, reconstruction, abandonment, reclamation, and road use activities also apply.

Gravel operations that are 10,000 cubic yards or greater in size are also subject to rules and regulations adopted under the Opencut Mining Act (MCA 82-4-4) administered by MDEQ. Pursuant to ARMs 17.24.201 through 225, a gravel operation of this size must obtain an opencut mining permit from MDEQ. Application for a permit must include a plan of operation that addresses measures that will be used to protect on- and off-site surface and ground water from impacts caused by gravel operations. The operating plan must also include a reclamation plan that ensures proper stabilization and revegetation of the site following gravel quarrying. Once an operating plan is approved and permitted, compliance of all provisions of the permit are required, and a bond must be submitted that is equivalent to the cost of reclaiming disturbed lands.

A DNRC water resource specialist and/or soil scientist review most gravel operations associated with timber sales or roads used for forest management activities. General and site-specific BMP designs and other mitigation measures recommended by these specialists are incorporated into EAs, contracts, permits and operating plans.

HCP Sediment Delivery Reduction Conservation Strategy

The HCP commitments comprising the sediment delivery reduction conservation strategy will rely heavily on the existing ARMs, laws, and approaches used in the current practices. These practices already provide a large degree of conservation to HCP fish species and provide a sound basis for meeting the HCP sediment delivery reduction strategy objectives. The additional HCP commitments described below will provide better assurances that the HCP sediment delivery reduction strategy objectives are being met.

AQ-SD1 Commitments for Minimizing Forest Management Roads

The HCP commitments for minimizing roads used for DNRC forest management activities incorporate the existing DNRC sediment delivery reduction practices for planning transportation systems for the minimum number of road miles (ARM 36.11.421). The HCP commitments will include the following existing DNRC practices:

1. DNRC will only build roads that are necessary for current and future management objectives.
2. DNRC will identify necessary roads by conducting transportation planning as part of landscape-level or project-level evaluations.
3. DNRC transportation planning will consider
    a. Existing and probable future access needs within the road planning project area
    b. The relationship of existing access routes and road systems on adjacent parcels
    c. Logging system capabilities
    d. Access needs of planned and future forest improvement activities
    e. Access needed for fire protection
    f. Public access
    g. Planning road systems cooperatively with adjacent landowners whenever practicable
    h. Protection of wildlife and aquatic habitat.
4. DNRC will evaluate and consider the use of alternative yarding systems that minimize road needs if such systems are practicable and economically feasible and their use will meet immediate and foreseen future management objectives.
5. DNRC will use existing roads located in an SMZ only if potential impacts to water quality and aquatic habitat can be adequately mitigated. DNRC will consider relocating roads outside of the SMZ when these impacts cannot be adequately mitigated.

Rationale: Under the existing SMZ Law, construction of roads is prohibited within an SMZ except when necessary to cross a stream. The construction of stream crossings is regulated by several existing laws with corresponding permits. The installation of a new stream crossing or replacement of an existing stream crossing requires a 124 permit from MFWP under the Montana Stream Protection Act. A DNRC road-stream crossing construction project may also require a 318 permit from MDEQ. The requirement for a 318 permit is specified or waived by MFWP during the 124 permit review process.

6. DNRC will restrict or ~~abandon~~reclaim roads that are non-essential to near-term future management needs, or where unrestricted access would cause excessive resource damage. The term "near-term future" generally refers to a period of 15 or 20 years. Decisions on road restrictions or ~~abandonment~~reclamation will be based on consideration of several factors, including, but not limited to, planned activities, desired future stand conditions, silvicultural objectives, infrastructure needs, cost, fire protection access needs, and available human and financial resources.

Rationale: These commitments limit roads to those necessary to meet near- and long-term forest management needs. This approach is described in the existing practices. Long-term, landscape-level planning has been completed on the Stillwater Block and Swan River State Forest during the development of the grizzly bear conservation strategy. As a result, DNRC has committed to limiting new roads in the Stillwater Block and Swan River State Forest. This includes approximately 19.3 miles in the Stillwater Block and approximately 70.3 miles of new road in the Swan River State Forest constructed during the 50-year Permit term. According to the analysis in the EIS for this HCP, during the 50-year Permit term, less than 1 mile of road would be ~~abandoned or~~ reclaimed in the Stillwater Block, and approximately 11 miles of road would be ~~abandoned or~~ reclaimed in the Swan River State Forest. All new roads would be closed to motorized public access. Transportation planning has not been completed on other state forests or scattered parcels. This would be completed at the project level as outlined in the existing strategy, which consists of ARMs addressing DNRC road management (ARM 36.11.421) and Montana Forestry BMPs. In the EIS analysis for this HCP, it was estimated that up to 410 miles of road would be abandoned or reclaimed during the 50-year Permit term on scattered parcels in the NWLO, SWLO, and CLO. Under the grizzly bear strategy, DNRC will analyze the road system on each parcel in the CYE recovery zone and identify and close roads within a 5-year period. Lastly, DNRC will enhance its current conservation practices for minimizing roads by committing to monitor implementation of this strategy. This task will be completed by tracking the amount of new road constructed, reconstructed, relocated, ~~abandoned,~~ and reclaimed within the HCP project area.

AQ-SD2 Commitments for Reducing Sediment Delivery from Existing Roads

The commitments for reducing sediment from all existing DNRC roads incorporate the existing ARMs, BMPs, and policies covering DNRC forest management programs as described in the existing practices. All existing DNRC roads include permanent, temporary, open, closed, abandoned, and reclaimed surfaces, as well as all stream crossing structures (Appendix B, Document B-4 – DNRC Road Inventory Procedures). These measures already provide a large degree of conservation to HCP fish species and provide a sound basis for meeting the HCP sediment delivery reduction strategy objectives.

The HCP commitments include several additions to the current DNRC practices that will provide better assurances that the HCP sediment delivery reduction strategy objectives are being met. These additions include a timeline for completing road inventories in watersheds supporting HCP fish species, a prioritization scheme for implementing corrective actions, and a timeline for identifying and implementing corrective actions, as described below.

1. DNRC will complete inventories of all existing roads and stream crossing structures used for forest management activities and abandoned roads that are within the HCP project area and located within watersheds (sixth-order HUCs) supporting HCP fish species. Roads inventoried will be limited to those for which DNRC has legal access and sole ownership, or cost-share or reciprocal road agreements.
2. DNRC will complete ~~road~~ inventories using current methods and procedures. A detailed description of these inventory methods, procedures, and data sheets are contained in Appendix B, Documents B-4 – DNRC Road Inventory Procedures and B-5 – DNRC Road Inventory Field Form. These methods and procedures may be revised over time to include additional information, take advantage of new technology, or gain efficiency. However, the essential elements of the existing inventory will be maintained. Any revision of the methods and procedures will continue to provide all information required for the identification of existing and potential sediment sources and the development of corrective measures.

Rationale: Roads located within watersheds supporting HCP fish species have the highest potential to affect the HCP species' habitat; therefore, roads within the HCP project area are the focus of the HCP planning process. The methods and procedures currently used by DNRC to inventory and assess roads have been widely used by both DNRC staff and contractors and their employees. They are similar to methods used by other agencies and private forest managers, and have been demonstrated to be a practicable and efficient means for DNRC to collect useful information adequate for identifying potential sediment problems and maintenance needs.

3. DNRC will complete road inventories on all watersheds supporting bull trout (including core and nodal habitat) during the first 10 years that the Permit is in effect.
4. All road inventories for watersheds supporting westslope cutthroat trout or Columbia redband trout will be completed within the first 20 years that the Permit is in effect.

Rationale: This strategy is aimed at focusing DNRC efforts on those roads located in sixth-order HUC watersheds supporting HCP fish species in order to identify potential sediment sources directly affecting HCP fish species in as timely a manner as possible.

DNRC estimates there are approximately 2,645 of existing road on forested trust land in the HCP project area. Over the last 9 years, DNRC has completed road inventories on approximately 1,466 miles of the road on forested trust lands under its SFLMP Monitoring Program (approximately 85 percent of these roads are likely in the HCP project area). DNRC has inventoried an average of 163 miles of road per year, or 3.2 percent, of the total amount of forest roads annually. The amount of road inventory completed to date within watersheds supporting HCP fish species has not been calculated. However, approximately 75 percent of the 1,466 miles inventoried are likely within watersheds supporting HCP fish species. It is therefore reasonable to assume that almost half of the road inventories required under this commitment have already been completed.

Approximately 177 miles of existing road within the HCP project area are located within 300 feet of streams supporting bull trout. By focusing existing monitoring resources and placing an emphasis on completing road inventories within watersheds supporting bull trout, DNRC will be able to complete inventories on the remaining roads located within bull trout watersheds within the timeframes contained in this commitment.

5. Based on the completed road inventories, DNRC will classify all inventoried road segments/sites as being either:
    a. Low risk of sediment delivery (meets BMPs or has very low risk of sediment delivery)
    b. Moderate risk of sediment delivery (does not meet BMPs, has moderate risk of sediment delivery, or meets BMPs but is poorly located)
    c. High risk of sediment delivery (does not meet BMPs, is poorly located, is currently delivering sediment, or has high risk of future sediment delivery).
6. Corrective actions will be prioritized by considering the following factors:
    a. Watersheds supporting bull trout
    b. Watersheds supporting westslope cutthroat trout or Columbia redband trout
    c. Watersheds supporting other sensitive beneficial uses (e.g., domestic/municipal uses)
    d. Watersheds in which total daily maximum loads (TMDLs) are in place
    e. 303(d) listed watersheds in need of TMDL development.
7. Corrective actions will be prioritized for implementation within a watershed by:
    a. High-risk sites,
    b. Moderate-risk sites, then
    c. Low-risk sites whenever feasible.

Rationale: The existing practices for reducing sediment from DNRC roads already provide a large degree of conservation to HCP fish species and provide a sound basis for meeting the HCP sediment delivery reduction strategy objectives.

The HCP commitments provide better assurances that the HCP sediment delivery reduction strategy objectives are being met. This is achieved by establishing an inventory timeline for completing road inventories in watersheds supporting HCP fish species so that problem sites are identified in a timely manner. The commitments also include a method for prioritizing sites for implementation of corrective actions that makes DNRC more accountable and establishes timeframes for completing actions in HCP fish species habitat.

8. Project-level, site-specific corrective actions will be developed and implemented on sites identified as having a high or moderate risk of sediment delivery. These corrective actions will only occur on roads and stream crossing structures where DNRC has legal access and has sole ownership. These sites will be improved to a level necessary to reduce risk of sediment delivery to streams supporting fish species and to meet or exceed the habitat requirements for HCP fish species. Primary mechanisms to achieve this action are development and implementation of site-specific road improvements and road upgrades, road abandonment or road reclamation, culvert replacement and/or removal, and other mitigation~~s~~ measures necessary to bring problem road segments up to minimum BMP standards.

9. On roads with shared ownership where DNRC does not have sole ownership, DNRC will continue to work with other cooperators to address road segments identified as having moderate or high risk of sediment delivery as described under existing practices.

10. Corrective actions will be completed on all identified sites with high risk of sediment delivery located within bull trout watersheds that are in the HCP project area within the first 15 years that the HCP and Permit are in effect. Annual updates and the 5-year monitoring report will be used to document progress of corrective actions.

11. Corrective actions will be implemented at all identified high-risk sites in watersheds supporting westslope cutthroat trout or Columbia redband trout within the first 25 years that the HCP and Permit are in effect. Annual updates and the 5-year monitoring report will be used to document progress on these corrective actions.

12. DNRC will continue to implement the road sediment source inventories and corrective actions in watersheds supporting HCP fish species throughout the duration of the Permit term.

Rationale: Under these commitments, problem roads would be corrected faster, and because of the prioritization list described above, the roads causing the greatest effects on HCP species would be corrected first. In the recent past, DNRC has addressed road sediment problems and implemented road improvements on an average of approximately 114 miles of road per year through timber sale contracts and forest improvement projects. These activities included reconstruction, improvements, maintenance, abandonment, and reclamation. Recently completed road inventories indicate that identified high- to moderate-risk problems occurred on less than 5 percent of the total road miles evaluated. Therefore, it is expected that the amount of corrective measures needed to meet this commitment can be accomplished under the existing DNRC forest management program. DNRC timber sale contracts will continue to be the primary mechanism to implement site-specific corrective actions. The road maintenance portion of the forest improvement funds will also be used, whenever available, for high-priority projects where no timber sale projects are occurring. Other opportunities, such as cooperative agreements and special grants, will be pursued to supplement the funding of corrective actions.

DNRC must limit the commitments for corrective actions to roads where it can secure access and has sole ownership. DNRC cannot commit to making corrective actions on roads where there is no definitive legal access or roads with shared ownership where DNRC does not have the authority to specify design standards for other users. DNRC also cannot commit to bearing sole responsibility and cost of corrective actions on roads that are under shared ownership.

13. DNRC will incorporate the goals, targets, and prescriptions contained within approved TMDLs applicable to covered activities where DNRC has actively participated in the development of the TMDL, and the TMDL planning area is located within a watershed containing HCP project area parcels supporting HCP fish species. In these cases, the requirements of the TMDL may be applied in conjunction with the commitments contained in one or more of the aquatic conservation strategies. DNRC will actively participate in TMDL development when 25 percent or more of the TMDL planning area consists of HCP project area parcels in watersheds supporting HCP fish species.

Rationale: The goal of the TMDL process is to reduce sources of pollutants in a watershed so that impaired waters can meet water quality standards, thereby benefiting all aquatic species in the watershed. Under this program, participating non-point source entities in the watershed are allocated a pollutant amount so that the water quality standards can be achieved. Existing DNRC practices and the HCP sediment delivery reduction strategy are compatible with the goals, objectives, and requirements of existing TMDLs that have been developed within the HCP project area. When DNRC participates in the TMDL process, it is another way to gain insight on the necessary corrective actions and ensure that all landowners in the watershed are moving in the right direction for aquatic habitat protection. However, due to limited land ownership in some TMDL areas, DNRC may not have the resources to participate in development of every TMDL. In those cases where DNRC is not an active stakeholder in development of the TMDL, DNRC cannot be assured that all the objectives, targets, and practices contained in a TMDL are practicable, feasible, or attainable on DNRC lands. Therefore, DNRC must limit its commitment to implement all aspects of a TMDL only in those specific cases where DNRC has been an active stakeholder in the development of the TMDL.

AQ-SD3 Commitments for Reducing Sediment Delivery from New Road Construction, Reconstruction, Maintenance, and Use

The commitments for reducing potential sediment delivery from all new DNRC road construction, reconstruction, maintenance, and use rely primarily on DNRC's continuing commitment to implement existing SMZ Laws, ARMs, and policies covering DNRC forest management programs, as described above for the existing practices. These policies apply to both new temporary and new permanent roads. These commitments also include several additions to the current DNRC practices that will provide better assurances for meeting conservation strategy objectives. These commitments include a process for ensuring (1) adequate review of proposed road activities potentially affecting HCP fish species habitat by a DNRC water resource specialist, (2) design and implementation of site-specific mitigation measures, and (3) adequate monitoring and adaptive management on both the implementation and effectiveness of the conservation commitments. The additions included in these commitments are:

1. A DNRC water resource specialist will review road management activities associated with forest management projects located within watersheds (sixth-order HUCs) supporting HCP fish species. The water resource specialist will make recommendations that will be integrated into the development of road standards, contract specifications, site-specific BMPs, and other mitigation measures. The purpose and role of the specialist reviews are detailed in commitment 5 below. Specific road management activities that will be reviewed by a water resource specialist include

    a. Road construction and reconstruction projects meeting one or more of the following criteria:

        i. Greater than 0.5 mile in length,

        ii. Located within the RMZ of a Class 1 stream supporting an HCP fish species,

        iii. Includes the installation of ~~perennial stream~~a Class 1 stream crossing, or

        iv. Located on sites with high erosion risk as defined by ARM 36.11.403(82).

    b. Road maintenance projects and use of roads for hauling timber harvest greater than 100 mbf involving one or more of the following circumstances:

        i. Located within the RMZ of a Class 1 stream supporting an HCP fish species,

        ii. Includes a ~~perennial stream~~Class 1 stream crossing, or

        iii. Located on sites with high erosion risk as defined by ARM 36.11.403(82).

2. New road locations or reconstruction of existing roads will avoid high-hazard sites prone to mass failure as required in BMP III.A.4. Proposed road locations will be screened during the cumulative watershed effects (CWE) coarse-filter analysis for locations associated with slope instability and prone to mass failure (see Section 2.2.3.5, Cumulative Watershed Effects Conservation Strategy). A DNRC water resource specialist will review all proposed road locations in the field when a CWE coarse-filter analysis indicates that the proposed road is located on sites with high risk of slope instability in watersheds supporting HCP fish species.

3. When new road construction or reconstruction cannot be avoided on potentially unstable slopes, DNRC will design and implement site-specific mitigation measures to reduce the risk of mass failure.

4. Roads deemed unnecessary for future use that are ~~abandoned or~~ reclaimed will be left in a stable condition not requiring maintenance. ~~Abandoned roads will continue to be inventoried.~~

5. DNRC will design and implement site-specific BMPs and other mitigation measures to reduce the risk of sediment delivery to streams affecting HCP fish species to the maximum extent practicable. A DNRC water resource specialist will make recommendations that will be integrated into the development of road standards, contract specifications, site-specific BMPs, and other mitigation measures. In cases where measures necessary to adequately reduce the risk of sediment delivery may not be practicable or feasible due to site, funding, or other limitations, decision rationale will be documented in the HCP implementation checklist and provided to the USFWS in the annual update.

6. DNRC contracts that address forest management activities conducted in watersheds supporting HCP fish species and including road construction, reconstruction, maintenance, and use will include applicable road design specifications and operating requirements. These specifications will include road construction and maintenance standards, resource protection requirements, BMP requirements, special operating and design requirements, and site-specific BMP and mitigation measure specifications.

Rationale: The existing practices for addressing potential sources of erosion and sediment delivery from all new DNRC road construction, reconstruction, maintenance, and use already provide a high degree of conservation to HCP fish species and provide a sound basis for meeting HCP sediment delivery reduction strategy objectives. The additional commitments, which require water resource specialist oversight on projects with a high likelihood of sediment delivery, will provide additional assurances that HCP fish species are protected through recommendations on design and site-specific mitigation measures to reduce the risk of erosion. Updating the USFWS annually on situations where measures could not be implemented provides a system of checks and balances so that both parties can assess whether additional measures are required to meet the goals of the strategy.

The determination of which administrative process is used to implement DNRC timber harvests is primarily determined by harvest volume and not by harvest area. Timber harvests greater than 100 mbf are generally completed through the DNRC Timber Sale Planning Process. Harvest less than 100 mbf may be completed through a DNRC Timber Permit. Water resource specialists are typically involved in all timber sales (harvest greater than 100 mbf) through the MEPA interdisciplinary process. The level of water resource specialist involvement on timber permits (harvest less than 100 mbf) is determined by the project forester.

7. DNRC will incorporate the goals, targets, and prescriptions contained within approved TMDLs applicable to covered activities where DNRC has actively participated in the development of the TMDL, and the TMDL planning area is located within a watershed containing HCP project area parcels that support HCP fish species. In these cases, the requirements of the TMDL may be applied in conjunction with the commitments contained in one or more of the aquatic conservation strategies. DNRC will actively participate in TMDL development when 25 percent or more of the TMDL planning area consists of HCP project area parcels in watersheds supporting HCP fish species.

Rationale: The goal of the TMDL process is to reduce sources of pollutants in a watershed so that impaired waters can meet water quality standards, thereby benefiting all aquatic species in the watershed. Under this program, participating non-point source entities in the watershed are allocated a pollutant amount so that the water quality standards can be achieved. Existing DNRC practices and the HCP sediment delivery reduction strategy are compatible with the goals, objectives, and requirements of existing TMDLs that have been developed within the HCP project area. When DNRC participates in the TMDL process, it is another way to gain insight on the necessary corrective actions and ensure that all landowners in the watershed are moving in the right direction for aquatic habitat protection. Due to limited land ownership in some TMDL areas, DNRC may not have the resources to participate in the development of every TMDL. In those cases where DNRC is not an active stakeholder in development of the TMDL, DNRC cannot be assured that all the objectives, targets, and practices contained in a TMDL are practicable, feasible, or attainable on

DNRC lands. Therefore, DNRC must limit its commitment to implement all aspects of a TMDL to those cases where DNRC has been an active stakeholder in the development of the TMDL.

8. DNRC will administer road construction projects to ensure that contract specifications, BMPs, and other resource protection requirements are met on a weekly basis when road construction and maintenance activities are actively occurring.

9. On sites where practices implemented have resulted in unacceptable levels of impact to soil or water resources, appropriate mitigation and/or rehabilitation measures will be implemented as soon as possible. Examples of unacceptable levels of impact are major departures in BMPs resulting in actual sediment delivery to streams or a high risk of sediment delivery to streams.

Rationale: Addressing sediment delivery issues in a timely manner prevents chronic deterioration of habitat and avoids future problems when DNRC contract administrators are faced with a similar situation. When specified mitigation measures are incorrectly applied and/or unacceptable impacts occur, DNRC implements corrective actions and/or rehabilitation measures immediately or as soon as possible. These situations are usually identified and resolved during contract administration and may or may not involve technical assistance from the DNRC water resource specialist.

AQ-SD4 Commitments for Reducing Potential Sediment Delivery from Timber Harvest, Site Preparation, and Slash Treatments

The commitments for reducing potential sediment delivery from DNRC timber harvest activities (harvest, yarding, site preparation, and slash treatment) focus on reducing the levels of soil disturbance and subsequent levels of erosion and providing buffers zones for effective filtration of sediment. The commitments are primarily based on existing practices, but also include new measures for (1) providing a process for ensuring adequate review by a DNRC water resource specialist of harvest activities potentially affecting HCP fish species habitat, (2) designing and implementing site-specific mitigation measures, and (3) providing adequate feedback using both implementation and effectiveness monitoring. The additions included in the commitments are:

1. A DNRC water resource specialist will review all proposed timber harvests greater than 100 mbf located within a watershed supporting an HCP fish species. The water resource specialist will conduct a field review and make recommendations that would be integrated into the development of ~~road standards,~~ contract specifications, site-specific BMPs, and other mitigation measures. The purpose and role of the specialist reviews are detailed in commitment 4 below.

   ~~**Allowance:**~~ In situations or circumstances determined to have low risk of substantial soil disturbance, the DNRC water resource specialist may ~~invoke the right to~~ forgo ~~this level of~~a field review and not make any recommendations to be integrated into contract specifications. Low risk will be determined after consulting with a DNRC water resource specialist. An example of a situation that would not require field review by a water resource specialist might include activities such as ~~RMZ salvage harvest from an existing road or other situations with a low-risk for soil disturbance~~salvage harvest from existing roads with no RMZs present.

2. Timber harvests proposed on high-hazard sites prone to mass failure will be screened during the CWE coarse-filter analysis as outlined in the HCP CWE conservation strategy (Section 2.2.3.5). A DNRC water resource specialist will conduct a field review of all proposed harvest locations when CWE coarse-filter analysis indicates the timber harvests are located on sites with high risk of slope instability and are prone to mass failure.
3. When timber harvests are conducted on unstable slopes, DNRC will modify harvest prescriptions and/or design and implement mitigation measures to avoid increasing the risk of mass failure.
4. DNRC will design and implement timber sale contract specifications, special timber harvest operation requirements, site-specific BMPs, and other mitigation measures to reduce the risk of sediment delivery to streams affecting HCP fish species to the maximum extent practicable. A DNRC water resource specialist will make recommendations that will be integrated into the development of contract specifications, special operating requirements, site-specific BMPs, and other mitigation measures. In cases where measures necessary to adequately reduce the risk of sediment delivery may not be practicable or feasible due to site, funding, or other limitations, decision rationale will be documented in the HCP implementation checklist and provided to the USFWS in the annual update.
5. Contracts addressing DNRC timber harvest and associated forest management activities will include applicable standard operating requirements and restrictions; special operating requirements and restrictions; BMPs; and site-specific mitigation measures designed to avoid, minimize, or mitigate the risk of sediment delivery to streams affecting HCP fish species.
6. DNRC will administer timber sale projects to ensure that contract specifications, BMPs, and other resource protection requirements are met.

Rationale: The commitments for reducing potential sediment delivery from DNRC timber harvest activities (harvest, yarding, site preparation, and slash treatment) focus on reducing the levels of soil disturbance and subsequent levels of erosion and providing buffers zones for effective filtration of sediment. These commitments rely primarily on the existing SMZ Law, ARMs, Montana Forestry BMPs, and other policies covering the DNRC forest management programs, as described in the existing practices. These existing practices already provide a high degree of conservation to HCP fish species.

The commitments also contain several additions to current DNRC practices that will provide better assurances for meeting the HCP sediment delivery reduction strategy objectives. These commitments include (1) providing a process for ensuring adequate review by a DNRC water resource specialist of harvest activities potentially affecting HCP fish species habitat, (2) designing and implementing site-specific mitigation measures, and (3) providing adequate feedback using both implementation and effectiveness monitoring. These additional measures will ensure better protection of HCP fish species through specialist oversite and design of site-specific mitigation measures. Monitoring will help specialists and field staff refine the design and implementation of measures to improve effectiveness where needed.

7. DNRC will incorporate the goals, targets, and prescriptions contained within approved TMDLs applicable to covered activities where DNRC has actively participated in the development of the TMDL, and the TMDL planning area is located within a watershed containing HCP project area parcels that support HCP fish species. In these cases, the requirements of the TMDL may be applied in conjunction with the commitments contained in one or more of the aquatic conservation strategies. DNRC will actively participate in TMDL development when 25 percent or more of the TMDL planning area consists of HCP project area parcels in watersheds supporting HCP fish species.

Rationale: The goal of the TMDL process is to reduce sources of pollutants in a watershed so that impaired waters can meet water quality standards, thereby benefiting all aquatic species in the watershed. Under this program, participating non-point source entities in the watershed are allocated a pollutant amount so that the water quality standards can be achieved. Existing DNRC practices and the HCP sediment delivery reduction strategy are compatible with the goals, objectives, and requirements of existing TMDLs that have been developed within the HCP project area. When DNRC participates in the TMDL process, it is another way to gain insight on the necessary corrective actions and ensure that all landowners in the watershed are moving in the right direction for aquatic habitat protection. Due to limited land ownership in some TMDL areas, DNRC may not have the resources to participate in the development of every TMDL. In those cases where DNRC is not an active stakeholder in development of the TMDL, DNRC cannot be assured that all the objectives, targets, and practices contained in a TMDL are practicable, feasible, or attainable on DNRC lands. Therefore, DNRC must limit its commitment to implement all aspects of a TMDL to those cases where DNRC has been an active stakeholder in the development of the TMDL.

8. DNRC will complete contract inspections during routine contract administration. DNRC will document the levels of compliance with contract specifications and requirements.

9. On sites where practices implemented have resulted in unacceptable levels of impact to soil or water resources, appropriate mitigation and/or rehabilitation measures will be implemented as soon as possible. Examples of unacceptable levels of impact are major departures in BMPs resulting in actual sediment delivery to streams or a high risk of sediment delivery to streams.

Rationale: Addressing sediment delivery issues in a timely manner prevents chronic deterioration of habitat and avoids future problems when DNRC contract administrators are faced with a similar situation. When specified mitigation measures are incorrectly applied and/or unacceptable impacts occur, DNRC implements corrective actions and/or rehabilitation measures immediately or as soon as possible. These situations are usually identified and resolved during contract administration and may or may not involve technical assistance from the DNRC water resource specialist. Requiring USFWS review and approval of DNRC HCP corrective measures would delay implementation of corrective and rehabilitation actions. The potential delays caused by a review period would likely result in higher levels of impact and more costly implementation.

AQ-SD5 Commitments for Reducing Potential Sediment Delivery from Gravel Excavation, Processing, Hauling, and Use

These commitments build upon the commitments for gravel pits described in the grizzly bear conservation strategy, including commitments GB-PR7, GB-NR6, GB-ST5, GB-SW5, and GB-SC4.

1. DNRC will design and implement site-specific BMPs and other mitigation measures to reduce the risk of sediment delivery to streams affecting HCP fish species from all gravel pits. A DNRC water resource specialist will make recommendations that will be integrated into the development of contract specifications, permits, and Plans of Operation (as required under ARM 17.24.217).
2. DNRC gravel pits will comply with biennial agreements established with county weed boards. Noxious weeds will be managed utilizing an integrated weed management approach. Such practices include, but are not limited to: (1) The use of weed-free equipment; (2) re-vegetation of disturbed areas with site-adapted species, including native species as available; and (3) biological control measures included in timber sale contracts and Plans of Operations (as required under ARM 17.24.217). Non-vegetated areas associated with large gravel pits may not exceed 40 acres.

Rationale: The gravel pit commitments contained in the grizzly bear conservation strategy limit the number and location of pits that may be active in the Stillwater Block, Swan River State Forest, and on scattered parcels. Generally, these pits would be located in upland areas with minimal potential effects on riparian conditions or aquatic habitat. However, requiring a DNRC water resource specialist review of pit sites will ensure that potential risks of sediment delivery to streams are addressed through site-specific BMPs and mitigation measures.

Addressing weeds at gravel pits is expected to promote healthy and diverse forest vegetation, including riparian areas.

3. Gravel pits will not be developed within SMZs. Some site-specific minor levels of borrowing and stockpiling of material may occur in an SMZ where required to construct, reconstruct, improve, or maintain roads or road stream crossings. If borrows occur in SMZs, measure to minimize risk of sediment delivery will be developed by a DNRC water resource specialist and integrated into the development of contract specifications or permits.
4. Gravel pits will not be developed within RMZs. Some site-specific minor levels of borrowing and stockpiling of material may occur in an RMZ where required to construct, reconstruct, improve, or maintain roads or road stream crossings. If borrows occur in RMZs, measures to minimize risk of sediment delivery will be developed by a DNRC water resource specialist and will be integrated into the development of contract specifications or permits.
5. The Stillwater Block and the Swan Unit, may each have one medium non-reclaimed gravel pit within the portion of an RMZ that extends beyond the SMZ.

Rationale: Limiting the location, number, and size of allowable pits in SMZs and RMZs reduces the risk of aquatic habitat concerns associated with sedimentation, reduced shading, and lowered availability of LWD. Requiring water resource specialist oversight provides additional assurances that HCP fish species habitat will be protected and that sediment risks will be addressed through the development of site-specific BMPs or mitigation measures.

Some headwater basins within the Stillwater and Swan Units have high drainage densities that typically result in overlapping RMZs. These areas have legacy road systems that have not been upgraded to a standard that meets minimum BMPs. Therefore, it is likely that it will be necessary to occasionally develop medium pits within RMZs in these areas.

6. Gravel development and use associated with borrows is considered a normal and necessary component of road construction and road maintenance. Development and use of borrows is allowed unconstrained when associated with allowable road construction and/or road maintenance activities.

Rationale: Borrows typically involve very small amounts of additional ground or motorized disturbance when considered in conjunction with other mechanized activities associated with road construction and road maintenance. Development and use of this material, which typically occurs immediately adjacent to road surfaces, is expected to have minimal additional impact.

2.2.3.3 Fish Connectivity Conservation Strategy

The critical ecological function specifically addressed in this HCP strategy is fish connectivity. The strategy is formulated to address barriers to HCP fish species that prevent or impede fish migration upstream or downstream. For the purposes of the HCP, the connectivity strategy focuses exclusively on road-stream crossings. In some cases (i.e., to prevent hybridization, predation, and the spread of disease), it may be desirable to prevent connectivity by maintaining or fortifying existing barriers at road-stream crossings. For example, it may be important to maintain barriers between non-introgressed westslope cutthroat trout and potentially hybridizing species. The establishment of connectivity or maintenance of isolation will be made on a case-by-case basis for each site using a review process performed in collaboration with MFWP and other stakeholders.

This strategy has evolved from an assessment of DNRC's existing conservation strategies, identified gaps in existing strategies, and new management concepts. These ideas and guidance are summarized in this strategy and explored in detail by Bower (DNRC 2004f). The findings of the technical report lead to a basis for the HCP fish connectivity strategy that facilitates naturally occurring levels of connectivity for all life stages of HCP fish species. DNRC will provide connectivity by designing fish passage structures to accommodate background levels of streambed form and function that would otherwise occur at the site. By emulating these streambed processes, ordinary stream habitat features and properties will develop in a crossing structure, thereby allowing naturally occurring levels of connectivity. This strategy will ensure connectivity from low to bankfull flows because it is during these periods that the vast majority of HCP fish species migration occurs. Stream crossings will be designed to accommodate flows, and consequently streambed functions, during runoff events greater than bankfull flows (for example, 25-, 50-, or 100-year flow events). These concepts are consistent with the DNRC HCP aquatic biological goals and objectives, and provide a firm foundation to serve as the basis for the HCP fish connectivity strategy.

As a first step in this process, DNRC launched the DNRC Fish Passage Assessment Project to inventory and analyze all road-stream crossings where native fisheries connectivity is an issue on forested trust lands. As of the end of 2006, the preliminary inventory of the applicable road-stream crossing sites in the project area was completed. The inventory will be continually updated as the data are refined or projects are completed. The four objectives of the project are to (1) establish an inventory of every road-stream crossing within known and suspected native fisheries habitat, (2) collect sufficient detailed information from each site to facilitate an accurate assessment of connectivity, (3) conduct detailed analysis of each site and compile results into a database, and (4) develop a maintenance planning schedule focusing on the status of the stream crossings and the need to provide connectivity at those sites. A detailed description of the project protocol is provided by Bower (DNRC 2004f).

Using this inventory information, DNRC has identified approximately 106 fish passage culvert barriers in the HCP project area (Appendix C, Figure C-34). DNRC is currently in the process of prioritizing road-stream crossing improvements based on existing levels of connectivity, as well as species status and biological goals established collaboratively with MFWP and other stakeholders. Prioritization will be conducted on two levels: (1) a coarse filter based on species presence and genetic data, and (2) a fine filter based on overall conservation objectives and current levels of connectivity provided to the different life stages of HCP fish species found in the stream.

When all sites are prioritized, DNRC will set target rates for road-stream crossing improvements based on a timetable for allowing connectivity of adult and juvenile HCP fish species during low to bankfull flows within the first 30 years that the HCP and Permit are in effect. DNRC will commit to specific improvement rates over this time period. In addition, all high-priority sites will be improved within the first 15 years that the HCP and Permit are in effect.

DNRC has also formulated design options by preference and feasibility. However, the selection of a road-stream crossing design will be determined by DNRC and based on stream channel form and function, flow regimes, costs, anticipated use, and regulatory approval.

Existing DNRC Practices

Existing plans and practices provide DNRC various levels of management direction for bull trout, westslope cutthroat trout, and Columbia redband trout connectivity:

- ARMs – 36.11.422, 36.11.427, 36.11.428, 36.11.436
- Montana Forestry BMPs – VA2, VC2, VC3, VD1
- Montana Stream Protection Act – MCA 87-5-501 to 87-5-509 (including MFWP administration of the 124 permit process and draft internal stream permitting policies)
- *Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin, Montana* (MBTRT 2000)
- *Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat and Yellowstone Cutthroat Trout in Montana* (MFWP 2007)
- *Bull Trout Draft Recovery Plan* (USFWS 2002)
- Existing institutional practices.

These existing conservation practices are directly or indirectly tied to one another, but there is not a clear and detailed set of standards for providing connectivity for bull trout, westslope cutthroat trout, and Columbia redband trout. The lack of a unified approach among the strategies for managing connectivity also complicates associated decision-making processes, allowing for inconsistent 124 permit prescriptions throughout the different regions of Montana.

To establish long-term guidance for the management of fish connectivity, DNRC must interpret the overall intent of the existing strategies. Given that the Forest Management ARMs (36.11.421 through 427) eventually direct a DNRC resource specialist to multiple prescriptions and goals for bull trout, westslope cutthroat trout, and Columbia redband trout connectivity, the logical existing standard may be the sum of the highest potential prescriptions and goals. Because existing BMPs and the Montana Stream Protection Act language collectively provide a regulatory framework for the highest prescriptions and goals, the existing standard for new and existing structures is essentially to ensure fisheries connectivity for all species and life stages. The following regulatory requirements are applicable to fish connectivity:

- ARM 36.11.422(2) – The department will incorporate BMPs into the project design and implementation of all forest management activities.
- ARM 36.11.427(4) – When installing new stream crossing structures on fish-bearing streams, the department will provide for fish passage as specified in MCA 87-5-501, the Montana Stream Protection Act (124 permits).
- BMP VC2 – Design stream crossings for adequate passage of fish (if present) with minimum impact on water quality. When using culverts to cross small streams, install those culverts to conform to the natural stream bed and slope on all perennial streams and on intermittent streams that support fish or that provide seasonal fish passage. Ensure fish movement is not impeded. Place culverts slightly below normal stream grade to avoid outfall barriers.
- MCA 87-5-501 (State Policy) – It is hereby declared to be the policy of the State of Montana that its fish and wildlife resources and particularly the fishing waters within the state are to be protected and preserved to the end that they be available for all time, without change, in their natural existing state except as may be necessary and appropriate after due consideration of all factors involved.

HCP Conservation Strategy

AQ-FC1 Fish Connectivity Commitments

The following commitments comprise the HCP fish connectivity conservation strategy

1. This strategy for connectivity applies to HCP project area lands and those roads and stream crossings that DNRC has access to and sole ownership of. For roads with shared ownership, DNRC will work with other road cooperators to address fish passage issues.

Rationale: DNRC will retain an interest in the maintenance, rebuilding, or construction of high standard road-stream crossings that accommodate native fish passage on project area roads with shared ownership. DNRC will not commit to this strategy for those road-stream crossings where there is no definitive legal access or where DNRC does not have the authority to specify design standards for other users. DNRC also cannot commit to bearing sole responsibility for the cost of stream crossing improvements on roads in which have shared ownership.

2. DNRC will provide connectivity to adult and juvenile bull trout, westslope cutthroat trout, and Columbia redband trout during low to bankfull flows by emulating streambed form and function at stream crossings. DNRC will use the best available design technology while considering site conditions and cost efficiencies.

Rationale: There are two approaches for providing fisheries connectivity during the design phase of stream crossing structures: direct and indirect. Directly providing connectivity involves designing a structure to specifically accommodate the passage of select species and life stages throughout some range of flows. Because the detailed study of bull trout, westslope cutthroat trout, and Columbia redband trout swim performances while migrating through difficult hydraulics under varying environmental conditions is a research gap, this is not an ideal approach. Indirectly providing connectivity first involves designing a structure to accommodate the background levels of streambed form and function that would otherwise occur at the site. By emulating these streambed processes, ordinary stream habitat features and properties evolve in a crossing structure, thereby allowing naturally occurring levels of connectivity.

The strategy will ensure connectivity from low to bankfull flows because it is during these periods when the vast majority of bull trout, westslope cutthroat trout, and Columbia redband trout migrations occur. Road-stream crossings will be designed to accommodate flows during runoff events that are greater than bankfull flows, which will in turn accommodate the majority of streambed functions. The majority of fish passage structures in streams supporting HCP fish species will be designed to pass a minimum of the 50-year flood event.

This particular approach for integrating connectivity in new stream structures is beginning to be embraced by 124 permit issuers throughout the state. Design specifications meant to achieve the same intent of this strategy are likely to be included in nearly all 124 permits in the future.

3. DNRC will inventory and assess for connectivity all existing stream crossings on known and presumed (see AQ-RM1 commitments) bull trout, westslope cutthroat trout, and Columbia redband trout habitat not surveyed during the DNRC Fish Passage Assessment Project. DNRC will also foster cooperative relationships with other agencies and landowners to further refine the status and prioritization of bull trout, westslope cutthroat trout, and Columbia redband trout connectivity on the watershed scale. The methods for assessing fish passage and connectivity will be the same as those used for the DNRC Fish Passage Assessment Project.

Rationale: Through the ongoing Fish Passage Assessment Project described in Section 2.2.3.3 (Fish Connectivity Conservation Strategy), DNRC is addressing the major informational gap in the conservation strategy, which is determining the scope of existing bull trout, westslope cutthroat trout, and Columbia redband trout connectivity on state trust lands. This project has identified 106 fish barriers in the HCP project area.

The ongoing Fish Passage Assessment Project uses the following methods for assessing fish passage and connectivity: (1) technical surveys of structure profile, channel cross-section, substrate, and multiple flow scenarios; and (2) data analysis using fish passage models (e.g., FishXing), flow models (e.g., NFF and HY-8), and multiple regional measures of fish swim performances. Assessment tools will typically incorporate existing substrates at a survey site, but the assessment of fish passage will not necessarily include the technical analysis of sediment budget, sediment transport processes, or the ability of a structure to pass large debris.

Fostering cooperative relationships with other agencies and landowners will further expedite bull trout, westslope cutthroat trout, and Columbia redband trout conservation by bringing into light the status of road-stream crossings on adjacent ownerships. This expanded field of assessment will help ensure greater accuracy in the planning schedule and the success of shared interagency goals for connectivity. DNRC recognizes the importance of connectivity within an entire watershed despite a mixed ownership pattern.

4. DNRC will prioritize road-stream crossing improvements based on existing levels of connectivity, as well as species status and population biological goals established while taking into consideration other regulatory agencies' or cooperative organizations' activities and goals. Genetic data used for a coarse filter will be obtained primarily from MFWP data sets. Where practicable and where time is permitting, DNRC will collaborate with MFWP to collect species genetics information to supplement those data sets.
    a. Fish connectivity coarse filter
        i. Priority 1 – Habitat includes any bull trout life stage
        ii. Priority 2 – Habitat includes 100 percent genetically pure westslope cutthroat trout or Columbia redband trout
        iii. Priority 3 – Habitat includes westslope cutthroat trout or Columbia redband trout of unknown genetic purity
        iv. Priority 4 – Habitat includes 80 to 99 percent genetically pure westslope cutthroat trout or Columbia redband trout.
    b. Fish connectivity fine filter (within priority groups)
        i. Determine if the action of culvert removal or replacement meets conservation objectives (i.e., prevention of genetic introgression or displacement by non-native species) while considering the goals of MFWP, the USFWS, and other appropriate organizations (see item (5) below).
        ii. Determine the status of existing connectivity for different life stages at varying flows through model outputs, field verification, and other available data.
        iii. Crossing site improvements may also be prioritized based on management opportunities, such as associated timber sales and other projects, forest improvement funds, grant availability, and structural failure due to catastrophic natural events.

Rationale: Use of a dynamic planning schedule that incorporates both coarse and fine filters will provide for maximum efficiency and effectiveness in addressing different species' connectivity status and concerns. The prioritization schedule will ensure that the most important habitats for HCP fish species are addressed first. These commitments will enhance and expand habitat for HCP fish species in the project area. This planning schedule also accounts for changing interagency biological goals and improvement opportunities developed from the availability of different funding sources.

5. DNRC will maintain a planning schedule containing a list of road-stream crossing sites to be addressed by this strategy. The planning schedule will identify current site prioritizations, potential mechanisms for implementation, and project status. The schedule will be reviewed annually and updated as new road-stream crossing sites are identified, there are changes in crossing status, new information becomes available, or improvements are completed. DNRC will provide this planning schedule to MFWP, the USFWS, and other appropriate organizations to effectively collaborate with adjacent landowners and other agencies on bull trout, westslope cutthroat trout, and Columbia redband trout conservation objectives.
6. All Priority 1 sites determined to require connectivity will be improved within the first 15 years that the HCP and Permit are in effect.
7. All road-stream crossings will allow connectivity of adult and juvenile bull trout, westslope cutthroat trout, and Columbia redband trout during low to bankfull flows within the first 30 years that the HCP and Permit are in effect, except in those cases identified in item (4)(b)(i).
8. Every 5 years, one-sixth of all sites that do not meet the objectives of the fish connectivity strategy as determined by the DNRC Fish Passage Assessment Project will be improved to meet the strategy or, at a minimum, have final plans and designs for improvements to meet the strategy.

   If, due to initial programmatic adjustments in HCP implementation, the first one-sixth of the sites cannot be improved in the first 5-year period, then those sites will be improved within the first 10 years that the HCP and Permit are in effect. Sites that may be delayed under this scenario would be improved in addition to other sites selected for improvement during the second 5-year period.

Rationale: The rationale and benefits to HCP fish species for these commitments are described in Section 2.2.3.3 (Fish Connectivity Conservation Strategy). Culvert lifespan is primarily a function of culvert material, culvert coatings, water chemistry, soil resistivity, and abrasion. Due to the variability of environmental conditions, galvanized steel culverts generally have a lifespan of 20 to 100 years under controlled conditions (NCSPA 2000). Foresters and water resource specialists with DNRC have found the average lifespan of steel culverts to be 30 to 35 years. It is therefore presumed that most, if not all, existing culverts on DNRC holdings will be replaced or removed within that timeframe.

The planning methodology for establishing the 15-year and 30-year target rates of site improvements as outlined above in items (6) and (7) will (1) ensure that all road-stream crossing sites on forested trust lands meet objectives for connectivity within the timeframe of the HCP, (2) accommodate a yet unknown number of sites that do not meet the objectives for connectivity, (3) maintain a steady rate of site improvement, and (4) provide allowances for economic fluctuations, funding and project availability, logistical issues, and timing of associated local road maintenance projects.

9. The selection of a road-stream crossing design on streams supporting HCP fish species will be determined by DNRC based on stream channel form and function, costs, long-term environmental risk (sedimentation), and anticipated use. The selection of site-specific stream crossing designs is contingent upon approval by regulatory permitting authorities such as MFWP and MDEQ. The construction and maintenance of forest roads, including bridge and culvert stream crossings, are activities that normally do not require 404 discharge permits administered by the U.S. Army Corps of Engineers (33 CFR 323.4 (1i) and (6iii)). The majority of fish passage structures in streams supporting HCP fish species will be designed to pass a minimum of the 50-year flood event. In order of preference, subject to environmental, operational and economic feasibility, design options that DNRC will consider include:
    a. Permanent structure removal
    b. Temporary bridges
    c. Permanent bridges
    d. Bottomless arch culverts
    e. Fords – (1) reinforced fords such as armored fords, and (2) fords with streambeds suitable to handle predicted loads (both are generally only feasible in low-traffic areas)
    f. Box culverts (only in low-gradient streams where substrate retention can be ensured through sufficient culvert embeddedness)
    g. Round or elliptic corrugated metal pipe (CMP) – channel simulation design (Bates et al. 2003)
    h. Round or elliptic CMP – no-slope design (design option only for streams where gradients are generally less than 3 percent) (Bates et al. 2003)
    i. Round or elliptic CMP – hydraulic design (Bates et al. 2003).

Rationale: All the above design options can provide for streambed form and function emulation while accommodating economic feasibility, the availability of different funding sources, and varying environmental conditions from site to site.

10. Road-stream crossings constructed on streams with bull trout, westslope cutthroat trout, and Columbia redband trout habitat will include the following additional mitigations:
    a. Construction windows are generally July through mid-August (within habitat occupied by bull trout), July through November (within habitat occupied by westslope cutthroat trout or Columbia redband trout), or as specified by MFWP in a 124 permit.
    b. DNRC will implement reasonable measures to exclude and/or salvage fish from construction sites, such as constructing block nets and removing fish from de-watered stream sections, as practicable.
    c. As practicable and economically feasible, stream flows will be rediverted through newly constructed crossing structures to allow engineered substrates to adjust to stream energies and processes.

Regarding the rediversion of stream flows through a newly constructed crossing structure, diligence during the final phases of construction when stream flows are rediverted into crossing structures can help ensure proper sealing of engineered substrates and prevent costly reinstallation of substrate material. This practice is most appropriate where higher stream energies and steeper gradients occur.

d. Montana Forestry BMPs will be met at each site during and after modification or construction. A DNRC contract administrator will be present during all fish passage installations. The application of BMPs will occur during contract administration and after site modification or construction. Contract administrators will have the authority to halt or modify a project if BMPs are not being met during construction. Additional BMP implementation and effectiveness monitoring is addressed in the HCP sediment delivery reduction strategy (Section 2.2.3.2).

e. DNRC will provide training on fish connectivity design and construction techniques for field staff responsible for fish passage installations. Training will occur early in the implementation of the HCP. Additional training will be provided as new technologies become available or there are changes in personnel.

Rationale: These additional mitigations are designed to minimize to the greatest extent possible any impacts to HCP fish species habitat as a result of construction associated with a site improvement.

Allowances for AQ-FC1:

A. Road-stream crossings that will provide connectivity to limited or marginal fisheries habitat may not be required to emulate streambed form and function when approved by the USFWS. The USFWS will conduct reviews of requests for this allowance and approve or deny within 45 days.

Rationale: In some instances a road-stream crossing may provide connectivity to only a very short reach of fish habitat (for example, 500 feet or less habitat). In another instance, a road-stream crossing may provide connectivity to stream reaches with only seasonal surface flows. In situations such as these, an appropriate and reasonable design approach may include providing connectivity only to adult fish during some or all flows. When DNRC requests an allowance to provide less than full connectivity at a proposed road-stream crossing identified for replacement under this strategy, the following information will be submitted to the USFWS for review and consideration: flow regime (i.e. perennial, intermittent, and disconnected flows); habitat types (e.g. rearing, spawning, and wintering habitats); quality and quantity of different habitat types; species composition and populations (e.g., native/non-native species presence, genetic status [if available], estimated numbers of individuals [if available], and stream temperature [if available]).

B. DNRC may receive a 124 permit that requires the installation of a stream crossing structure that does not meet the design standards contained in the fish connectivity strategy. In these cases, DNRC will notify the USFWS during the annual update that an allowance is being invoked.

Rationale: In issuing 124 permits to DNRC, MFWP may recognize that a road-stream crossing will provide connectivity to very limited or marginal fisheries habitat. In this case, MFWP may elect to issue a 124 permit that requires road-stream crossing installations with lower design standards for connectivity than those described in this strategy. In certain situations, MFWP may also issue 124 permits that require a barrier to connectivity in order to meet other long-term native fisheries biological goals.

2.2.3.4 Grazing Conservation Strategy

The HCP grazing conservation strategy applies only to grazing licenses issued on DNRC classified forest trust lands and that are included in the HCP project area. It does not apply to grazing leases issued on DNRC classified grazing or classified agricultural lands because those are administered and managed under separate planning processes. Grazing licenses on classified forest trust lands are associated with DNRC forest management activities and are therefore included in the HCP because they are addressed in the SFLMP and Forest Management ARMs (36.11.421 through 427) for state trust lands.

Under this strategy, DNRC will follow the existing grazing inspection and monitoring program as a coarse filter to identify potential problem areas. The new concepts developed under this strategy for grazing focus on an inspection process and timeline for defining acceptable levels of livestock use and impact, verification and prioritization of problems that will affect HCP fish species, development and implementation of corrective actions to decrease effects to HCP fish species, and follow-up with implementation and effectiveness monitoring.

This approach will allow DNRC to quickly identify and then eliminate or minimize unacceptable grazing effects on HCP fish species or their habitat. The process is specifically designed for application to grazing activities and incorporates scientifically defensible numeric and narrative criteria in a grazing coarse-filter approach that will describe general acceptable levels of livestock use and identify potential problem areas. There is considerable support for these criteria referenced in the scientific literature (Ehrhart and Hansen 1997, 1998), and they are very similar, if not identical to, the criteria used in the *Plum Creek Timber Company Native Fish HCP* (Plum Creek 2000); the Montana State Office of the USDA NRCS (USDA NRCS 2003); and the *Beaverhead Forest Plan Riparian Amendment* (USFS 1997); and recommended by the now-defunct University of Montana Riparian and Wetland Research Unit (Thompson et al. 1998). Furthermore, the coarse-filter process directly addresses existing riparian conditions and assesses project risk to specific habitat elements, such as streambank stability and riparian vegetation.

While these standards provide a useful reference point in identifying potential problems and determining relative risk, indices of healthy and functioning riparian communities, streambank stability, and acceptable levels of impact must be ultimately determined on a site-specific basis. The strategy accomplishes this by addressing potential problems through field verification and corrective action. During the process, site-specific information is collected to more clearly define the problem and develop solutions best suited to the circumstances involved. Licensees and other DNRC resource specialists can be brought into the process to help craft solutions that are both reasonable and practicable while still meeting conservation objectives.

The strategy is designed to identify and address grazing problems through license compliance inspections, thereby ensuring that DNRC grazing management practices minimize loss of riparian vegetation, minimize physical damage to stream banks, maintain channel stability and channel morphological characteristics, and promote diverse and healthy riparian plant communities. These concepts are consistent with the DNRC HCP aquatic biological goals and objectives, and provide a firm foundation to serve as the basis for an HCP grazing conservation strategy. The strategy is expected to contribute to DNRC HCP biological objectives for temperature; sedimentation; habitat complexity; and channel form, function, and stability.

Existing DNRC Conservation Practices

The existing grazing conservation practices are based on the existing ARMs (36.11.444). The basic premise of the existing ARMs is to ensure that grazing management practices minimize the loss of riparian vegetation, minimize physical damage to stream banks, maintain channel stability and channel morphological characteristics, and promote diverse and healthy riparian plant communities.

There are currently 261 grazing licenses issued on 454 separate parcels of classified forest trust lands administered by DNRC. Approximately 198,907 acres of classified forest trust lands are under grazing licenses. A total of 391 parcels with grazing licenses encompassing 164,931 acres within the HCP project area are proposed to be covered by the Permit. Approximately 163 of the 391 parcels of classified forest trust land in the HCP project area with grazing licenses contain a segment of stream known to support at least one of the three HCP fish species. These 163 parcels contain approximately 82 miles of stream supporting bull trout, 121 miles of stream supporting westslope cutthroat trout, and 4 miles of stream supporting Columbia redband trout. See Tables 4.8-5 and 4.8-6 in Section 4.8.2.1 (Fish and Fish Habitat – Sediment) of the EIS for this HCP for a summary of DNRC grazing licenses affected by bull trout, westslope cutthroat trout, and Columbia redband trout distributions.

In addition to lands licensed for grazing, some DNRC classified forest parcels are occasionally subject to unauthorized livestock use. DNRC parcels are subject to Montana's open range doctrine requiring landowners who do not wish to allow livestock grazing on their land to fence the livestock out. Because of this doctrine, simply canceling a grazing license or deciding not to license a parcel for grazing use does not ensure the absence of livestock. Without an active grazing license, large investments in fencing and maintenance would be necessary to keep open range cattle off DNRC lands without the benefit of license income.

The Agriculture and Grazing Management Bureau within the TLMD of DNRC administers grazing licenses issued on state trust lands. Grazing licenses may be issued for a term between 1 and 10 years. Most grazing licenses are issued for 10-year terms. In all cases, grazing licenses expire on February 28 of the expiration year. All DNRC grazing licenses specify the carrying capacity of the parcel in animal unit months (AUMs) and the allowable season of use. Grazing licenses may also contain stipulations for addressing problems or corrective actions necessary to prevent or mitigate previous or existing impacts.

Detailed grazing inspections are conducted on each licensed parcel during the field season prior to license renewal. During these inspections, DNRC determines stocking rates for the licensed parcel, identifies potential problems related to the overall conditions of the tract, checks conditions of any existing improvements, and identifies the need for any additional improvements. Stocking rates are based on the grazing capacity of the licensed parcel. Grazing capacity is the maximum number of animals that can graze each year on a given area of land, for a specific number of days, without inducing a downward trend in forage production, forage quality, or soil. Grazing capacity determinations are based on existing range conditions, which are estimated through visual assessment of existing plant species composition compared to potential plant species composition (climax range condition). The methods used for these determinations are based on guidelines developed by the NRCS (USDA NRCS 1977). All information collected during the grazing license renewal inspections is recorded on a DNRC Grazing Field Evaluation Form (Appendix B, Document B-6 – Grazing Field Evaluation Form).

The SFLMP established both narrative standards and numeric criteria for grazing management on classified forest trust lands. These standards address the determination of initial stocking rates and acceptable levels of riparian use and streambank impact, and specify the roles of both DNRC and licensees in identifying and mitigating problems. The SFLMP also initiated the requirement for DNRC to evaluate grazing licenses midterm between license renewal inspections. A Supplemental Grazing Evaluation Form and Instructions (Appendix B, Document B-7 – Montana DNRC Supplemental Grazing Evaluation Form and Instructions) was developed for use in assessing riparian and streambank conditions during both grazing license renewal and midterm inspections. Instructions for completing the Supplemental Grazing Evaluation Form are also contained in Appendix B, Document B-7.

Noxious weeds are also evaluated during both license renewal and midterm grazing evaluations (see Appendix B, Document B-8 – DNRC Noxious Weed Inventory/Management Form and Instructions). During license renewal inspections, the location of noxious weeds and existing control strategies are noted on the standard DNRC Field Evaluation Form. During midterm grazing inspections, a DNRC Noxious Weed Inventory/Management Form is completed. Appendix B, Document B-8 also contains instructions for completing the DNRC Noxious Weed Inventory/Management Form.

Potential problems may be identified and addressed at any time during the license term. However, most problems are likely to be identified during the renewal or midterm inspections. Mechanisms for addressing issues may involve continuing or changing the existing license stipulations, shortening the license term, reducing numbers of livestock, changing season of use, increasing monitoring, recommending other changes in grazing management or grazing practices, or, in rare cases, canceling the license. The number of AUMs issued under a grazing license is generally relatively low. Therefore, it is often difficult to make improvements cost-effective. Cancellation of a grazing license often will not solve the problems because of the open range law and the need for active licensees to effectively maintain fences and other improvements.

The numeric criteria used in the SFLMP were largely adapted from interim standards in use by the USFS during the development of the *Beaverhead Forest Plan Riparian Amendment* (USFS 1997). The numeric criteria contained in the SFLMP resource management standards were based on the most stringent numeric criteria developed by the USFS for the most sensitive beneficial use categories.

The one-size-fits-all approach used in the SFLMP numeric criteria was very difficult to implement and not necessarily applicable nor appropriate for all riparian areas or all situations. Therefore, the ARMs were designed to capture the philosophy of the SFLMP by retaining narrative criteria and concepts contained in the plan, but dropping the specific numeric criteria to provide more flexibility for site-specific circumstances.

The current ARMs addressing grazing licenses (ARM 36.11.444) specify the following:

1. During renewal inspection, DNRC will evaluate the range conditions, plant species composition, levels of riparian forage and browse utilization, levels of streambank disturbance, presence of noxious weeds, erosion, and condition of improvements on each grazing license.
2. During midterm inspections, DNRC will evaluate the range conditions, levels of riparian forage and browse utilization, levels of streambank disturbance, and overall tract conditions, emphasizing any problems noted on last inspection.
3. DNRC may require stipulations at any time during the license term.
4. DNRC will specify AUMs, type of livestock, and grazing period.
5. DNRC will identify methods to specify AUMs.
6. DNRC will design grazing plans to minimize loss of riparian streambank vegetation and to reduce structural damage to stream banks.
7. DNRC will manage licenses to maintain or restore both herbaceous and woody riparian vegetation to a healthy and vigorous condition, facilitate all age classes of riparian community, leave sufficient plant biomass and residue for adequate filter and energy dissipation during floodplain function, and minimize physical damage to stream banks.
8. DNRC will authorize continuous or season-long grazing only if #6 and #7 are met.
9. DNRC will direct the grazing licensees to place mineral, protein, or other supplements in areas to minimize livestock concentration near riparian areas.
10. DNRC will require holding facilities be located outside of riparian areas.
11. DNRC will evaluate existing riparian use during renewal or midterm inspections and specify acceptable conditions to be met for #6.
12. DNRC will offer technical assistance to mitigate or rehabilitate riparian impacts. If improvements do resolve damages, then DNRC may revise the license. The licensee is primarily responsible for grazing mitigations.
13. The licensee will be responsible for mitigating problems. DNRC may offer technical or financial assistance.

HCP Conservation Strategy

AQ-GR1 Grazing Commitments

DNRC will use existing Forest Management ARMs for grazing (ARM 36.11.444) as the basis of this HCP grazing strategy. The strategy will adopt and apply the concepts contained in the grazing management ARMs, such as minimizing loss of riparian vegetation, minimizing physical damage to stream banks, maintaining channel stability and channel morphological characteristics, and promoting diverse and healthy riparian plant communities. The following clarifications to the existing practices and commitments will be implemented under this strategy.

1. DNRC will continue to review all grazing licenses on a 5-year cycle, with both license renewal and midterm inspections using the Montana DNRC Supplemental Grazing Evaluation Form and Instructions (Appendix B, Document B-7) as a grazing coarse filter to evaluate range, riparian, and streambank conditions, and presence and extent of noxious weeds. This form may be revised or automated in the future. However, if the form is revised, the information collected will be comparable to the type of data and level of detail provided by the current form.

2. DNRC will use both numerical and narrative criteria in a grazing coarse-filter approach to identify potential problem areas. Numerical criteria to be used in the coarse-filter are:

    a. Riparian forage utilization (50 percent for season-long grazing)

    b. Riparian browse utilization (up to 25 percent shrubs in the heavy or moderate browse form class)

    c. Streambank disturbance (10 percent).

    These parameters and methods used for their field assessment are described in Appendix B, Document B-7.

3. DNRC will retain the narrative criteria contained in the existing grazing management ARMs (ARM 36.11.444), and DNRC will continue to assess these parameters with methodologies used in the Supplemental Grazing Evaluation Form. Criteria to be evaluated include:
    - Range condition
    - Age class distribution of woody shrubs and deciduous trees
    - Presence and extent of noxious weeds
    - Condition of improvements
    - Other problems (such as erosion).

4. DNRC will include in its grazing evaluations an assessment of the following riparian parameters:

    a. A qualitative assessment of grazing impacts on coniferous tree regeneration and tree seedlings will be added to the inspection process, with observations recorded on the Supplemental Grazing Evaluation Form (Appendix B, Document B-7).

    b. The presence and extent of other invasive non-native plant species considered a major threat to riparian or aquatic plant communities and not currently listed as noxious weeds by the State of Montana will also be evaluated and noted on DNRC's Noxious Weed Inventory/Management Form (Appendix B, Document B-8). DNRC will develop and maintain a list of these species and provide field evaluators an identification guide for field identification. This will include species listed on county weed districts' watch lists.

5. DNRC will complete noxious weed evaluations during both license renewal and midterm grazing evaluations. DNRC currently uses an existing Noxious Weed Inventory/ Management Form (Appendix B, Document B-8), which may be revised in the future. However, if the form is revised, the information collected will be comparable to the type of data and level of detail provided by the current form.
6. Each year, DNRC will compile the data contained in each Supplemental Grazing Evaluation Form (Appendix B, Document B-7) completed for all grazing licenses affecting streams supporting bull trout, westslope cutthroat trout, and Columbia redband trout. Results from these evaluations will be used to assess the conditions of HCP-affected riparian areas and as a coarse filter to identify potential problem sites.
7. DNRC will complete field verification of potential problem sites within 1 year of receiving the results of coarse-filter evaluations. Potential problems will be identified when coarse-filter results indicate levels of livestock use and/or impacts above specified numerical and narrative criteria. DNRC will alert the licensee to any potential problems. The objectives of field verification include the following:
    a. Verify the accuracy of field data collected in the Supplemental Grazing Evaluation Form (Appendix B, Document B-7).
    b. Determine the applicability of criteria to site-specific conditions.
    c. Determine whether criteria actually represent acceptable levels of livestock use.
    d. Verify and document whether unacceptable levels of impact are occurring within the riparian area.
    e. Determine if terms and conditions of licenses are being followed.
    f. Provide an opportunity to involve the licensee in the field assessment.
    g. Involve a DNRC water resource specialist or fisheries biologist in the field assessment as necessary.
    h. Allow for the collection of any additional information that may be necessary to prioritize problems.
    i. Develop a general approach, specific solution, and/or alternatives to resolve issues.
8. When the verification process determines that no corrective action is necessary, the rationale used to make that determination will be documented by DNRC and discussed at the annual meeting with the USFWS.
9. DNRC will prioritize sites with verified problems in need of corrective action. Priority will be established using the following approach:
    a. Sites with severe problems resulting in highly degraded conditions and problems affecting bull trout core habitat will receive the highest priority. These sites will be addressed before livestock are allowed to use the parcel the next grazing season.
    b. Sites with problems affecting bull trout nodal habitat, westslope cutthroat trout priority management areas, Columbia redband trout habitat, and impaired streams (listed on the most recent 303(d) list and scheduled for TMDL development) that support HCP fish species will receive the second-highest priority. DNRC will also attempt to address these sites before livestock turnout the following year. However,

if higher-priority sites (as described in commitment 9(a)) are being addressed, then DNRC will, at a minimum, address these second-priority sites within 1 year of verification.

c. Sites with problems affecting remaining bull trout and westslope cutthroat trout habitat will have lower priority. Lower-priority sites will be addressed within 1 year of verification.

Rationale: These commitments are expected to minimize the loss of riparian vegetation and physical damage to stream banks, maintain channel stability and channel morphological characteristics, and promote diverse and healthy riparian plant communities. DNRC expects that approximately 30 grazing license inspections or midterm evaluations affecting HCP fish species will be completed each year. Of these, approximately five sites per year will require verification of potential problems based on coarse-filter results. It is anticipated that one to three of the sites undergoing verification will require follow-up action to implement corrective actions.

Field data collected during renewal or midterm evaluations are typically not available for assessment until late fall of each year. The administrative processing of renewals is completed prior to February of the following year. Therefore, there is a very limited amount of field time available prior to winter weather to conduct verification or planning of corrective actions. Due to these limitations, it is logical to prioritize which sites will be addressed first based on the present species' legal status and the severity of the problem. With this in mind, DNRC has agreed to address sites with listed species before turnout the next grazing season. The remaining situations will be addressed within 1 year of verification. This is a reasonable prioritization schedule given the limited staff and short timeframes available.

10. DNRC will develop and document site-specific corrective actions for addressing verified grazing problems using the following mechanisms, as appropriate:

    a. Most cases are likely to simply require enforcement or compliance with existing license terms and conditions.

    b. Other cases may require a change in the grazing license, such as a change in carrying capacity, season of use, or installation of improvements. Examples include, but are not limited to, fencing, weed control, grazing exclosures, riparian pastures, and off-site watering. Additional examples can be found in Ehrhart and Hansen (1997, 1998) and USDA NRCS (2003). Under ARM 36.11.444 (3), DNRC may specify grazing stipulations at any time during the term of the license.

    c. More complex issues or severe impacts not readily addressed by commitments 10(a) and 10(b) will require the development of grazing management plans.

    d. DNRC will make the licensee responsible for mitigation, rehabilitation, and/or the development of a grazing management plan. Technical assistance may be provided by DNRC, NRCS, or another appropriate entity.

    e. Cancellation of a license will be reserved for the most extreme situations when no other solutions are feasible, the licensee is uncooperative, or all other feasible alternatives have failed.

A grazing management plan will be developed in coordination with the applicable county weed district in situations where invasive non-native plant species not currently listed as noxious weeds by the state are found and determined to be a major threat to riparian or aquatic plant communities.

11. DNRC will complete implementation evaluations on sites where corrective actions are implemented. These evaluations will occur within 1 year of development and implementation of corrective actions. Implementation evaluations will be completed with the following objectives:
    a. Verify implementation of improvements, changes in grazing license, other changes in grazing management, or compliance with existing terms of the license.
    b. Determine the effectiveness of improvements, newly implemented practices, and/or a new grazing strategy.
12. If improvements or changes to grazing management are determined to be ineffective in correcting problems, DNRC will
    a. Adjust the license to facilitate progress toward meeting the corrective action objectives.
    b. Continue annual effectiveness monitoring until improvements are verified to be effective.
13. DNRC will develop and complete formal training on the implementation of this HCP conservation strategy for all DNRC field staff involved in the administration of grazing licenses.
14. DNRC will provide grazing licensees with informal training opportunities and education outreach materials, such as pamphlets and brochures, designed to provide information regarding the HCP, riparian conservation objectives, and grazing management conservation commitments contained in the HCP.
15. At the annual HCP review meetings with the USFWS, DNRC will provide a summary of inspection results and licensee responsiveness describing the status of coarse-filter grazing evaluations, problem verifications completed, and corrective actions implemented.
16. DNRC will provide the USFWS with more detailed information in a comprehensive monitoring report during the 5-year reviews. This report will include results of coarse-filter evaluations and documentation on the implementation and effectiveness of corrective actions.

2.2.3.5 Cumulative Watershed Effects Conservation Strategy

For the purposes of this strategy, cumulative effects are defined as the collective impacts on the human environment of a proposed action when considered in conjunction with other past, present, and future actions related to the proposed action by location or generic type (MCA 75-1-220(3)). Future actions include state-sponsored actions under concurrent consideration by any state agency through environmental analysis or permit processing procedures. The HCP CWE conservation strategy and its underlying conservation commitments were designed to minimize or eliminate those collective aquatic impacts that specifically affect watershed resource variables, including water yield, flow regimes, channel stability, stream temperature, and in-stream and upland sedimentation due to surface erosion and mass failure.

The HCP CWE strategy incorporates conservation commitments for the implementation of a screening process, whereby CWE from covered activities will be identified prior to the occurrence of an activity. This will allow DNRC time and opportunity to further analyze the potential for CWE, implement management mitigations, and/or develop project alternatives to eliminate or minimize potential CWE on HCP fish species or their habitat.

The CWE screening process is well-suited for application to covered activities and incorporates site-specific, scientifically defensible thresholds. The screening process directly addresses existing watershed conditions and assesses project risk to specific habitat elements, including temperature, sedimentation, and habitat complexity. The strategy is expected to meet or partially meet Montana DNRC HCP management objectives for temperature; sedimentation; habitat capacity; and channel form, function, and stability.

Existing DNRC Practices

Analyzing CWE is not a new idea, and the concept has been part of the management philosophy on forested trust lands since the early 1980s. The methods and extent to which CWE were evaluated by DNRC have changed as new technologies were developed. The existing framework with which CWE have been assessed on forested trust lands has continually undergone public and scientific scrutiny.

CWE are those collective impacts specifically affecting watershed resource variables, including water yield, flow regimes, channel stability, stream temperature, and in-stream and upland sedimentation due to surface erosion and mass failure. With respect to forested trust lands, CWE are exceedingly difficult to measure because the actions affecting watershed resources occur across multiple land ownerships, are temporally and spatially complex, and are typically difficult to accurately inventory and evaluate.

Existing polices and practices that provide DNRC various levels of management direction for assessing CWE to bull trout, westslope cutthroat trout, and Columbia redband trout habitat are

- ARM 36.11.423
- MEPA (MCA 75-1-101 through 75-1-324)
- *Montana Cumulative Watershed Effects Cooperative Memorandum of Understanding* (June 1993).

The ARMs, and specifically ARM 36.11.423, require DNRC to conduct an assessment of CWE when substantial vegetation removal or ground disturbance is anticipated as a result of proposed actions on forested trust lands. MEPA requires DNRC to conduct an assessment of cumulative effects as part of a review of potential impacts to the human environment. As a signatory to the *Montana Cumulative Watershed Effects Cooperative Memorandum of Understanding* (Young 1989), DNRC has agreed to complete and share analyses and data necessary to conduct CWE assessments with other cooperators. These existing practices are indirectly tied to one another, and each provides some level of guidance in assessing the potential CWE as a result of a proposed action. However, due to generally high levels of environmental variability and different interpretations of environmental risk, the existing practices have intentionally not identified a set of standards or thresholds defining levels of potential impact.

HCP Conservation Strategy

AQ-CW1 Cumulative Watershed Effects Commitments

The HCP CWE conservation strategy is a framework that essentially clarifies the existing Forest Management ARMs (36.11.423, Watershed Management – Cumulative Effects). Under this strategy, DNRC will continue to analyze the potential for impacts due to CWE as currently conducted under ARM 36.11.423. Additional commitments included in the conservation strategy are designed to (1) specify the type of forest management activities that will be analyzed for CWE, (2) define the described levels of risks, (3) implement alternatives or measures to offset potential impacts, and (4) provide consistent documentation of analysis methods and rationale used for risk determinations.

Rationale: The existing ARMs provide the best framework for assessing the highly variable conditions that may contribute to CWE in both scattered and blocked forested trust lands. The framework is specifically designed to evaluate past, present, and future conditions unique to the different physiographic regions of Montana. The framework also supports the flexibility to use the most appropriate analysis tools and methods for different sites, watersheds, regions, and conditions. The existing ARMs and administrative framework therefore do not limit DNRC to pre-set models, methodologies, or fixed thresholds for the assessment of potential CWE related to future actions on forested trust lands. The HCP CWE conservation strategy applies to forest management activities within the watershed boundary containing (1) the headwater streams to drainage(s), up to a maximum of the sixth-order HUC designation, and (2) one or more HCP fish species. See additional rationale contained in the introduction to this strategy under Section 2.2.3.5 (Cumulative Watershed Effects Conservation Strategy).

DNRC will analyze CWE on all forest management projects (including projects categorically excluded from MEPA analysis) involving (1) upland timber and salvage harvest of more than 15 acres or 50 mbf, (2) RMZ harvest of green timber, ~~or~~ (3) salvage harvest within the RMZ of 1 or more acres of dead and dying timber, (4) new road construction greater than 0.5 mile, (5) new road construction located within the RMZ of a Class 1 stream supporting an HCP fish species, or (6) construction of any length of new road that includes the installation of new Class 1 stream crossings. DNRC w~~W~~atershed resource specialists will complete CWE assessments. Using the analysis, DNRC will ensure that a forest management project will not increase impacts beyond the physical limits imposed by the stream system for supporting its most restrictive beneficial use(s), when considered with other existing and proposed state activities for which the scoping process has been initiated. The analysis will identify specific measures, where appropriate, for mitigating adverse effects on beneficial water uses.

For this strategy:

- RMZ harvest refers to harvest within the SMZ, the RMZ as defined by the HCP riparian harvest conservation strategy, or the CMZ as defined by the HCP riparian harvest conservation strategy.
- Physical limits generally refer to streambank stability, sediment yield, streambed stability, channel processes, etc.
- Restrictive beneficial uses are those uses of a water body that are classified by MDEQ in established water quality standards. Two examples of beneficial uses are the support of cold-water fisheries and drinking water.

DNRC makes the following commitments to address CWE:

1. DNRC will determine the necessary level of CWE analysis on a project-level basis, and, at a minimum, will complete a watershed coarse-filter (Level 1) analysis (see Appendix B, Document B-9 – CWE Coarse Filter Analysis Form). The level of analysis will depend on assessment of the following factors.
    - The extent of the proposed activity will be determined through evaluation of the magnitude, range, or geographic scope of the activity. Extent will also consider the degree or level of intensity of the activity. For example, regeneration harvest would be considered a high-intensity activity, and salvage harvest of individual dead trees would be considered a low-intensity activity.
    - Levels of past activities will be determined through the Level 1 analysis and then integrated into further analysis if necessary.
    - Beneficial uses at risk are those beneficial uses considered to be impaired relative to established water quality standards.
    - DNRC will use the factors listed above during the Level 1 analysis to determine the risk of existing CWE or the potential for CWE to result from a proposed DNRC forest management activity. If a Level 1 analysis determines there is only a low potential for adverse cumulative impacts, then the analysis will be considered complete. Low potential for impacts implies there is a low likelihood that adverse CWE of a proposed DNRC action can be detected and foreseen by DNRC. If there is a moderate to high potential for adverse CWE to result from the proposed DNRC forest management activity as determined by a Level 1 analysis, then a Level 2 or Level 3 analysis will be conducted.

    a. DNRC will complete a preliminary watershed coarse-filter (Level 1) analysis on all eligible projects. This analysis will rely primarily on existing data and information, and will include documentation of rationale describing those variables that may contribute to CWE, an assessment of adverse CWE risk, and a description of future detailed analysis, if required.

    b. DNRC will complete a more detailed Level 2 and/or Level 3 watershed analysis on projects where DNRC determines (through the Level 1 analysis) there is greater than a low potential for CWE.

    A low potential for CWE implies that there is a low likelihood that adverse CWE of a proposed action can be detected and foreseen by DNRC when considering past and present activities on all ownerships. Future actions are also considered when they are state-sponsored actions that are under concurrent consideration by any state agency through environmental analysis or permit processing procedures.

Level 2 watershed analysis will generally include four steps

i. Evaluation of Level 1 analysis results

ii. Field review of the project area by a DNRC watershed resource specialist

iii. Evaluation of existing direct and indirect effects on watershed resources within the project area to establish a baseline of existing conditions

iv. Qualitative assessment by DNRC of both the watershed coarse-filter (Level 1) analysis data and collective projected direct and indirect effects of the proposed action relative to the baseline of existing conditions.

Examples of current Level 2 watershed analysis methodologies that could be used by DNRC include the MEPA Environmental Assessment Checklist (DNRC 1998b), Pfankuch channel stability rating (USFS 1974), Lassen National Forest method (Young 1989), and *A Framework for Analyzing the Hydrologic Condition of Watersheds* (McCammom et al. 1998).

c. DNRC will complete a detailed Level 3 watershed analysis when the Level 1 or Level 2 analysis predicts or indicates the existence of or potential for unacceptable CWE as a result of the proposed forest management activity.

i. A Level 3 watershed analysis uses appropriate levels of information and technology in a quantitative assessment by DNRC of both (1) the Level 1 and Level 2 analysis data, and (2) the collective projected direct and indirect effects of the proposed action relative to the baseline of existing conditions. Examples of current Level 3 watershed analysis methodologies that could be used by DNRC include water yield increases relative to equivalent clearcut areas (USFS 1974), Washington Forest Practices Board (WFPB) *Standard Methodology for Conducting Watershed Analysis* (WFPB 2002), *Forest Practices Cumulative Watershed Effects Process for Idaho* (IDL 2000), *An Approach to Water Resources Evaluation of Non-Point Silvicultural Sources* (EPA 1980), and *WATSED* (*water and sediment yields*) (USFS 1992).

ii. Unacceptable CWE implies there is a high degree of risk that an adverse CWE of an action can be foreseen and detected by DNRC when considering past and present activities on all ownerships. Future actions are also considered when they are state-sponsored actions under concurrent consideration by any state agency through environmental analysis or permit processing procedures.

2. DNRC will establish thresholds for CWE on a watershed-level basis when completing all Level 2 or Level 3 analyses. Thresholds will take into account items such as (1) stream channel stability, (2) beneficial water uses, and (3) existing watershed conditions. The thresholds established for any analysis will be based on the ranges of environmental variability found to be naturally occurring within the watershed(s) encompassing the project area.

For this analysis framework:

a. Thresholds are either qualitative (including narrative descriptions) or quantitative standards used to describe acceptable levels of risk of CWE. For example, thresholds for a Level 2 analysis may be low, moderate, and high, while thresholds for a Level 3 analysis may be 5 percent, 10 percent, and 15 percent.

b. A watershed-level basis is specific to the watershed boundary containing the headwater streams to the drainage(s) within the project area up to a maximum of the sixth-order HUC designation.

c. Stream channel stability describes the ability of a given stream reach or network to facilitate the movement of relatively equal quantities of incoming and outgoing sediment classes. Stream channel stability also describes the ability of a given stream reach or network to facilitate a range of flow regimes without increased rates of in-stream erosion, migration, or flooding beyond those that would otherwise be expected to occur.

d. Existing watershed conditions include variables such as forest cover, road construction, road conditions, flow regimes, natural disturbance, geology, susceptibility to erosion, and other concurrent management proposals.

Rationale: Due to high levels of environmental variability and the unique character and circumstances associated with each project area and watershed, the HCP CWE conservation strategy has intentionally not identified a broad set of standards or thresholds defining levels of potential impact or environmental risk. DNRC uses general indices as indicators of the potential for CWE during the Level 1 (coarse-filter) analysis process. More specific thresholds and acceptable levels of risk are best developed, described, and implemented at the project- or watershed-level, where specific proposals can be evaluated in conjunction with site-specific watershed values, issues, characteristics, and conditions.

3. DNRC will set water quality thresholds at a level that ensures compliance with water quality standards and protection of beneficial water uses, including HCP fish species habitat, with a low to moderate degree of risk.

   a. Water quality standards are established by MDEQ (ARM 17.30.641, Water Quality – Surface Water Quality Standards and Procedures).

   b. In watersheds of water-quality-limited water bodies, DNRC will set thresholds at a level providing a low degree of risk to beneficial water uses.

   c. A watershed of a water-quality-limited water body is analogous with the sixth-order HUC watershed contributing to a 303(d) listed water body. A water body identified on a current 303(d) list is determined by MDEQ to have impaired water quality for one or more reasons. The MDEQ maintains 303(d) listings through an interagency agreement with the EPA, the entity responsible for implementation of the CWA.

Rationale: The CWE strategy is applicable to those forested trust lands within sixth-order HUC watersheds providing habitat for one or more HCP fish species. GIS information indicates that approximately 453,099 acres of the HCP project area are located within sixth-order HUC watersheds providing habitat for one or more HCP fish species. GIS information also indicates approximately that 296,087 acres of the HCP project area are located within sixth-order HUC watersheds that (1) provide habitat for one or more HCP fish species, and (2) include 303(d) listed water bodies.

ARM 36.11.423(1)(g) states that the maximum allowable risk of CWE is low in 303(d) listed water bodies. For those forested trust lands west of the Continental Divide that fall under this strategy, the existing management prescription currently limits the risk of CWE to low on 65 percent of those parcels providing habitat for one or more HCP fish species. This percentage is expected to decrease over time as water bodies are removed from the state 303(d) lists.

4. DNRC will implement management mitigations or project alternatives to offset potential impacts when a high risk of CWE is apparent after Level 2 or Level 3 analysis. Management mitigation measures will be designed to reduce the potential for CWE to a moderate or low level.

5. DNRC will consider implementing management mitigation or project alternatives when a moderate risk of CWE is apparent after Level 2 or Level 3 analysis.

6. Whenever feasible, DNRC will cooperate with other landowners in watersheds with mixed ownership to minimize CWE within acceptable levels of risk. Feasibility for cooperation with other landowners in a watershed to minimize CWE will depend on (1) DNRC time, financial, and logistical constraints; and (2) the willingness of other landowners to cooperate in such efforts.

Chapter

Transition Lands Strategy

3 TRANSITION LANDS STRATEGY

DNRC is charged with the management of over 5.1 million surface acres of state trust lands. DNRC considers and addresses environmental factors as required by various laws and rules and balances those considerations with the short- and long-term revenue-generating capacity of the lands. Protecting the future revenue-generating capacity of the land includes not only forest management activities, but other income-producing activities, such as grazing; mineral, oil, and gas exploration, development, and extraction; recreation; real estate uses; and other potential uses not yet identified. Thus, lands currently managed for timber production have the potential for other uses over the term of the Permit.

DNRC considers opportunities to sell, purchase, develop, or exchange state trust land parcels to diversify land holdings, maximize the rate of return to the trusts, improve public access to state trust lands, and consolidate state trust lands for more efficient management. In order to accomplish these objectives, DNRC must be able to maintain the flexibility to move lands into and out of the HCP project area over the 50-year Permit term. Lands identified for removal from or addition to the HCP project area due to proposed land use or ownership changes are termed “transition lands.”

3.1 TRANSITION LANDS STRATEGY PURPOSE AND OBJECTIVES

The purpose of this transition lands strategy is to describe the process for moving DNRC lands into or out of the HCP project area. This strategy ensures adequate levels of conservation for HCP species while allowing DNRC to meet its land management and fiduciary trust obligations.

To maintain the overall integrity of the conservation levels provided under the HCP, this transition lands strategy provides two important benefits:

1. Long-term biological assurances by setting caps on the amount of land DNRC can remove from the HCP project area

2. The opportunity and framework for interested parties to extend conservation benefits on DNRC lands through leases, licenses, or other legal instruments pursuant to existing state laws.

In addition to these conservation benefits, this strategy also allows for the continuation of DNRC’s ability to acquire, develop, and dispose of trust lands. This program includes, but is not limited to, land transfers, development, sales, purchases, and exchanges to realize short- and/or long-term benefits for the trust beneficiaries.

Lands identified for addition to or removal from the HCP project area will be considered under the guidance of the *DNRC Real Estate Management Programmatic Plan: Final EIS Record of Decision* (DNRC 2005c) and in coordination with the FMB.

3.2 REMOVAL OF LANDS FROM THE HCP

At its sole discretion, DNRC may remove lands from the HCP project area through either disposal or leasing. DNRC may also request that the recipient of the removed lands commit to managing them in accordance with the HCP and Permit. However, DNRC will not be required to mandate continuation of the HCP commitments and Permit conditions on the disposed or leased lands by the new land owner or lessee.

DNRC may lease, license, sell, or exchange HCP project area lands to a federal or state agency, a not-for-profit conservation organization, private corporations or individuals, or any other non-governmental entity. If that entity has an existing Permit or agreement with the USFWS under which the leased, licensed, or disposed HCP project area lands will be managed in a manner providing similar or greater benefits to HCP species than the HCP, then the caps described below will not be applied to those lands.

Some HCP project area lands within grizzly bear recovery zones, CYE grizzly bear NROH, LMAs, or bull trout core habitat areas may be proposed for removal from the HCP project area and not be expected to remain under conservation measures similar to those in the HCP. ~~In such cases,~~ DNRC will notify interested parties of the proposed dispositions of lands from the HCP project area using established mailing lists for notifying interested parties of potential real estate activities such as land sales and potential commercial, residential, or industrial development projects. Any interested party may request to be included on the mailing list. When a notice is mailed for lands included in the HCP project area, the notice will include information regarding potential land conservation opportunities as outlined by this transition lands strategy. A~~a~~ federal, state, or non-federal land management or conservation agency or entity will have 60 days upon notification by DNRC to respond with a letter of intent and proposal to purchase the land outright or to lease, license, or explore other legal instruments for conservation purposes pursuant to existing state laws. Any purchase, lease, license, or other legal instrument must be executed within 24 months at full market value unless otherwise extended at the sole discretion and benefit of the state. If no response is received within 60 days, DNRC will continue to pursue the lease, development, or disposal of such HCP project area lands.

In addition to the lease, license, or similar instrument, conservation buyers may elect to pursue an option with the state to purchase the parcel in the future. If the state chooses to grant such an option, then an upfront fee will be assessed along with a specified closing date to exercise this option. Specific terms, such as the fee amount and closing date, will be negotiated at the time of the lease, license, or similar legal instrument.

Upon written request from the USFWS within 60 days of the proposed sale of HCP project area lands to a private entity, DNRC, at its sole discretion, will apply deed restrictions with enforceable terms or other binding conservation measures, as long as the value of the land is not reduced. Incorporating such measures will be prioritized in areas with substantial use by grizzly bears and areas of notable importance to grizzly bears, such as habitat linkage (Servheen et al. 2001), as well as bull trout core areas defined by MBTRT (2000). Specific deed restrictions pertaining to grizzly bears and bull trout will be developed on a case-by-case basis using measures similar to those contained in Appendix B (Documents B-10 – Example Grizzly Bear Deed Restrictions and Document B-11 – Example Bull Trout Deed Restrictions, respectively). Potential deed restrictions may include, but are not limited to, development limitations or specifications, riparian setbacks, food disposal and storage requirements, livestock grazing restrictions, or other conservation measures.

The ability to remove lands from the HCP project area is capped. DNRC will abide by the 5 percent and 10/15 percent caps on removal of lands from the HCP project area as described below.

3.2.1 5 Percent Cap on Removal of Lands from the HCP

Over the 50-year Permit term, DNRC will cap the removal of HCP project area lands in the NCDE and CYE grizzly bear recovery zones, CYE grizzly bear NROH, LMAs, and bull trout core habitat areas (as defined in MBTRT 2000) to 5 percent of the baseline of original HCP project area lands in these habitat areas.

Rationale: This 5 percent cap would allow ~~10,990~~10,880 acres from ~~219,800~~217,600 acres of these habitat areas to be removed from the HCP project area. ~~This cap is the amount of acres providing important grizzly bear and bull trout habitat that can be removed from the HCP project area while allowing DNRC the flexibility to meet its land management and fiduciary goals.~~This cap ensures adequate conservation for the HCP species by limiting the amount of lands that can be removed from these key areas in the HCP project area while allowing DNRC the flexibility to meet its land management and fiduciary goals. The cap describes the total acres that may be affected. The limit on the removal of lands does not mean that only the baseline acres may be removed; it may also apply to lands subsequently added to the HCP and Permit at a later date. The scattered DNRC parcels in the CYE NROH will be subject to the 10/15 percent cap (described below) once grizzly bear populations reach stable levels as described in the CYE commitments for grizzly bears in Section 2.1.1 (Grizzly Bear Conservation Strategy).

3.2.2 10/15 Percent Cap on Removal of Lands from the HCP

For all other HCP project area lands, DNRC would cap the removal of lands at~~o~~ 10 or 15 percent of the original baseline over the 50-year Permit term. The cap would be 10 percent of the original baseline acres unless and until DNRC acquires large amounts of former industrial timber lands (e.g., through the Montana Working Forests Project) and adds at least 15,000 acres to the HCP project area. At that time, the cap would increase to 15 percent.

Rationale: The 10 percent cap would allow ~~32,870~~33,090 acres from ~~328,700~~330,900 acres, and the 15 percent cap would allow 49,640 acres, of all other HCP project area lands to be removed from the HCP project area. This cap ensures adequate conservation for these species by limiting the amount of lands that can be removed from the HCP project area while allowing DNRC the flexibility to meet its land management and fiduciary goals.

The ~~5 and 10 percent~~ caps were determined by using the acreages represented under Alternatives C and D of the *DNRC Real Estate Management Programmatic Plan: Final EIS Record of Decision* (DNRC 2005c). These alternatives estimated that DNRC's proportionate share of the projected growth (in the residential, commercial, and industrial sectors) over the next 25 years would be approximately 30,000 to 40,000 acres. Because the Permit term is 50 years, up to 80,000 acres of DNRC land could potentially be sold, developed, or conserved. The 5 percent cap and the first

10 percent of the 10/15 percent cap~~s~~ would supply about half the total acreage needed to meet the projected growth on state trust lands. Most of the HCP project area lies west of the Continental Divide, where much of the population growth and subsequent real estate transactions are expected to occur over the next 25 to 50 years. These caps represent DNRC's willingness to more strictly limit the amount of land removed from the HCP project area. Increasing the 10/15 percent cap by 5 percent after DNRC acquires a large amounts of former industrial timber lands (e.g., through the Montana Working Forests Project) and subsequently adds 15,000 acres or more to the HCP project area is meant to provide DNRC some additional flexibility to meet any adjustments in its real estate management program. These adjustments may be necessary to meet future disposal requirements because DNRC is generally expected to keep the amount of state-owned acres of land consistent over time. Further, large-scale acquisitions may require DNRC to balance its ownership in a given area so that a disproportionate amount of land is not retained under public ownership.

The removal of lands is not limited to the original lands comprising the HCP project area, but may also apply to any lands subsequently added to the HCP project area at a later date. As long as DNRC stays within the caps, removing lands from the HCP project area could be accomplished through a minor modification.

3.3 ADDITION OF LANDS TO THE HCP

DNRC will likely propose to add lands to the HCP project area over the Permit term. Lands proposed for addition would be located within the ~~planning area and may include (1) lands which DNRC acquired during development of the HCP but have not yet been incorporated into the HCP project area and (2) lands which DNRC subsequently acquires~~NWLO, SWLO, or CLO and would be similar to the original project area lands because they would be in the same landscapes and watersheds and would have the same forest cover types and habitat types. These lands would also likely have similar management histories as state trust lands, although the management intensity may be varied depending on the mission of the previous land owner. Examples of lands that DNRC may propose for addition to the HCP project area and the process for adding lands are described below.

3.3.1 Lands DNRC May Propose for Addition to the HCP Project Area

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Examples of lands that could potentially be proposed for future addition to the HCP project area include, but are not limited to:

- **Lolo Land Exchange.** The state is currently in the process of exchanging lands with the Lolo National Forest, through which DNRC would acquire approximately 10,500 acres that are currently National Forest System lands. When complete, this exchange will result in more contiguous ownership for both agencies. The lands DNRC would acquire are in the SWLO and include 240 acres in the CYE grizzly bear recovery zone. These lands support 32.3 stream miles, 3.7 of which are likely fish-bearing streams, including bull trout and/or westslope cutthroat trout habitat. These lands also support a minimal amount of suitable lynx habitat. Once the land exchange is complete, DNRC will evaluate these parcels for potential addition to the HCP project area.

- **Former Plum Creek lands, including:**
  - **Scattered Parcels in the SWLO.** In summer 2008, DNRC acquired the Ovando Mountain, Tupper Lakes, and North Lincoln scattered parcels, which encompass several sections and partial sections totaling 4,258 acres in the SWLO. The two North Lincoln parcels are in the NCDE grizzly bear recovery zone, and adjacent DNRC-owned parcels currently included in the HCP project area support westslope cutthroat trout streams. The Ovando and Tupper Lake parcels are in grizzly bear NROH. One of the Ovando parcels supports a westslope cutthroat trout stream. Some of the Tupper Lake parcels are immediately adjacent to a westslope cutthroat trout stream, but the stream does not flow through the acquired parcels. DNRC is still in the process of acquiring data associated with these parcels and does not yet know the presence of potential lynx habitat, road conditions, or forest stand attributes. Once data associated with the parcels are acquired, DNRC will evaluate these parcels for potential addition to the HCP project area.

  - **Chamberlain Creek Acquisition.** DNRC recently acquired title to 14,581 acres of land in the SWLO referred to as the Chamberlain Creek parcels. These parcels are a mostly contiguous set of lands adjacent to several DNRC scattered parcels in the HCP project area. The entire site is outside of the NCDE grizzly bear recovery zone, but is located in grizzly bear NROH south of the NCDE. It also includes streams supporting westslope cutthroat trout. Most roads necessary for forest management in this area have already been constructed and are in fair condition. DNRC is currently conducting inventories of the forest stands and the road system and will be evaluating these parcels for potential addition to the HCP project area.

  - **Potomac Acquisition.** The 2009 Montana Legislative passed House Bill 674, which authorized the state of Montana to issue general obligation bonds for the purchase of approximately 32,000 acres in the vicinity of Potomac, Montana. These mostly contiguous parcels are located in the SWLO and are primarily forested. The forest stands are of varying age classes, and they are composed of ponderosa pine, western larch, Douglas-fir, lodgepole pine, Engelmann spruce, and other mixed conifers and hardwoods. Most non-merchantable stands are fully stocked, and pre-commercial thinning has been completed on many of the older age class stands. Many of the older age class stands will be approaching merchantable size within the next 20 to 30 years, and the parcels are roaded to accommodate future forest management. The parcels provide habitat for many wildlife species, including transient use by Canada lynx and grizzly bears. Two of the parcels, totaling approximately 400 acres, are located within the Garnet LMA and, if added to the HCP project area, would increase lynx habitat managed by DNRC in this LMA by 30 acres. The Potomac acquisition area is outside the NCDE grizzly bear recovery zone and NROH. Many of the streams provide habitat for native fish, including westslope cutthroat trout. Once the acquisition is complete, DNRC will evaluate these parcels for potential addition to the HCP project area.

The Decision Notice on the Lolo Land Exchange and a “property flier” for each of the acquisitions discussed above are posted on the HCP project website (http://dnrc.mt.gov/HCP). These documents provide more detailed descriptions, including maps and legal descriptions, of the parcels that will likely be proposed for addition to the HCP project area in the near term. Over time there will likely be many opportunities for DNRC to evaluate other potential additions to the HCP project area through acquisitions of other lands formerly managed by Plum Creek and through other land acquisitions and exchanges. DNRC will evaluate new acquisitions for potential addition the HCP project.

3.3.2 Process for Adding Lands to the HCP project Area

When DNRC proposes to add lands to the HCP project area, it will provide the following information to the USFWS for its approval to include these lands in the HCP project area and manage them under Permit conditions:

1. A map, legal description, and acreage of the proposed lands, along with the HCP species and/or their associated habitat currently believed to occur within the land area proposed for addition to the HCP project area. Additional information may include
    - Stream miles and HCP stream type
    - Road miles, densities, and general condition of roads
    - General description of the condition of the RMZs and SMZs
    - Location of any known or registered cultural sites.
2. A written description of the baseline conditions of the proposed lands in relation to the HCP covered species and relevant commitments under the HCP.
3. An evaluation of the effects of the action (action is defined as amending the Permit to add lands to obtain take authorization for covered activities).
4. A plan of action demonstrating how DNRC will incorporate the relevant commitments of the HCP into the management of the lands proposed for addition. The plan will describe
    - How the lands would be classified and managed under the HCP (i.e., which administrative unit they are in, whether they are in a recovery zone, LMA, etc.)
    - How habitat commitments will be tracked (e.g., lynx suitable habitat)
    - A timeline for implementing the commitments on the newly added lands (e.g., fish passage culverts).

Timelines and tracking methods for commitments on newly added lands may be different from those established for the original HCP project area.

Upon receipt of the information identified above and any proposed modifications to activities to avoid, minimize, or mitigate potential take, the USFWS will determine if ~~any potential~~the impacts of such take ~~is~~were analyzed under the existing National Environmental Policy Act (NEPA) documentation and biological opinion or subsequent supplements to those documents. If the existing documents are adequate, the addition of lands may be processed as an ~~minor~~ amendment. If ~~the existing documents are inadequate, possible solutions include amendment of the Permit or amendment of the activities to avoid take.~~ further analyses are necessary, they may include the

USFWS reinitiating Section 7 consultation and/or preparing a supplemental NEPA document, as appropriate, before determining whether to amend the Permit to include additional lands. Regardless of whether additional analyses would be conducted, the USFWS will provide the public at least 30 days to review the proposed changes before making its determination.

3.4 NOTIFICATION AND REVIEW OF ADDITION AND REMOVAL OF LANDS

DNRC and the USFWS will hold annual meetings to facilitate the exchange of information related to proposed and completed transactions of HCP project area lands. The agencies will mutually agree on the date, time, and location for this annual meeting. Additional meetings may be convened more frequently based on the mutual consent of both parties. Topics of discussion at such meetings will include the status of adherence to the caps on removal of lands from the HCP, along with the completed or known proposed transfers, purchases, sales, developments, leases, and/or exchanges that occurred over the past year and those that are expected to occur during the upcoming year.

DNRC will notify the USFWS of proposed or completed real estate transactions involving all HCP project area lands, including those discussed at the annual review and those that were not identified at the time of the annual review. Closing documents will be made available to the USFWS upon request.

Regarding land transactions that arise after the annual meeting and therefore were not considered at the annual meeting or any subsequent meeting(s), DNRC will notify the USFWS by letter of the proposed transaction to add or remove lands. The USFWS will have 30 days to respond with any concerns. The date of receipt of the letter by the USFWS will trigger the 24-month process described in Section 3.2 (Removal of Lands from the HCP).

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Chapter

Monitoring and Adaptive Management

4 MONITORING AND ADAPTIVE MANAGEMENT

During development of the conservation strategies, DNRC and the USFWS included commitments to monitor certain aspects of the HCP conservation strategies. The monitoring and adaptive management program provides assurances that the HCP is being appropriately and effectively implemented, and outlines a course of action if the conservation commitments are not yielding the desired results. In this section, monitoring and adaptive management are defined, and the monitoring commitments and triggers for action through adaptive management are identified. Additionally, the annual update and 5-year monitoring report requirements are summarized, and the process for adapting the HCP is outlined.

4.1 MONITORING

Monitoring includes two components: (1) implementation monitoring, and (2) effectiveness monitoring. These two components, as well as research, which may be a part of effectiveness monitoring, are described in the following subsections.

4.1.1 Implementation Monitoring

Implementation monitoring ensures implementation of DNRC's conservation commitments throughout the Permit term. Implementation monitoring involves tracking, reporting, and evaluating whether the covered activities are being performed in compliance with the HCP requirements (e.g., management prescriptions and conservation commitments).

Implementation will be documented through project-level checklists, and will be validated through internal audits and USFWS evaluations.

4.1.1.1 Project-level Monitoring

DNRC's interdisciplinary teams will incorporate the habitat-based commitments of the HCP into the design of timber sale projects. The teams will incorporate such elements as on-the-ground marking of RMZs with special management restrictions, forest cover retention requirements, seasonal restrictions, and site-specific BMPs into the project design.

The interdisciplinary teams will use a central database to help them determine which HCP commitments are applicable to a particular trust land parcel(s). For example, available data will include information such as road status, status of the parcel relative to active management or rest, percentages of various lynx habitats, and HCP fish species presence.

The HCP Implementation Checklist will be used to ensure the appropriate HCP commitments are implemented for a project. The checklist will be similar to a flow chart, directing interdisciplinary teams on the required commitments based on the location of the project and presence of HCP species habitats (e.g., location in relation to recovery zones, Class 1 streams, etc). The interdisciplinary teams will use the checklist to document that the HCP commitments are incorporated into the project design and contract stipulations. The HCP checklist will be stored in the project file and, if appropriate, attached to the MEPA document. If an allowance within an HCP commitment as identified in Chapter 2 (Conservation Strategies) is invoked, the circumstances will be documented through the HCP implementation checklist and other applicable forms, and reported in the annual update and 5-year monitoring reports as specified later in this chapter. The HCP implementation checklist is currently under development and upon completion will be posted on the HCP project website for review and published with the Final EIS.

HCP commitments that serve as project level mitigation measures will be incorporated into the MEPA planning process and documentation.

While DNRC interdisciplinary teams are responsible for planning projects to be in compliance with the HCP, many of the covered activities (such as harvesting, log-hauling, road building, culvert installation, etc.) are conducted by private businesses under contract with DNRC. The process for ensuring that contractors and their employees implement the HCP correctly involves two major steps: (1) the interdisciplinary teams includes project-level mitigation measures and all applicable HCP commitments in the contract stipulations, and (2) DNRC employs contract administrators to ensure that the terms of the contract are being followed by the contractors and their employees.

Prior to the start-up of activities, DNRC contract administrators will hold a pre-work meeting with contractors and their employees to explain the contract stipulations, including HCP commitments and mitigation measures. Planned and impromptu on-site timber sale contract inspections are the primary monitoring mechanism to ensure continuous compliance with contract stipulations. All contracts stipulate the authority of the contract administrators to suspend operations either verbally or in writing if a contract violation is observed. In the event of a suspension, contract administrators work with the contractor to implement measures to abate any problems.

The results of the site inspections will be documented through inspection reports tailored to cover the requirements for HCP or other commitments. The results of grazing inspections will also be documented through evaluation forms. DNRC staff administering grazing inspections will have the authority to require corrective actions for noncompliance and all violations and corrective actions will be reported to the FMB.

4.1.1.2 Office-level Reviews

All environmental documents, HCP checklists, and timber sale contracts will be submitted to the FMB for review. The FMB will verify that the HCP commitments were incorporated into the contract.

Data from the checklist will be compiled into a tracking database at the FMB for compilation into annual updates and 5-year monitoring reports to the USFWS. FMB can also periodically review comment fields where teams record their rationale and justification for invoked allowances. At a minimum, FMB will review the database annually as a quality control measure to (1) determine whether allowances were invoked within the allowable limits, (2) identify commitments that require additional training to implement, and (3) verify that any required communications with or approval from the USFWS were executed.

4.1.1.3 Field Reviews

In addition to the office-level review of the HCP checklists and contract stipulations, the FMB will conduct HCP implementation audits in the field.

During these field reviews, the FMB will verify that habitat-based commitments were appropriately applied on the ground. If the FMB observes that a commitment has not been met, it will coordinate with the project leader as necessary to remedy the situation and minimize risk of future occurrence. If an immediate remedy is not possible, DNRC would take actions to minimize risk of future occurrence.

Monitoring of the HCP commitments for terrestrial HCP species will consist of the field evaluation of two projects per year in the HCP project area. Projects prioritized for evaluation will typically be those affecting the greatest numbers of HCP species and greatest number of applicable conservation commitments. This approach will provide the greatest returns in understanding problems, determining how well commitments are implemented, and assessing how effective the strategies are. Monitoring up to two projects in a specific year represents approximately 16 percent of the projects for that year, assuming each of the 12 unit offices with an active timber sale program has an active project.

The evaluations will be led by the FMB and may be conducted in coordination with the biological diversity monitoring conducted in support of SFLMP monitoring.

The purpose of the evaluations is to

- Verify that habitat-based commitments were appropriately applied on the ground
- Give both parties assurance that HCP commitments are understood and are being implemented properly at all levels
- Identify implementation challenges that need to be discussed at annual meetings
- Identify needs for additional training in proper implementation of HCP commitments.

Required attendance for these reviews will include at a minimum, the DNRC project leader, project wildlife biologist, and one FMB staff person with HCP implementation responsibilities. Other forest management program staff will be made welcome and encouraged to attend as work load and schedules allow. The USFWS will be invited to participate in the evaluations. For each review, forms will be completed that document (1) the HCP species and conservation issues that were present, (2) required commitments that were incorporated into the project, (3) explanation of how the commitments were implemented, (4) a qualitative assessment of the likelihood of effectiveness (if possible), (5) recommendations to improve implementation and/or effectiveness on future projects, and (6) deficiencies to be disclosed or allowances to the commitments that were invoked. The results and findings of the meetings will be summarized and reported in the annual update to the USFWS.

Monitoring of the HCP commitments for HCP aquatic species will also consist of the field evaluation of two projects per year in the HCP project area as described above. FMB will lead the evaluations and may conduct them in coordination with terrestrial monitoring, SFLMP monitoring, or other forest management program field audits for the sake of efficiency.

The purpose of the evaluations is the same as for terrestrial HCP species. The USFWS will be invited to participate in the evaluations. The results and findings of the meetings will be summarized and reported in the annual update to the USFWS.

Under the HCP, internal BMP audits described in Section 2.2.3.2 (Sediment Delivery Reduction Conservation Strategy) of this HCP would continue and would be used to demonstrate compliance and effectiveness of sediment delivery reduction conservation commitments also described in Section 2.2.3.2.

4.1.1.4 USFWS Evaluations

In addition to monitoring by DNRC, the USFWS will also monitor the implementation activities associated with the HCP. DNRC will facilitate monitoring by the USFWS by providing access to DNRC lands, sharing data, notifying the USFWS of scheduled audits, and by providing the USFWS with opportunities to participate in DNRC's internal monitoring program. The USFWS will conduct an independent analysis of the data and reporting by DNRC. Coordination with DNRC may include recommendations to improve monitoring actions of HCP conservation commitments and developing additional monitoring protocol as needed.

4.1.2 Effectiveness Monitoring

Effectiveness monitoring typically involves evaluation of a particular conservation commitment or suite of commitments designed to have a desired effect on a target species or resource. For the species being addressed in the DNRC HCP, this type of monitoring is very expensive, and often requires years of data collection and analysis from highly trained teams of research biologists. Such efforts are beyond the expertise of, and scope of work performed by, DNRC. Current examples of such efforts include the ongoing population estimation and monitoring efforts of the GYE (National Park Service, USFS, USFWS, and others), NCDE population estimate study (i.e., U.S. Geological Survey [USGS] led interagency effort – Northern Divide Grizzly Bear Project), Swan Agreement cooperative monitoring effort (USFWS, Plum Creek, DNRC, MFWP), and the Seeley Lake/Garnet Mountains Canada lynx study (USFS Rocky Mountain Research Station, BLM, and Plum Creek). Such efforts typically require inter-agency cooperation, significant staff time, and millions of dollars over periods of one or more decades to complete. Also, because DNRC's HCP project area lands in western Montana represent a small percentage of the overall land area (about 2 percent), it would be difficult to evaluate and detect the effectiveness of conservation commitments. That is, the effects of outside environmental influences or activities of others on neighboring lands may easily swamp or overshadow influences occurring on a small subset of lands, particularly for species such as lynx and grizzly bears that have large home ranges (more than 15,000 acres). Because of the high costs associated with such studies, the relatively small landscape contribution of DNRC ownership, and inherent difficulty in answering questions pertaining to population-level influences of implemented conservation commitments, DNRC will primarily address effectiveness of the HCP commitments in the following ways.

First, DNRC reviewed the best available science to develop the conservation strategies. Therefore, implementation of the conservation commitments will be the primary means relied on to meet the biological goals and objectives for the HCP species. However, new research through DNRC partnerships and by others (such as the local studies described above) will be considered by both parties at annual meetings to determine if changes in a conservation strategy are needed. Necessary changes would be implemented through the process described below in Section 4.2.3 (Adjusting for New Research). In this manner, DNRC will utilize information obtained from other ongoing monitoring efforts to assess effectiveness and whether adjustments in conservation commitments may be warranted during the term of the Permit.

Second, some effectiveness monitoring will be conducted to evaluate whether the management prescriptions and conservation commitments being implemented are having the desired biological effect on the given resource or species. For example, road closure devices in grizzly bear recovery zones will be examined annually, and they will be evaluated for how effective they are at restricting legal and illegal access. A system of closure devices determined to be highly effective is expected to have much greater conservation value for grizzly bears than one that is not. However, both DNRC and the USFWS recognize that evaluating the effectiveness of such measures, in the context of contributing to increasing or decreasing grizzly bear numbers in the western Montana grizzly bear population is not a reasonable expectation. Although all conservation commitments are expected to benefit the targeted species, some measures are expected to have a greater certainty of benefit than others. For some measures where the benefit is less certain, effectiveness monitoring will be conducted. The results of effectiveness monitoring will be used to assist the USFWS and DNRC with development of appropriate management responses when a commitment is not having the desired biological effect. This is referred to as adaptive management, which is described below.

4.1.3 Research

As suggested above, DNRC typically considers its role in local research efforts as that of a supporter and cooperator. DNRC has participated in the following research projects, and support of these and similar projects is expected to continue under the HCP:

- DNRC cooperative effort with a USGS monitoring project to estimate the grizzly bear population in the NCDE (USGS lead agency – Northern Divide Grizzly Bear Project)
- NCDE subcommittee population trend monitoring for grizzly bears (MFWP lead agency)
- Swan Agreement cooperator on grizzly bear telemetry study in the Swan Valley
- Funding for radio collars for monitoring grizzly bear movement in the Blackfoot River Valley
- NCDE funding cooperator for a USFS GIS analyst to manage grizzly bear road data and cumulative effects model project for western Montana
- Senior thesis research and publication on snowshoe hare response to pre-commercial thinning
- DNRC cooperative effort with MFWP to collect fish species presence/absence and genetics data on unsurveyed stream reaches
- DNRC cooperative effort with MFWP to collect bull trout and migratory westslope cutthroat trout population and habitat data as part of the Flathead Basin Commission efforts.

DNRC will continue to support monitoring and research efforts for grizzly bears in the future as funding and budgets allow. DNRC will prioritize participation in the evaluation of effectiveness of the Swan River State Forest and Stillwater Block transportation plans in mitigating risks to grizzly bears.

4.2 MODIFYING THE HCP

The results of monitoring, research, or simply a few years of experience with implementing the HCP may cause either party to want to propose a change in the HCP. The HCP may be adapted through several processes including CMRs, adaptive management, new research results, and modifications. These processes are described below. DNRC will review and use all available and applicable data when making management decisions or proposed modifications that affect HCP species.

4.2.1 Cooperative Management Response

A CMR is a process by which minor adjustments can be made to improve the HCP or to clarify HCP language. Through this process, DNRC or the USFWS may identify opportunities to change or improve an HCP conservation commitment in a straightforward and cost-effective manner to which both agencies can agree. Either party, through their respective HCP coordinator, can propose a change intended in good faith at any time to improve the HCP. When such a change is proposed, the problem statement and recommendations for resolution will be presented in writing to the other party for discussion of why and how the change would be made. After a period of review, which may include a field visit, the agencies may decide to accept, reject, or postpone the decision. If both parties' decision-makers agree on a change, a written response that includes both parties' official agreement will be incorporated into the HCP.

4.2.2 Adaptive Management

Adaptive management is a process whereby conservation commitments and management actions may be changed based on the results obtained from effectiveness monitoring and/or research. This process results in a feedback loop that incorporates better understanding into everyday practices.

For this HCP, the adaptive management process will be used to address issues identified through effectiveness monitoring or results of research as mutually agreed. The adaptive management process for responding to issues raised through effectiveness monitoring is a collaborative approach based on the following steps:

1. DNRC conducts the effectiveness monitoring as required for the HCP.
2. DNRC provides annual updates and 5-year monitoring reports to the USFWS summarizing and evaluating the results of monitoring.
3. The USFWS reviews the updates and 5-year monitoring reports.
4. DNRC and the USFWS conduct an annual HCP review and 5-year meeting whereby the results and evaluation of the effectiveness monitoring are discussed. If the agencies find that the commitments are not effective at meeting the desired results, the management actions identified through adaptive management would be revised into HCP conservation commitments and implemented.

4.2.3 Adjusting for New Research

In the case of new research or emerging science applicable to terrestrial or aquatic HCP species, DNRC and the USFWS will exchange relevant publications for review and discussion at the annual meeting or 5-year reviews. Both parties will cooperatively determine the applicability of the new information to the HCP species and may propose changes to commitments or management actions upon mutual agreement. Depending on the nature of the change, it may be processed through a CMR, modification to the HCP, or an amendment to the HCP and Permit, if necessary.

4.2.4 Modifications

The implementing agreement allows the HCP and Permit to be modified when warranted (Appendix F of the EIS for this HCP). Modifications that may be made at the discretion of DNRC are outlined in the implementing agreement. DNRC may also adjust lands in the HCP project area in compliance with the transition lands strategy (see Chapter 3).

4.3 REPORTING REQUIREMENTS

Under the HCP monitoring and adaptive management program, DNRC will submit annual updates and 5-year monitoring reports to the USFWS summarizing its monitoring results, documenting its compliance with the HCP, and evaluating the effectiveness of the commitments in place. Any non-compliance with the commitments will be reported immediately to the USFWS. The reporting requirements and frequency for each conservation commitment are identified below by HCP species in Sections 4.4 (Grizzly Bear Monitoring and Adaptive Management), 4.5 (Lynx Monitoring and Adaptive Management), and 4.6 (Aquatic Monitoring and Adaptive Management). The requirements for the transition lands strategy are discussed in Section 4.7 (Transition Lands Monitoring). Annual reports, 5-year monitoring reports, and meeting notes from annual and 5-year meetings will be made available to the USFWS and posted on the DNRC website. Changes made to the HCP during annual or 5-year meetings through a CMR, the adaptive management program, or in response to new research will be summarized in meeting notes and made available on the DNRC website.

The annual updates will primarily identify DNRC's progress with implementation of the HCP, such as whether a commitment has been implemented within the agreed upon timeframe. The annual meeting is a forum to foster relationships, share information, identify issues and concerns, develop corrective actions if needed, and ultimately allow for continual improvement of the HCP. Also during these meetings, DNRC will share information related to proposed or completed land transactions involving all HCP project area lands and the planning area lands outside the HCP project area where HCP species occur. DNRC will also provide an update on its progress implementing commitments within its contingency plans for changed circumstances.

The 5-year monitoring reports will summarize the status of implementation monitoring, summarize the findings of implementation monitoring, and report the results of effectiveness monitoring and research programs in which DNRC has participated. DNRC will also report on the status of land transactions relative to the ~~net-loss commitment~~caps on removal of lands from the HCP project area within the transition lands strategy. The 5-year monitoring report and meeting is an important milestone, which will address progress during the initial 5 years of implementation and determine what changes are needed, if any, for the next 5 years. Section 8.4 (Reporting Procedures) describes how DNRC will go about compiling and reporting the results of its monitoring program.

4.4 GRIZZLY BEAR MONITORING AND ADAPTIVE MANAGEMENT

4.4.1 Implementation Monitoring

Table 4-1 identifies the biological goals and objectives for grizzly bears and the conservation commitments intended to meet those goals. Because the HCP conservation strategies are based on the best available science and are expected to be effective when implemented properly, little effectiveness monitoring is required or proposed. Best available science is described in Section 1.3.3.3 (Use of Best Available Information). Rather, the monitoring commitments focus on implementation monitoring, which typically requires some form of reporting to verify that the conservation commitment has been implemented. The conservation commitments requiring implementation monitoring are summarized in Table 4-2. For each monitoring commitment, the level and frequency of reporting varies, as does the compliance threshold. Chapter 8 (HCP Implementation) contains the implementation schedule for the conservation commitments and subsequent monitoring.

The primary means by which DNRC will document compliance with the HCP commitments is through an implementation checklist. Field reviews as described in Section 4.1.1.3 (Field Reviews) will also be conducted.

4.4.2 Effectiveness Monitoring and Adaptive Management

Little effectiveness monitoring is required because the HCP conservation strategies are based on the best available science and are understood to be effective when implemented properly. Further, little effectiveness monitoring is proposed because independently conducting meaningful grizzly bear effectiveness monitoring studies is beyond the scope of DNRC's budget and mission. However, some of the commitments do warrant additional monitoring to ensure their effectiveness at meeting the biological goals. For these commitments, an adaptive management process is also described in the event the commitment is deemed ineffective.

4.4.2.1 Promote Safety for Humans and Bears (GB-PR1, PR2, and PR3: Information, Firearms Restrictions, and Food Storage)

Many commitments are intended to reduce the potential for bear-human conflicts. Reporting the number and outcomes of incidences can be used to measure effectiveness of these commitments, that is, whether human and bear safety is promoted as identified in biological objective 1. DNRC will report instances of bear-human conflict involving DNRC ownership, employees, or contractors and their employees. Incidents will be discussed at the annual meeting. Based on the context and cause of the incident, DNRC and the USFWS will cooperatively identify the appropriate management action and evaluate and revise the conservation commitments if necessary.

TABLE 4-1. GRIZZLY BEAR BIOLOGICAL GOALS AND OBJECTIVES AND THE CONSERVATION COMMITMENTS DEVELOPED TO MEET THOSE GOALS AND OBJECTIVES

Goals and Objectives	Conservation Commitments to Meet Objectives
Goal – Support federal grizzly bear conservation efforts by providing quality seasonal habitat and avoiding or minimizing bear-human conflicts.	
Objective 1 – Promote safety for humans and bears on HCP project area lands through vegetation management constraints, comprehensive sanitation policy, education, and livestock grazing commitments.	PR1 – Information and Education PR2 – Firearms Restriction PR3 – Food Storage/Sanitation PR6 – Cover Retention NR4 – Distance to Cover RZ2 – Visual Screening NR5 – Grazing Restrictions RZ4 – Grazing Restrictions
Objective 2 – Minimize displacement of grizzly bears from suitable habitat, and provide for seasonal habitat use and security through overall access management.	NR3, ST4, CY3 – Spring Restrictions RZ5 – Post Denning ST2, SW3, SC2 – Management /Rest ST1, SW1 – Transportation Management NR2, RZ6 – Granting of Easements NR1, SC1, CY4 – Open Roads RZ3 – Road Closure Maintenance NR6, ST5, SW5, SC4 – Gravel Operations ST3, ST4, SC3, and CY2 – Salvage in Rested Subzones/Parcels PR8, CY5 – Helicopter Use
Objective 3 – Contribute to grizzly bear recovery where the conservation of seasonally important grizzly bear habitat would complement efforts of adjacent federal landowners.	This objective is addressed through the structure and layering of the commitments and how they are applied on the ground based on land ownership patterns. Specifically, see the Stillwater Block and Swan River State Forest commitments. SW2 – Adjacent Landowners
Objective 4 – Promote grizzly bear habitat connectivity where HCP project area lands occur in "linkage zones."	NR1 – Open Roads NR3 – Spring Restrictions RZ2 – Visual Screening ST2, SW3, SC2 – Management /Rest Existing Swan Agreement Commitments
Objective 5 – Maintain important habitat features, including den sites, avalanche and snow chutes, lush riparian zones, and locations that produce high volumes of forage.	PR4 – Roads in ~~Riparian Zones~~RMZs, WMZs, and Avalanche Chutes PR5 – Den Sites PR6 – Cover Retention in RMZs and WMZs PR7 – Weeds in Gravel Pits RZ1 – Habitat Considerations ST2, SW3, SC3 – Management /Rest (as it pertains to the winter period)
Objective 6 – Increase DNRC's understanding of grizzly bear habitat quality in managed forests through HCP monitoring and voluntary cooperation in research programs as funding and budgets allow.	Addressed through DNRC monitoring commitment to support monitoring and research efforts in the future at levels similar to its current participation. DNRC will prioritize participation in the evaluation of effectiveness of the Swan River State Forest and Stillwater Block transportation plans in mitigating risks to grizzly bears.

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
ents				
C developed a n bear habitat" or contractors mployees n DNRC	Approval of brochure	Submit brochure to the USFWS for approval.	Initially and when changes are made.	USFWS – Comment on brochure. DNRC – Use feedback to update brochure as necessary.
C distributed to contractors mployees on ect?	Y/N	NA	NA	DNRC – Ensure brochure is provided to all contractors and their employees.
C trained s on bear ?	100% of new employees within 1 year and veterans every 5 years	Submit training content and methods to the USFWS.	5-year.	USFWS – Provide comments on training content. DNRC – If any employees missed, immediately schedule training for any missed employees.
C incorporated striction clauses acts?	Y/N	NA	Initial review of contract language and when changes are made.	USFWS – Provide initial review and approval of contract language. DNRC – If language omitted, add required language to contract.
C restricted s from carrying	Y/N	Report number of employees by administrative unit with authorization to carry a firearm under Policy 3-0621.	5-year.	DNRC – If more than 5% of all employees within the forest management program~~an administrative unit~~ have permission to carry a firearm, DNRC will review and require re-authorization under Policy 3-0621.
C incorporated ge/sanitation nts in all	Y/N	NA	Initial review of contract language and when changes are made.	USFWS – Provide initial review and approval of contract language. DNRC – If language omitted, add required language to contract.

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
construct open ~~parian zones~~ WMZs, or chutes?	90% of projects each year (averaged over a 5-year reporting period) would avoid construction in RMZs, WMZs, and avalanche chutes ~~and riparian zones~~	HCP implementation checklist review occurred on each project. All projects with such construction, and the circumstances, would be reported.	5-year, ~~(infractions require annual and 5-year)~~ allowances reported annually.	DNRC – If the allowance is ~~exceeded or used for non-allowable circumstances, DNRC would provide a plan to ensure that this commitment will not be violated again~~at risk of exeedance, DNRC will not invoke the allowance until back in compliance. USFWS – Review projects where allowances invoked. ~~If DNRC violates allowance, require plan to ensure commitment is not violated again.~~
d DNRC notorized forest ent activities mile of active until May 31?	100%	Report active den sites found, including the following information (to the extent it is available): (1) location of the den, (2) when the bear was documented as present and by whom, (3) when the bear vacated the site (if known), and (4) a description of activities that were delayed as a result of the den site.	Annual in the year den site is found and 5-year.	DNRC – If den site encountered during motorized activities, notify the USFWS immediately (cease operations and/or re-schedule work as applicable to minimize further risk to bears) ~~and provide documentation. DNRC will document the situations under which infractions occur and plan to minimize any risk of future occurrence. Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports~~. To the extent possible, identify measures to improve compliance with commitment.
d control mplemented at ?	100%	No reporting requirement (addressed in contract specifications, permits, Plans of Operation).	5-year.	DNRC – Immediately schedule weed control practices at any missed pits.
copter flight paths o minimize e to bears? t paths designed ter than 1 mile e areas?	Y/N	Complete HCP implementation checklist review on each project. For all projects requiring helicopters, report whether the 1-mile threshold was met and the circumstances for any instances of impracticability.	5-year.	USFWS – Review instances of impracticability and discuss with DNRC any concerns regarding inappropriate application of the commitment. DNRC – Develop measures to address inappropriate application of the commitment if warranted.

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
C minimized new construction in	Minimize	Use HCP implementation checklist to document DNRC is adding fewest miles of road needed to implement forest management. Report open and total road miles in NROH by DNRC administrative unit at year 0 and every 5 years thereafter.	5-year.	USFWS – Periodically request EA checklist or other MEPA documentation to review transportation decisions made for projects in NROH. DNRC – Upon request, provide summary of transportation discussion in MEPA documents for projects in NROH.
C discouraged f easements as in conservation	Minimize	Report number and type of access easements ~~(all types)~~ granted by each administrative unit in NROH and grizzly bear recovery zones. Use easement checklist to evaluate how the easement was discouraged in recovery zone.	5-year.	USFWS – Review checklists (or summaries provided by DNRC) for compliance.
C met spring ent restrictions?	Y/N	Use annual accomplishment report by administrative unit to acknowledge implementation of the requirement. Report number of days for mechanical site preparation, road maintenance, and bridge repair by administrative unit.	5-year ~~(infractions require annual and 5-year)~~.	DNRC – If DNRC exceeds the allowable number of days, it will propose mitigation measures to offset the effect and provide documentation in the annual update and 5-year monitoring report of the circumstances and further steps that will be taken to reduce risk of future occurrence. USFWS – Review documentation and approve mitigation measures.
C maintained o cover as in conservation	Y/N	Use HCP implementation checklist to ensure compliance. Summarize and report instances of impracticability. ~~Report projects and the circumstances where allowances were invoked.~~	5-year ~~(infractions require annual and 5-year)~~.	USFWS – Review ~~projects where allowances invoked~~instances of impracticability and discuss with DNRC any concerns regarding inappropriate application of the commitment. ~~If DNRC violates allowance, require plan to ensure commitment is not violated again~~. DNRC ~~– If the allowance is exceeded or used for non-allowable circumstances, DNRC would provide a plan to ensure that this commitment will not be violated again.~~ Develop measures to address inappropriate application of the commitment if warranted.

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
C developed plans for small razing licenses?	100%	Plan developed with opportunity for USFWS review prior to issuance.	Project by project.	USFWS – Review and comment on plan within 30 days of receiving it. DNRC – If a license is issued without a mitigation plan or DNRC fails to provide an opportunity for the USFWS to review the plan, the plan will be cooperatively developed with the USFWS and incorporated into the grazing license within 45 days.
C cooperated in arcass removal?	100%	Verbally discuss concerns, problems, or changes as necessary at annual meetings.	~~Annual~~5-year.	USFWS – Review situations where DNRC has cooperated with others if problems arise. DNRC – Work with other agencies as necessary, and adjust commitment to comply with changing grizzly bear management direction.
C limited active and counted in pits more mile from an in the spring ard the 10-day w-intensity	100%	Report number of active pits by administrative unit in grizzly bear recovery zones and NROH. If pit operated more than 0.25 mile from an open road during the spring period, report number of operating days applied against the 10-day limit for low-intensity forest management activities during spring period (GB-NR3).	5-year.	USFWS – Review situations where DNRC has operated pits more than 0.25 mile from an open road to ensure mitigation measures adequately applied.

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
ents				
C addressed nsiderations in nning as in conservation	90% calculated over 5-year period for all projects in recovery zones	Use HCP implementation checklist for each project to ensure compliance. ~~Report all projects and the circumstances where allowances are required~~.	5-year ~~(infractions require annual and 5-year~~).	DNRC ~~– If the allowance is exceeded or used for non-allowable circumstances, DNRC would provide a plan to ensure that this commitment will not be violated again.~~ In 5-year report, provide number of projects with habitat elements and the number of projects where it was impracticable or infeasible to apply specific mitigation measures. Develop measures to improve compliance as warranted. USFWS – Review ~~projects where allowances invoked~~5-year report to assess how DNRC addressed grizzly bear habitat elements for projects in recovery zones. Review proposal to improve compliance. ~~If DNRC violates the allowance, require plan to ensure commitment is not violated again.~~
C retained visual as described in on strategy?	100%	Use HCP implementation checklist to ensure compliance. Report project ~~and the circumstances where allowances were invoked~~ names, number of instances of impracticability, and descriptions of impracticable situations.	5-year.	USFWS ~~– Review projects where allowances invoked. If DNRC violates the allowance, require plan to ensure commitment is not violated again.~~ Review instances of impracticability during 5-year review and discuss with DNRC any concerns regarding inappropriate application of the commitment. DNRC ~~– If the allowance is exceeded or used for non-allowable circumstances, DNRC would provide a plan to ensure that this commitment will not be violated again.~~ Develop measures to address inappropriate application of the commitment if warranted.

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
C examined road nnually in the one and repaired closures and neffective ithin 1 year of the problem?	100%	Prepare annual accomplishment report by administrative unit. Report structure status (intact, functioning as planned, breached), and when and how structure will be repaired if damaged or breached.	5-year.	DNRC – Immediately inspect any missed closures and schedule repairs if needed. ~~Develop closure numbering system and inspection process for each unit to identify closures and repair status on an annual basis.~~
C implemented ng mitigation ?	100%	Use HCP implementation checklist and applicable contract language to ensure compliance.	5-year ~~(infractions require annual and 5-year~~).	DNRC – Identify factors leading to non-compliance. DNRC will document the situations ~~under which infractions occur~~ and approach ~~plan~~ to ~~minimize~~minimizing ~~any~~ risk of future occurrence. Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports. USFWS – Review and approve documentation.
how granting of s was evaluated, outes d, and how measures were d or applied.	100%	Use easement checklist to evaluate the easement, review alternate routes, and identify mitigation measures applied. Annually compile the number of easements granted and associated miles of newly created open roads.	Annual meeting topic and 5-year.	USFWS – Review checklists (or summaries provided by DNRC) for compliance and application of appropriate mitigation measures. Discuss any outstanding concerns with DNRC at annual meetings.

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
nents				
C adhered to the tion plan as conservation	100%	Report changes to the transportation plan: number, length, classification, and location of new roads for forest management, easements, and found roads. ~~Report open road created on Class B lands, through the granting of private easements, not to exceed 5 miles in total.~~	5-year.	DNRC – If out of compliance, manage road system as necessary to ensure road amounts are within allowable levels. ~~Provide plan to ensure commitment will not be violated again.~~ Identify the issue and develop corrective action(s) in coordination with the USFWS within 60 days or next summer period, whichever is sooner. USFWS – Review transportation plans to ~~gain~~ ensure compliance, and review and approve modifications to the transportation plan ~~to prevent future violations~~.
C limited ~~open~~ roads to 8 miles e?	100%	Use annual accomplishment report by administrative unit to acknowledge implementation of the requirement. Maintain system to track temporary road amounts present through time.	5-year ~~(infractions require annual and 5-year~~).	DNRC – Immediately close temporary roads in excess of 8-mile commitment. DNRC will develop corrective action(s) in coordination with the USFWS ~~document the situations under which infractions occur and plan to minimize any risk of future occurrence~~. Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports. USFWS – Review and approve documentation provided by DNRC.
C installed bear signs? Is DNRC g these signs?	100% by year 2	Number and locations included in accomplishment report for Stillwater Unit. Provide informal updates on maintenance issues as needed.	Year 2, then 5-year.	DNRC – Immediately schedule installation of signs on any missed roads as agreed after year 2. Provide reasonable level of maintenance of signs on an annual basis.
C followed ent/rest period n Class A lands?	100%	Provide ~~near-term schedule~~listing of active/inactive subzones of Class A lands to demonstrate compliance with 4-year management/8-year rest commitment for each 5-year monitoring period. Report use of the allowable 30 commercial operating days that are	5-year. Extensions require immediate reporting ~~(any infractions require annual and 5-year~~	DNRC – If allowable operating days are exceeded, ~~delay sale/operation until a course of action is identified and documented to mitigate for the infraction~~ develop corrective action(s) in coordination with the USFWS. ~~DNRC will document the situations under which infractions occur and plan to minimize any risk of future occurrence~~. Documentation will be reported

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
		allotted for parcels in formal rest status and report these days to the USFWS at 5-year intervals. This information will also be available to the USFWS upon request. Report the number of times the management period was extended. When management period is extended due to allowable delays, DNRC will write an explanation of the delay and submit it to the USFWS immediately upon notice that a delay will be necessary. Requires USFWS review only.	~~reporting~~).	in applicable annual updates and summarized in 5-year monitoring reports. USFWS – Review and approve ~~documentation~~corrective action(s).
C implemented itigation for extended salvage projects ed in item (2) of tment?	100%	Report number, location, and duration of salvage projects. Use Appendix B, Document B-1 (salvage checklist for projects in rest) to report compliance with commitment and additional mitigation measures applied to the project.	5-year ~~(infractions require annual and 5-year~~).	USFWS – Review Appendix B, Document B-1 (salvage checklist for projects in rest) for appropriate application of commitments and mitigation measures. DNRC – ~~DNRC will document the situations under which infractions occur and plan to minimize any risk of future occurrence.~~ Documentation will be reported ~~in applicable annual updates~~ and summarized in 5-year monitoring reports.
C followed spring ninistrative use on 39.6-mile oads?	100%	Use annual accomplishment report by administrative unit to acknowledge implementation of the requirement. Track compliance with restricting administrative use on 39.6 miles of the entire set of spring roads closed for spring habitat by documenting that no motorized administrative use occurred on the standard subset of roads. If motorized administrative use during the spring period was required on the standard subset of roads, the alternate segment of road restricted from spring motorized administrative use will be	5-year ~~(infractions require annual and 5-year~~).	DNRC ~~– If in violation of spring restrictions, DNRC will document the situations under which infractions occur and plan to minimize any risk of future occurrence. DNRC would be required to propose mitigation to offset the effect (e.g., apply additional restrictions the following year).~~If spring restrictions are not met, DNRC will document the situation and apply mitigation measures to offset the effect (e.g., apply additional restrictions the following year). Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports. USFWS – Review and approve

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
		identified and reported internally on an annual basis and reported to the USFWS on a 5-year basis.		~~documentation provided by DNRC~~proposed mitigation measures.
C limited active to five? C implemented e mitigation when operating than 0.25 mile pen road on nds without ne transportation ctions?	100%	Report number and location of active pits. If a pit is operated more than 0.25 mile from an open road on Class B lands, report how DNRC minimized its distance away from an open road~~s~~ and ceased activities on other pits, including the number of licensed third parties continuing operation.	5-year on number/location of pits. Case-by-case at annual review for pits operating outside the transportation plan.	DNRC – Document the situations under which ~~infractions occur and plan to minimize any risk of future occurrence~~active pits were not limited to five and develop a corrective action(s) in coordination with the USFWS. Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports. USFWS – Review and approve corrective action(s). Review minimization measures implemented by DNRC for active pits 0.25 mile from an open road when transportation plan restrictions not followed, and address concerns cooperatively by developing corrective action(s).

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
Commitments wan Agreement until that agreement is no longer valid. If that occurs, follow the monitoring measures listed below.				
C adhered to the tion plan as	100%	Report changes to the transportation plan: number, length, classification, and location of new roads for forest management, easements, and found roads.	5-year ~~(infractions require annual and 5-year~~).	DNRC – If out of compliance, manage road system as necessary to ensure road amounts are within allowable levels. ~~DNRC will document the situations under which infractions occur and plan to minimize any risk of future occurrence.~~Identify the issue and develop corrective action(s) in coordination with the USFWS within 60 days or next summer period, whichever is sooner. Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports. USFWS – Review ~~and approve documentation~~transportation plans to ensure compliance, and review and approve modifications to the transportation plan.
C limited ~~open~~ roads to 5 miles e?	100%	Use annual accomplishment report by administrative unit to acknowledge implementation of the requirement. Maintain a system to track temporary road amounts present through time.	5-year ~~(infractions require annual and 5-year~~).	DNRC – Immediately close temporary roads in excess of 5-mile commitment. DNRC will document the situations under which infractions occur and ~~plan to minimize any risk of future occurrence~~develop corrective action(s) in coordination with the USFWS. Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports. USFWS – Review and approve documentation.
C installed bear signs? Is DNRC g these signs?	100% by year 2	Number and locations included in accomplishment report for Swan Unit. Provide informal updates on maintenance issues as needed.	~~Annual~~ Year 2, then~~and~~ 5-year.	DNRC – Immediately schedule installation of signs on any missed roads as agreed after year 2. Provide reasonable level of maintenance of signs on an annual basis.

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
C cooperated ent landowners vation?	Y/N	DNRC and the USFWS will discuss opportunities for cooperative management with neighboring landowners as they arise.	5-year. Check in with the USFWS at annual meeting immediately following termination of Swan Agreement.	DNRC – If Swan Agreement ~~dissolves~~is terminated, document efforts to coordinate activities with adjacent landowners.
C followed ent/rest period	100%	Provide ~~current~~ listing of active/inactive subzones to demonstrate compliance with 4-year management/8-year rest commitment for each 5-year monitoring period. ~~Employ a system to track and report status of 4-year management periods and 8-year rest periods.~~ Report use of the allowable 30 commercial operating days that are allotted for parcels in formal rest status and report these days to the USFWS at 5-year intervals. This information will also be available to the USFWS upon request. Report the number of times the management period was extended. When management period is extended due to allowable delays, DNRC will write an explanation of the delay and submit it to the USFWS immediately upon notice that a delay will be necessary. Requires USFWS review only.	~~Report status of rest/active areas to the USFWS upon request.~~ 5-year. Extensions require immediate reporting ~~(any infractions require annual and 5-year reporting)~~.	DNRC – If allowable operating days are exceeded, ~~delay sale/operation until a course of action is identified and documented to mitigate for the infraction. DNRC will document the situations under which infractions occur and plan~~ develop corrective action(s) in coordination with the USFWS to minimize any risk of future occurrence. Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports. USFWS – Review and approve ~~documentation~~corrective action(s).

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
C implemented nitigation for ~~proposed~~ salvage projects ed in item (2) of tment?	100%	Report number, location, and duration of salvage projects. Use Appendix B, Document B-1 (salvage checklist for projects in rest) to report compliance with commitment and additional mitigation measures applied to the project.	5-year ~~(infractions require annual and 5-year~~).	USFWS – Review Appendix B, Document B-1 (salvage checklist for projects in rest) for appropriate application of commitments and mitigation measures. ~~DNRC will document the situations under which infractions occur and plan to minimize any risk of future occurrence.~~ Documentation will be reported ~~in applicable annual updates~~ and summarized in 5-year monitoring reports.
C limited active to four? C implemented e mitigation when operating than 0.25 mile pen road in a zone?	100%	Report number and location of active pits. If a pit is operated more than 0.25 mile from an open road in a rested subzone, report how DNRC minimized its distance away from an open road~~s~~ and ceased activities on other pits, including the number of licensed third parties continuing operation.	5-year on number/-location of pits. Case-by-case at annual review for pits operating in rested subzone.	DNRC – Document the situations under which ~~infractions occur~~active pits were not limited to four and ~~plan to minimize any risk of future occurrence~~develop corrective action(s) in coordination with the USFWS. Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports. USFWS – Review and approve corrective action(s). Review minimization measures implemented by DNRC for active pits 0.25 mile from an open road in a rested subzone and address concerns cooperatively by developing corrective action(s).

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
red Parcels in Recovery Zones				
adequately nd justify need oads?	100%	Compile and report information from Open Road Reduction checklist (Appendix B, Document B-2) and any closures.	5-year.	DNRC – Complete checklists for any missed projects. ~~DNRC will document the situations under which infractions occur and plan to minimize any risk of future occurrence.~~ USFWS – Review ~~and approve documentation~~checklists for appropriate evaluation and justification of open roads. Discuss concerns and develop corrective action(s) with DNRC as warranted.
maintain or baseline open unts (total length) inistrative unit DNRC making mprove the GIS ?	100%	Report open road amounts (tracked with GIS) at administrative unit level to compare with HCP baseline. GIS data quality and management reported at annual meeting.	5-year, annual as needed for discussions on GIS data.	DNRC – Immediately close roads in excess of baseline commitment on applicable administrative units.
C followed ent/rest period	100%	~~Employ a system to track and report status of 4-year management periods and 8-year rest periods.~~ Provide ~~current~~ listing of active/inactive parcels to demonstrate compliance with 4-year management/8-year rest commitment for each 5-year monitoring period. Report use of the allowable operating days by administrative unit that are allotted for parcels in formal rest status, and report these days to the USFWS at 5-year intervals. This information will also be available to the USFWS upon request. Report the number of times the management period was extended. When management period is extended due to allowable delays, DNRC will	~~Report status of rest/active areas to the USFWS upon request.~~ 5-year. Extensions require immediate reporting ~~(any infractions require annual and 5-year reporting)~~.	DNRC – If allowable operating days are exceeded, ~~delay sale/operation until a course of action is identified and documented to mitigate for the infraction. DNRC will document the situations under which infractions occur and plan to minimize any risk of future occurrence~~develop corrective action(s) in coordination with the USFWS. Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports. USFWS – Review and approve ~~documentation~~corrective action(s).

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
		write an explanation of the delay and submit it to the USFWS immediately upon notice that a delay will be necessary. Requires USFWS review only. The number of times the management period was extended will be reported in 5-year report.		
C implemented nitigations for xtended salvage s described in the nt?	100%	Report number, location, and duration of salvage projects. Use Appendix B, Document B-1 (salvage checklist for projects in rest) to report compliance with commitment and additional mitigation measures applied to the project.	~~Project by project,~~ 5-year ~~(infractions require annual and 5-year~~).	USFWS – Review and approve Appendix B, Document B-1 (salvage checklist for projects in rest) for appropriate application of commitments and mitigation measures. DNRC – ~~DNRC will document the situations under which infractions occur and plan to minimize any risk of future occurrence.~~ Documentation will be reported ~~in applicable annual updates~~ and summarized in 5-year monitoring reports.
C implemented e mitigation rating a pit more mile from an in a rested	100%	Report number and location of active pits. If a pit is operated more than 0.25 mile from an open road in a rested parcel, report how DNRC minimized its distance away from an open road~~s~~ and ceased activities on other pits, including the number of licensed third parties continuing operation.	5-year on number/~~-~~location of pits. Case-by-case at annual review for pits operating in rested parcels.	DNRC ~~– DNRC will document the situations under which infractions occur and plan to minimize any risk of future occurrence~~ Review minimization measures implemented by DNRC for active pits and address concerns cooperatively by developing corrective action(s) with the USFWS. Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports.

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
Commitments				
C followed ent/rest period	100%	Report use of the allowable commercial operating days that are allotted for parcels in formal rest status and report these days to the USFWS at 5-year intervals. This information will also be available to the USFWS upon request.	5-year ~~(infractions require annual and 5-year~~). Report status of rest/active areas to the USFWS upon request.	DNRC ~~– DNRC will document the situations under which infractions occur and plan~~If allowable operating days are exceeded, develop corrective action(s) in coordination with the USFWS to minimize any risk of future occurrence. Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports.
C implemented itigation for proposed ojects?	100%	Report number, location, and duration of salvage projects. Use Appendix B, Document B-1 (salvage checklist for projects in rest) to report compliance with commitment and additional mitigation measures applied to the project.	~~Project by project,~~ 5-year ~~(infractions require annual and 5-year~~).	USFWS – Review and approve Appendix B, Document B-1 (salvage checklist for projects in rest) for appropriate application of commitments and mitigation measures. DNRC – ~~DNRC will document the situations under which infractions occur and plan to minimize any risk of future occurrence.~~ Documentation will be reported ~~in applicable annual updates~~ and summarized in 5-year monitoring reports.
C followed more spring period ent (10 days on rcels in CYE one and	100%	Use annual accomplishment report by administrative unit to acknowledge implementation of the requirement and report information regarding number of parcels where activities occurred and number of days activities occurred within each unit. Report number of parcels where activities occurred and number of days that activities occurred within CYE recovery zone and NROH.	5-year.	DNRC – If allowable operating days exceeded, DNRC will ~~document the situations under which infractions occur and plan to minimize any risk of future occurrence~~develop corrective action(s) in coordination with the USFWS,~~. DNRC would be required to propose mitigation~~ including measures to offset the loss (e.g., apply additional restrictions the following year). Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports. USFWS – Review and approve ~~proposed mitigation measures and plan to minimize risk of future occurrence~~corrective action(s).

ARY OF GRIZZLY BEAR HCP IMPLEMENTATION MONITORING (CONTINUED)

mpliance uestion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
C expedited of open road or recovery zone	100% within 5 years	Compile and report information from Open Road Reduction Checklist (Appendix B, Document B-2) for all CYE recovery zone parcels (does not include CYE NROH parcels).	One-time reporting within first 5 years of HCP implementation~~5 -year~~.	DNRC – If roads identified for closure have not been closed within 5 years, DNRC would be required to propose mitigation measures to offset the effect (e.g., apply additional restrictions the following year). USFWS – Review and approve proposed mitigation measures if needed~~and plan to prevent future violations~~.
copter flight paths o avoid sensitive bears? t paths designed mile from these t-duration ppropriately ess than 48	100%	Complete HCP implementation checklist review on each project. For all projects requiring helicopter operation, document that the 1-mile threshold was met.	5-year.	DNRC – If required measures are not appropriately applied, DNRC will document the situation, develop corrective measures, and apply additional mitigation measures to offset the effect (e.g., apply additional disturbance minimization restrictions the following year, such as forgoing salvage operating days in sensitive areas, etc.). Documentation will be reported in applicable annual updates and summarized in 5-year monitoring reports. USFWS – Review and approve proposed mitigation measures.

Depending on the nature of the incident, the following actions may be implemented through adaptive management:

- Evaluating and revising the methods for providing information and education to contractors and their employees
- Evaluating and revising the brochures on working in bear habitat
- Providing DNRC employees with bear-proof containers rather than relying on the employees to provide appropriate containers for themselves
- Providing training for DNRC contractors and their employees, and
- reviewing and ensuring all authorizations to carry firearms under DNRC Policy 3-0621 are current and justifiable.

4.4.2.2 Minimize Displacement of Bears through Access Management (GB-NR1: New Open Roads)

This commitment requires DNRC to minimize new open road construction in NROH. There is no target or cap on total road densities. Through implementation monitoring, DNRC will be required to report open and total road miles in NROH by DNRC administrative unit for the 5-year monitoring reports and reviews. If the results at the 5-year review indicate that efforts have not been consistently taken to construct minimal amounts of new open road, the adaptive management process may be initiated. Through this process, DNRC and the USFWS will discuss alternative strategies to ensure the commitment is effectively minimizing new open roads. Strategies that might be considered include, but are not limited to:

- Providing additional training on its implementation and monitoring for 5 more years before altering the commitment
- Using an Open Road Reduction Checklist (see Appendix B, Document B-2), or developing a new one, to document the thought process and craft a decision framework for constructing new open roads
- Developing a transportation plan at the administrative unit level (similar to those developed for the Stillwater Block and Swan River State Forest).

4.4.2.3 Minimize Displacement of Bears through Access Management (GB-NR2, RZ6: Granting of Easements)

These commitments require DNRC to discourage granting of easements that relinquish DNRC control of roads, except for reciprocal access agreements and cost-share agreements. During the development of the strategies, it was difficult for DNRC to predict how many such easements would be granted. Through implementation monitoring, DNRC will be required to use an easement checklist to justify the easements and apply appropriate mitigations when there is the potential to affect HCP species. The results would be reviewed every 5 years. If the results indicate appropriate efforts are not being made to apply these commitments, the adaptive management process may be initiated. Evidence that adequate efforts have not been made may include situations where easements have not been adequately reviewed or discouraged, or where mitigations have not been appropriately considered to offset the effects. Through this process, DNRC and the USFWS would discuss alternative strategies to ensure the commitment is appropriately discouraging easements. Strategies that might be considered include, but are not limited to:

- Providing additional training on the implementation of the commitment, and monitoring for 5 more years before altering the commitment
- Developing a list of mitigations to be applied and the circumstances under which they would be required
- Examining DNRC's road system to determine if any increases in open roads could be offset through closure of any of its roads.

4.4.2.4 Increase DNRC's Understanding of Grizzly Bear Habitat Quality in Managed Forests

DNRC will participate in cooperative bear research and monitoring programs as time and budgets allow. DNRC will prioritize participation in the evaluation of effectiveness of the Swan River State Forest and Stillwater Block transportation plans in mitigating risks to grizzly bears as cooperative study opportunities become available.

Recognizing that opportunities are often dependent on available resources and priorities of other government agencies and cooperators, new research findings or emerging science applicable to grizzly bears will be discussed at the annual meeting. If emerging science conflicts with assumptions made about grizzly bear habitat during planning of the HCP, including the implementation of quiet areas to provide secure habitat, DNRC and the USFWS will follow the process described in Section 4.2.3 (Adjusting for New Research) to collaboratively determine if the conservation commitments require modification.

4.5 LYNX MONITORING AND ADAPTIVE MANAGEMENT

4.5.1 Implementation Monitoring

Table 4-3 identifies the biological goals and objectives for lynx and the conservation commitments intended to meet those goals. As with the grizzly bear, the HCP conservation commitments for lynx are based on best available science, and they are expected to meet the biological goals when implemented properly. Best available science is described in Section 1.3.3.3 (Use of Best Available Information). Therefore, monitoring is focused on implementation. DNRC anticipates gathering and reporting a variety of information for implementation monitoring on the lynx conservation commitments (Table 4-4). Chapter 8 (HCP Implementation) contains the implementation schedule for the conservation commitments. The lynx monitoring commitments specify a variety of reporting requirements. For each LMA (see conservation commitment LY-LM1 in Table 4-4), DNRC will report

- Total potential lynx habitat (includes suitable and temporary non-suitable habitat)
- Suitable lynx habitat (includes winter foraging, ~~young~~summer foraging, and other suitable habitat)
- Winter foraging habitat

- ~~Young~~Summer foraging habitat
- Other suitable habitat
- Temporary non-suitable habitat.

This reporting will be based on data contained in DNRC's SLI database, and technical habitat definitions will follow those contained in the DNRC HCP lynx habitat mapping protocols document (Appendix B, Document B-3). This information will be used to calculate and report, for each LMA, the ~~combined~~ foraging habitat acreage~~s~~ and percentage~~s~~ present, the percentage increase in temporary non-suitable habitat by decade, and the proportion of temporary non-suitable habitat relative to total potential lynx habitat. Table 4-5 provides an example template for reporting this information. Additionally, habitat conversions may be calculated on a project-by-project basis and presented in the project MEPA document.

The primary means by which DNRC will document compliance with the HCP commitments is through the HCP implementation checklist. Field reviews as described in Section 4.1.1.3 (Field Reviews) will also be conducted.

TABLE 4-3. LYNX BIOLOGICAL GOALS AND OBJECTIVES AND THE CONSERVATION COMMITMENTS DEVELOPED TO MEET THOSE GOALS AND OBJECTIVES

Goals and Objectives	Commitments to Meet Objectives
Goal – Support federal Canada lynx conservation efforts by managing for habitat elements important for lynx and their prey that contribute to the landscape-scale occurrence of lynx, particularly in key locations for resident populations.	
Objective 1 – Minimize potential for disturbance to known active den sites.	HB3 – Den Site Protection
Objective 2 – Within preferred habitat types (Pfister et al. 1977), map potential lynx winter foraging, ~~young~~summer foraging, and other suitable and temporary non-suitable habitats.	HB1 – Lynx Habitat Map
Objective 3 – Provide stand structures or attributes that provide habitat for prey species, particularly in winter.	HB2 – Coarse Woody Debris HB4 – Foraging Habitat Attribute Retention
Objective 4 – Retain CWD and other denning attributes on managed sites.	~~HB2 – Den Site Attributes~~ HB2 – Coarse Woody Debris
Objective 5 – Limit conversion of suitable lynx habitat to temporary non-suitable habitat per decade in key geographic areas of notable importance for lynx (LMAs)	LM2 – Habitat Conversion Rate
Objective 6 – Ensure that adequate amounts of foraging habitat are maintained in defined LMAs.	LM1 – Habitat Suitability LM3 – Foraging Habitat
Objective 7 – Provide for habitat connectivity on the landscape where vegetation and ownership patterns allow.	HB5 – Habitat Connectivity
Objective 8 – Maintain suitable lynx habitat on DNRC scattered parcels outside LMAs.	HB6 – Habitat Suitability

ARY OF LYNX HCP IMPLEMENTATION MONITORING

pliance stion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Actions
itments				
NRC d a lynx map?	Y/N	Provide revised DNRC lynx habitat map that depicts cumulative annual changes and a table that includes lynx habitat amounts by type for each administrative unit and by LMA as appropriate.	Annual until both agencies are satisfied with ~~data~~ mapping revision procedures and 5-year thereafter.	DNRC – Report changes to the baseline total potential habitat attributed to mapping or habitat typing errors. USFWS/DNRC – Discuss at annual and 5-year meetings.
~~NRC ned two al den er square mapped bitat?~~	~~100%~~	~~Document compliance through HCP implementation checklist.~~ ~~Report number and locations of potential den sites retained and locate specific sites on project area maps. (This commitment would be revisited every 5 years to determine if any reporting requirements could be relaxed).~~	~~5-year (infractions require annual and 5-year).~~	~~DNRC – If retention of den sites requirement is not met, conduct site visit to map naturally occurring sites or create den sites to meet requirement. DNRC will document the situations under which infractions occurred and plan to minimize any risk of future occurrence.~~ ~~USFWS – Review and approve documentation.~~
~~NRC d 1% of wn area aged?~~	~~Y/N~~	~~Complete HCP implementation checklist review where specific blowdown projects occur.~~ ~~Report acreage of blowdown developed as timber sales/permits and acreage retained.~~	~~5-year (infractions require annual and 5-year).~~	~~DNRC – If out of compliance, provide additional mitigation measures to provide agreed-to amounts of natural den site habitat structures (to the extent possible). DNRC will document the situations under which infractions occurred and plan to minimize any risk of future occurrence.~~ ~~USFWS – Review and approve documentation.~~
~~NRC ned d den djacent to e habitat?~~	~~Y/N~~	~~Use HCP implementation checklist to acknowledge implementation of requirement. Where conditions do not allow den sites adjacent to suitable habitat, document circumstances. Review for compliance during post-harvest internal audits.~~	~~5-year (infractions require annual and 5-year).~~	~~DNRC – If out of compliance, conduct site visit to map naturally-occurring sites or create additional den sites in desired locations to meet requirement.~~ ~~USFWS – Review circumstances where conditions did not allow preferred location of den sites.~~

ARY OF LYNX HCP IMPLEMENTATION MONITORING (CONTINUED)

pliance stion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Actions
NRC d Graham 994) for etention ained as ed in vation y?	~~100~~90% of projects in lynx habitat over a 5-year period	Document compliance through HCP implementation checklist. Report amounts of snags, snag recruits, and CWD on a minimum of two projects (post-harvest) per year in lynx habitat when available. Monitor for the first 5 years of HCP implementation to ensure compliance. Review for compliance during post-harvest internal audits.	Report detailed data for first 5 years. Demonstrate compliance through HCP implementation checklist summaries every 5 years thereafter.~~5-year.~~	DNRC – If post-harvest monitoring identifies non-compliance, DNRC will document the situation~~s under which infractions occurred~~, communicate with local field staff, and develop corrective actions in coordination with the USFWS ~~plan~~ to minimize any risk of future occurrence. ~~DNRC may be required to propose mitigation measures to offset the effect. Management prescriptions may require revision to achieve required amounts of snags and CWD.~~ USFWS – Review and approve documentation.
NRC d 1% of wn area aged?	Y/N	Complete HCP implementation checklist review where specific blowdown projects occur. Report total acres- of blowdown, total acres treated, and total acres retained.	5-year.	DNRC – If adequate blowdown not retained, provide additional mitigation measures to provide agreed-to amounts of natural den site habitat structures (to the extent possible). DNRC will document the situations and develop corrective action(s) in coordination with the USFWS to comply with the commitment. USFWS – Review and approve documentation.
NRC ented den tections cribed for active	Y/N	Document compliance through HCP implementation checklist Report active den sites associated with DNRC projects to the USFWS as DNRC becomes aware of them. ~~Report any allowances required and the circumstances.~~	Report known active sites within DNRC projects immediately. 5-year ~~(infractions require annual and 5-year)~~.	DNRC – ~~DNRC will document the situation under which the infraction occurred and plan to minimize any risk of future occurrence.~~ If den site encountered where motorized activities are in progress, notify the USFWS immediately (cease operations and/or re-schedule work as applicable to minimize further risk to lynx). To the extent possible, identify and implement measures to improve compliance with commitment.

ARY OF LYNX HCP IMPLEMENTATION MONITORING (CONTINUED)

pliance stion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Actions
				USFWS – Review and approve documentation. ~~Review projects where allowances invoked. If violation occurs, review and approve proposed mitigation measures and plan to prevent future violation.~~
NRC d some shade- t trees fir, ne fir, and in pre- rcial g -units?	~~When present, greater than 5% shade-tolerant species should be retained.~~ Maintain a component of shade-tolerant trees that do not pose substantial competition to desired crop trees.	Use HCP implementation checklist prior to pre-commercial thinning projects in lynx habitat. Report number of projects and estimate of pre- and post-harvest tree species composition~~ and retained shade-tolerant trees per acre~~.	5-year~~ (infractions require annual and 5-year)~~.	DNRC – If out of compliance, ~~increase requirement for next sale to meet requirement. (The intent is not to promote this as a matter of practice.)~~ DNRC will document the circumstances~~situation under which the infraction occurred~~ and ~~plan~~develop corrective action(s) in coordination with the USFWS to minimize any risk of future occurrence. USFWS – Review and approve documentation.
NRC d some s of ed ration of tolerant grand fir, ne fir, and in rcial units?	In lynx habitat, maintain as many patches as possible that also allow achievement of silvicultural goals.	Use HCP implementation checklist to acknowledge requirement. Addressed through silvicultural prescriptions and contract specifications. Review for compliance during post-harvest internal audits.	5-year~~ (infractions require annual and 5-year)~~.	DNRC – If out of compliance, ~~increase requirement for next sale to meet requirement. (The intent is not to promote this as a matter of practice.)~~ DNRC will document the circumstances~~situation under which the infraction occurred~~ and ~~plan~~develop corrective action(s) in coordination with the USFWS to minimize any risk of future occurrence. USFWS – Review and approve documentation.

ARY OF LYNX HCP IMPLEMENTATION MONITORING (CONTINUED)

pliance stion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Actions
NRC ned tivity as ed?	Y/N	Complete HCP implementation checklist review. If applicable, report if project has provided a ~~mature~~ forest patch > 300 feet wide over a prominent ridge or saddle that would connect drainages and if project has provided mature forest connectivity along streams or other riparian features.	5-year.	DNRC/USFWS – Review ~~every 5 years~~ the instances and circumstances under which connectivity could not be adequately maintained. Discuss the adequacy of implementation and explore the need for corrective action(s), if necessary.
NRC ned the ratio of suitability tered outside	No less than 65% non-suitable lynx habitat should occur on any land office.	Report acres and percentages of total potential lynx habitat, suitable lynx habitat, and temporary non-suitable habitat on scattered parcels outside the LMAs for each land office.	Year 2, then 5-year (infractions also require annual reporting~~and 5-year~~).	DNRC – ~~If an infraction occurs that would not be addressed as a changed circumstance, DNRC will document the situation under which the infraction occurred and plan to minimize any risk of future occurrence including proposed mitigation to offset impacts.~~ If non-compliance is attributable to a natural event, follow the process outlined in HCP Chapter 6 (Changed Circumstances). If proportion of suitable habitat is out of compliance attributable to DNRC activities, DNRC will document the situation and develop corrective action(s) to minimize any risk of future occurrence and propose and implement mitigation measures to offset effects. USFWS ~~– If an infraction occurs, review and approve plan.~~Review and approve corrective action(s) and mitigation measures.

ARY OF LYNX HCP IMPLEMENTATION MONITORING (CONTINUED)

pliance stion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Actions
Commitments				
NRC ned the ratio of suitability s?	Unless unexpected natural disturbances occur, no less than 65% suitable lynx habitat of total potential lynx habitat should occur within any LMA.	~~Report acres and percentages of each habitat listed below for each LMA:~~ ~~a. total potential lynx habitat (includes suitable and temporary non-suitable habitat);~~ ~~b. suitable lynx habitat (includes winter foraging, young summer foraging, and other suitable habitat);~~ ~~c. winter foraging habitat;~~ ~~d. summeryoung foraging habitat;~~ ~~e. other suitable habitat; and~~ ~~f. temporary non-suitable habitat.~~ Report acres and percentages of total potential lynx habitat, suitable lynx habitat, and temporary non-suitable habitat on HCP project area parcels within each LMA.	Year 2, then 5-year ~~(infractions require annual and 5-year~~).	DNRC – ~~If an infraction occurs that would not be addressed as a changed circumstance, DNRC will document the situation under which the infraction occurred and plan to minimize any risk of future occurrence including proposed mitigation measures to offset impacts.~~ If non-compliance is attributable to a natural event, follow the process outlined in HCP Chapter 6 (Changed Circumstances). If proportion of suitable habitat is out of compliance attributable to DNRC activities, DNRC will document the situation and develop corrective action(s) to minimize any risk of future occurrence and propose and implement mitigation measures to offset effects. USFWS ~~– If an infraction occurs,review and approve plan.~~Review and approve corrective action(s) and mitigation measures.
NRC habitat sion to r ?	No more than 15% suitable lynx habitat can be converted to non-suitable per decade within any LMA.	~~Report acres and percentages of habitat by habitat type (see LY-LM1 above and Table 4-5), for each LMA.~~Report total potential habitat, 15% allowable quota per decade, and number of acres of suitable habitat converted to temporary non-suitable habitat in the 5-year monitoring period on HCP project area parcels within each LMA.	5-year ~~(infractions also require annual reportingand 5-year~~).	DNRC – ~~If an infraction occurs that would not be addressed as a changed circumstance, DNRC will document the situation under which the infraction occurred and plan to minimize any risk of future occurrence including proposed mitigation measures to offset impacts.~~ If non-compliance is attributable to a natural event, follow the process outlined in HCP Chapter 6 (Changed Circumstances). If DNRC activities convert more than 15% of habitat per decade, DNRC will

ARY OF LYNX HCP IMPLEMENTATION MONITORING (CONTINUED)

pliance stion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Actions
				document the situation and develop corrective action(s) to minimize any risk of future occurrence and propose and implement mitigation measures to offset effects. USFWS ~~– If an infraction occurs, review and approve plan.~~ Review and approve corrective action(s) and mitigation measures.
NRC ned 20% habitat as oraging ?	20% of total potential habitat must occur in winter foraging habitat within each LMA.	~~Report acres and percentages of habitat by habitat type (see LY-LM1 above), for each LMA.~~Report acres of total potential habitat and current percentage and acres of winter foraging habitat on HCP project area parcels within each LMA.	Year 2, then 5-year ~~(infractions require annual and 5-year)~~.	DNRC – ~~If an infraction occurs that would not be addressed as a changed circumstance, DNRC will document the situation under which the infraction occurred and plan to minimize any risk of future occurrence including proposed mitigation measures to offset impacts.~~ If non-compliance is attributable to a natural event, follow the process outlined in HCP Chapter 6 (Changed Circumstances). If the proportion of winter foraging habitat is out of compliance attributable to DNRC activities, DNRC will document the situation and develop corrective action(s) to minimize any risk of future occurrence and propose and implement mitigation measures to offset effects. USFWS ~~– If an infraction occurs, review and approve plan.~~ Review and approve corrective action(s) and mitigation measures.

ARY OF LYNX HCP IMPLEMENTATION MONITORING (CONTINUED)

pliance stion	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Actions
NRC d as ed, 20% rea in re- rcial g project g saplings habitat?		Report number of pre-commercial thinning projects targeting samplings in lynx habitat. For each project, report total number of acres thinned and acres left unthinned.	5-year.	DNRC – Document the situation under which inadequate amounts retained. Develop corrective action(s) in coordination with the USFWS to minimize any risk of future occurrence, including proposed mitigation measures to offset effects. USFWS – Review and approve corrective action(s) and mitigation measures.

TABLE 4-5. EXAMPLE MONITORING REPORT TABLE TEMPLATE FOR LYNX HABITAT FOR EACH LMA

A	B	C	D	E	F	G
Year	Total Potential Lynx Habitat[1]	Other Suitable Habitat	Temporary Non-suitable Habitat	Winter Foraging Habitat	~~Young~~ Summer Foraging Habitat	Suitable Lynx Habitat (CLO Only)
2010						
2015						
2020						
2025						
2030						

[1] Values in this column should remain relatively static and should not change appreciably over time.

Compliance with the HCP will be reported in the 5-year monitoring reports using Table 4-5 with the following methodology:

- Table 4-5 will be populated annually at approximately the same time of year through a query of the SLI database for the applicable year so that any decade may be queried. The SLI database query is expected to capture those habitat acres that have changed to temporary non-suitable habitat or a different habitat category, as well as those acres in temporary non-suitable that are growing into suitable habitat categories.
- Assess compliance with the 20 percent winter foraging habitat criterion by ~~adding the values for the decade of interest in columns E and F and~~ dividing ~~them~~column E by the corresponding value in column B. The resulting value is the percentage of total potential lynx habitat that consists of foraging habitat. A value of 20 percent or greater indicates compliance.
- Assess compliance with the commitment to not increase the proportion of temporary non-suitable habitat by greater than 15 percent per decade during the HCP term by using the following calculation: current period value in column D, minus the previous period value in column D, divided by total potential lynx habitat acres in column B, multiplied by 100 equals the percent change in temporary non-suitable habitat by decade. This calculation will be reported for 5-year intervals. A value of 15 percent or less indicates compliance.
- Assess compliance with the commitment to maintain at least 65 percent suitable lynx habitat by using the following calculation: current period value in column D, divided by the current period value in column B, multiplied by 100 equals the percentage of temporary non-suitable habitat present for the period in question. This value should not be greater than 35 percent.

4.5.2 Effectiveness Monitoring and Adaptive Management

As mentioned earlier in Section 4.1.2 (Effectiveness Monitoring), because of: (1) the high costs associated with effectiveness monitoring, (2) the relatively small landscape contribution of DNRC ownership, and (3) inherent difficulty in answering questions pertaining to population-level influences of implemented conservation measures, DNRC will address effectiveness of the HCP commitments for lynx in the following manner.

First, DNRC relied on the best available science to develop the conservation strategies. Therefore, implementation of the conservation commitments will be the primary means relied on to meet the biological goals and objectives for lynx. However, new research through DNRC partnerships and by others (such as the local studies described above) will be considered by both parties at annual meetings to determine if changes in a conservation strategy are needed. Necessary changes will be implemented through the process described in Section 4.2.3 (Adjusting for New Research). In this manner, DNRC will utilize information obtained from other ongoing monitoring and research efforts to assess effectiveness of conservation commitments and to determine whether adjustments to them may be warranted during the Permit term.

Second, some effectiveness monitoring will be conducted to evaluate whether the management prescriptions and conservation measures being implemented are having the desired effect on a given habitat condition or resource. The conservation commitments implemented to address four of the eight biological objectives require DNRC to track the availability of various types of lynx habitat in the HCP project area. Lynx habitat categories are defined based on the characteristics of timber stands as described in the SLI. DNRC's ability to provide the required amounts of lynx habitat relies on the SLI database's ability to accurately characterize conditions on the ground. Therefore, to monitor the effectiveness of the strategy for achieving desired amounts of lynx habitat, DNRC will evaluate the accuracy for characterizing stand conditions as they actually exist on the ground for the queried stand. Additionally, DNRC will evaluate post-harvest stand conditions to determine prevalence of potential future dens sites (large logs, piles of small logs, root wads, etc.).

The proposed monitoring methodologies to assess (1) the accuracy of the DNRC SLI, ~~and~~(2) habitat mapping protocols for describing lynx habitat, and (3) retention of potential den sites are contained in Appendix B, Document B-12 – Monitoring Methodologies to Assess Accuracy of DNRC Stand Level Inventory Data and HCP Habitat Mapping Protocols for Describing Lynx Habitat. The purpose of the monitoring document is to identify methodologies for identifying and ~~preliminarily~~ evaluat~~e~~ing the types and degrees of error associated with SLI data fields that address habitat parameters for lynx and to ensure that HCP commitments for snags, snag recruits, and CWD are leaving material suitable for lynx den sites. This must be done to provide assurances for both parties (the USFWS and DNRC) that lynx habitat parameters are being managed and retained at levels intended in the conservation strategy.

4.6 AQUATIC MONITORING AND ADAPTIVE MANAGEMENT

The following sections describe the monitoring and adaptive management commitments for the five aquatic conservation strategies: (1) riparian timber harvest, (2) sediment delivery reduction, (3) fish connectivity, (4) grazing, and (5) CWE.

4.6.1 Riparian Timber Harvest Monitoring and Adaptive Management

DNRC's monitoring and adaptive management commitments for the riparian timber harvest conservation strategy are described below.

4.6.1.1 Implementation Monitoring

Implementation monitoring for riparian timber harvest commitments will be tracked using the existing tools and programs described in Chapter 8 (HCP Implementation) as well as the HCP implementation checklist and new tools developed to support the HCP. Implementation monitoring commitments are summarized in Table 4-6 for all the negotiated aquatic conservation strategies. Chapter 8 contains the implementation schedule for the conservation commitments.

4.6.1.2 Effectiveness Monitoring

To evaluate the effectiveness of the riparian timber harvest conservation strategy, DNRC will conduct monitoring on a representative number of sites where Class 1 RMZ conservation strategies are implemented. The three effectiveness monitoring objectives for these Class 1 RMZ sites are: (1) provide adequate levels of LWD recruitment, (2) maintain adequate levels of in-stream shade, and (3) maintain in-stream temperature regimes suitable to support the HCP fish species. Effectiveness monitoring commitments are summarized in Table 4-7 and described in more detail in the following subsections.

Provide Adequate Levels of LWD Recruitment

DNRC will determine whether the proposed conservation strategy meets in-stream LWD targets by monitoring a total of five or more sites with riparian harvest adjacent to Class 1 streams during the first 10 years that the HCP and Permit are in effect. If the threshold is met after 10 years, monitoring may be reduced to ongoing monitoring at one active site through year 25 of the HCP. Monitoring projects will include riparian harvest located on sites with slopes greater than 35 percent and on sites with slopes less than 35 percent. The distribution of monitoring sites between the two slope classes will be representative of the Class 1 RMZs harvested. If five or more monitoring sites are not available due to a lack of riparian harvest, monitoring will occur on all available sites.

Rationale: For the first monitoring period (years 1 through 5), it is unlikely there will be a large pool of RMZ harvest sites to select for monitoring projects due to the time lag between HCP implementation and actual harvest activities. The level of monitoring reflected in this commitment is the amount that DNRC feels it can accomplish given its limited resources.

LWD monitoring will include the following steps:

1. DNRC will establish site-specific LWD targets using on-site stream reach baseline LWD data or local reference reach LWD data. When on-site or local reference reach data are not available, DNRC will use regional LWD targets established from reference reach data compiled for different physiographic regions across the state. Regional targets will be stratified by stream channel morphological classification, such as Rosgen (1994) channel types.
2. DNRC will assess pre-harvest stand conditions within the project RMZ and LWD amounts within the stream. Stand conditions will be characterized by tree diameters (at breast height) and tree density (trees per acre).
3. DNRC will evaluate post-harvest in-channel LWD and stand conditions within the RMZ.
4. DNRC will use model projections of forest stand growth, mortality, and LWD recruitment to evaluate whether both pre-harvest stand conditions and implemented harvest prescriptions meet LWD targets established for that specific stream reach.

ARY OF IMPLEMENTATION MONITORING FOR AQUATIC CONSERVATION STRATEGIES

Monitoring Commitment	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
one Commitments				
NRC implemented RMZ tments?	100%	Complete HCP implementation checklist review on all sites.	Annual.	Timber sales will not be implemented until HCP implementation checklists are completed.
~~rtion of~~Have allowances ss 1 RMZ harvest been d? ~~conducted under m retention tree ments of SMZ Law?~~	If more than ~~15~~20% of RMZ~~s~~ acres ~~on~~in any ~~administrative unit~~aquatic analysis unit are cumulatively in non-stocked or seedling/sapling size class, no allowances to Class 1 RMZ no-harvest buffer or minimum retention tree requirements.	Track and compile acres of Class 1 RMZs, ~~and~~ acres of Class 1 RMZs harvested under allowances, and RMZ area in non-stocked or seedling/sapling size class by aquatic analysis unit.	Annual and 5-year.	No additional Class 1 RMZ harvest using allowances ~~minimum SMZ retention requirements~~ will be conducted until acreage drops below ~~15~~20% threshold.
NRC used allowance for orridors in the 50-foot~~,~~ vest buffer?	No more than 15% of the buffer area may be affected, and corridors must be spaced a minimum of 150 feet apart.	If invoked, DNRC would monitor 3 sites every 5 years and report total acres of riparian harvest, total acres affected, and distance between corridors.	5-year.	DNRC – Develop and implement an action plan for improving compliance with allowance. USFWS – Review and approve action plan.

ARY OF IMPLEMENTATION MONITORING FOR AQUATIC CONSERVATION STRATEGIES TINUED)

Monitoring Commitment	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
ction Commitments				
NRC implemented nt delivery reduction tments?	Annual update to include new maps and data based on input from the field. (Maps may be contract maps for the first few years until DNRC is able to provide GIS mapping).	Track and report the amount of road newly constructed, reconstructed, relocated, abandoned, and reclaimed.	Annual.	DNRC – Identify problems with annual tracking/reporting procedures, and propose approach to ensure accurate updates of map and data.
nventories completed on ersheds supporting bull thin 10 years. d inventories completed 20 years. cation and prioritization ective actions. tive actions to high-risk ompleted in bull trout heds within 15 years. tive actions to high-risk ated in other watersheds 25 years.	Annual update and 5-year monitoring report indicates a trend toward meeting timelines.	Update status of all inventory projects and BMP audits. Complete accomplishment report detailing progress of road inventories, classification, and corrective actions.	5-year.	DNRC – Develop and implement an action plan for improving compliance with timelines. USFWS – Review and approve action plan.
ide and internal BMP and contract stration inspections ted on all applicable management activities.	Proper BMP implementation at or exceeding 90%.	BMP application rate included in accomplishment report.	5-year.	DNRC – Develop and implement an action plan for improving compliance with BMP implementation. USFWS – Review and approve action plan.
NRC limited oment of medium gravel RMZs in the Stillwater r Swan River State ?	100%	Report number of medium non-reclaimed pits and reclaimed pits within RMZs in Stillwater Block or Swan River State Forest.	5-year.	No additional medium gravel pits in RMZs until existing pits are reclaimed and DNRC is in compliance.

ARY OF IMPLEMENTATION MONITORING FOR AQUATIC CONSERVATION STRATEGIES TINUED)

Monitoring Commitment	Compliance Threshold	Reporting Requirement	Reporting Frequency	Management Response
itments				
NRC implemented fish tivity commitments? 5 years, one-sixth of all eeding improvement een implemented, d, or designed. rity 1 sites improved to connectivity within 15 s provide connectivity 30 years.	Accomplishment report indicates a trend toward meeting timelines.	Maintain planning schedule. Report accomplishments in context of completed or planned improvements.	Annual and 5-year.	DNRC – Develop and implement an action plan for improving compliance with timelines. USFWS – Review and approve action plan.
NRC implemented conservation tments?	Timelines for grazing evaluation, verification, and implementation of corrective actions are met.	Provide update on status of grazing evaluations, verifications completed, and corrective actions implemented. Report on results of grazing evaluations and implementation of corrective actions.	Status of evaluations reported annually. Results of evaluations reported at 5-year.	DNRC – Develop and implement an action plan for improving compliance with timelines. USFWS – Review and approve action plan.
Effects Commitments				
NRC implemented CWE tments?	CWE analysis completed for all applicable projects.	Report number, type, and location of CWE analyses completed. Provide documentation of mitigation measures or alternatives developed for projects with moderate or high CWE risk.	Annual and 5-year.	DNRC – Develop and implement an action plan for improving compliance. USFWS – Review and approve action plan.

ARY OF AQUATIC HCP EFFECTIVENESS MONITORING

Monitoring Action	Effectiveness Threshold	Reporting Frequency	Management Response
Conservation Strategy			
Assess the potential LWD ecruitment in post-harvest stands and determine whether n-stream LWD targets will be met. Initial assessments will be conducted on five or more iparian harvest sites.	80% of the RMZ acres harvested will meet LWD targets.	Annual updates will consist of a summary of the status of all monitoring activities. 5-year monitoring reports will include detailed analysis and results.	If threshold is not met, DNRC will implement modified approach using pre-harvest evaluations. If after 10 years threshold is being met, monitoring will be reduced to one ongoing LWD assessment project through year 25 of HCP implementation.
Evaluate levels of in-stream cover provided by riparian harvest strategy. Complete in conjunction with LWD and stream temperature assessments.	Thresholds for adequate stream shade will be determined through stream temperature monitoring.	Annual updates will consist of a summary of the status of all monitoring activities. 5-year monitoring reports will include detailed analysis and results.	Implement alternative approach described under adaptive management for stream temperature.
Monitor stream temperatures to evaluate if levels of in-stream cover provided by the riparian harvest strategy are adequate to maintain stream temperatures. nitial assessment will be conducted on five or more iparian harvest sites.	Temperature increase ~~less than 1°Celsius (1.8° Fahrenheit)~~not to exceed peak seasonal or diel criteria for non-temperature-sensitive streams and no significant temperature difference for temperature-sensitive streams.	Annual updates will consist of a summary of the status of all monitoring activities. 5-year monitoring reports will include detailed analysis and results.	If threshold is not met, DNRC will develop and implement an alternative approach as described under adaptive management. If after 10 years threshold is being met, monitoring will be reduced to one ongoing LWD assessment project through year 25 of HCP implementation.

ARY OF AQUATIC HCP EFFECTIVENESS MONITORING (CONTINUED)

Monitoring Action	Effectiveness Threshold	Reporting Frequency	Management Response
ction Conservation Strategy			
Qualitative assessments hrough BMP audits and timber sale inspections on all applicable projects.	BMP effectiveness is at or above 90%.	Annual updates will consist of a summary of the status of all monitoring activities. 5-year monitoring reports will include detailed analysis and results.	BMPs that fail to provide adequate protection of HCP fish species will be revised and reported to the USFWS.
Ongoing quantitative assessments at two sites at any ime.	Violation of thresholds established through site-specific monitoring plan for any one site.	Annual updates will consist of a summary of the status of all monitoring activities. 5-year monitoring reports will include detailed analysis and results.	BMPs that fail to provide adequate protection of HCP fish species will be revised and reported to the USFWS.
Case studies designed to monitor the effectiveness of corrective actions in reducing sediment production from existing sources	50% net reduction of sediment production from existing road sources within permit period. Pro-rated reduction requires a 10% reduction at each 10-year review.	Annual updates will consist of a summary of the status of all monitoring activities. 5-year monitoring reports will include detailed analysis and results	If 10% reduction target is not met at the 10-year review, DNRC will revise or create new or enhanced BMPs used for corrective actions on existing roads.
ervation Strategy			
Conduct effectiveness monitoring within 2 years, and again at 5 years (10 years for non-CMP structures) following structure installation, or ollowing 25-year storm event.	Structure not accommodating background ranges of stream form and function within and immediately adjacent to structure.	Annual updates will consist of a summary status of all monitoring activities. 5-year monitoring reports will include detailed analysis and results.	New technical surveys to determine the cause of problems completed within 1 year. Structure re-installed according to planning schedule.
trategy			
Evaluate all sites within 1 year ollowing corrective actions.	Correction action determined to be ineffective.	5-year monitoring reports will document effectiveness of corrective actions.	Adjust license and/or continue monitoring annually until improvement is verified to be effective.

MARY OF AQUATIC HCP EFFECTIVENESS MONITORING (CONTINUED)

Monitoring Action	Effectiveness Threshold	Reporting Frequency	Management Response
ffects Conservation Strategy			
DNRC and the USFWS meet to evaluate effectiveness of CWE process.	CWE process determined to be ineffective.	5-year.	DNRC will revise the CWE process to address ineffective components of the strategy.

Maintain Adequate Levels of In-stream Shade

DNRC will conduct monitoring to ensure the effectiveness of the proposed RMZ harvest prescription in maintaining adequate levels of in-stream shade in conjunction with timber harvest occurring within the RMZs of select Class 1 streams. In-stream shade is defined as the total solar energy affecting the surface of the stream in the stream reach adjacent to the timber harvest unit. This monitoring will be completed in conjunction with monitoring conducted as described in the previous subsection (Provide Adequate Levels of LWD Recruitment). Monitoring will occur on five or more sites with riparian harvest adjacent to Class 1 streams during the first 10 years the HCP and Permit are in effect. If the threshold identified in Table 4-6 is met after 10 years, monitoring may be reduced to ongoing monitoring at one active site through year 25 of the HCP. Monitoring projects will include riparian harvest located on sites with slopes greater than 35 percent and on sites with slopes less than 35 percent. The distribution of monitoring sites between the two slope classes will be representative of the Class 1 RMZs harvested. If five or more monitoring sites are not available due to a lack of riparian harvest, monitoring will occur on all available sites.

DNRC will measure both pre- and post-harvest levels of in-stream shade by the best available, scientifically valid, commonly accepted method. Existing methods that meet these criteria include the Solar Pathfinder and angular canopy densitometer. DNRC will conduct shade monitoring activities on at least five sites in Class 1 RMZs with timber harvest involving the removal of more than 25 percent of trees greater than or equal to 8 inches dbh as measured from the outer edge of the no-harvest buffer to the outer edge of the RMZ (based on SPTH).

DNRC will prioritize those sites located on Class 1 streams supporting HCP fish species for monitoring purposes. DNRC will also prioritize ~~selection of monitoring sites to study~~ harvest units that have the greatest potential to produce measured effects on the level of in-stream shade (such as harvest areas with the highest levels of forest canopy removal or those harvest units with narrower RMZs) for monitoring purposes.

DNRC will exclude from monitoring any RMZ harvest that results in the removal of less than 25 percent of trees greater than or equal to 8 inches dbh as measured from the outer edge of the no-harvest buffer to the outer edge of the RMZ (based on SPTH), because this level of RMZ harvest has little to no chance of producing a measured reduction in stream shading.

Maintain In-stream Temperature Regimes to Support HCP Fish Species

DNRC will conduct monitoring to determine if the levels of in-stream cover provided by the 50-foot no-harvest buffer and minimum tree retention requirements are effective at maintaining stream temperature regimes suitable to support the HCP fish species. DNRC will have a minimum of two ongoing stream temperature monitoring projects operating at any one time. All harvest units undergoing temperature monitoring will also undergo stream shade monitoring as described in the previous subsection (Maintain Adequate Levels of In-stream Shade). Monitored sites will include riparian harvest located on sites with slopes greater than 35 percent and on sites with slopes less than 35 percent. The distribution of monitoring sites between the two slope classes will be representative of the Class 1 RMZs harvested.

Temperature Monitoring Approach

The following approach (Steps 1 through 6) will be used for temperature monitoring at all sites. If the monitoring efforts show that DNRC is meeting its goals (see Steps 1 and 2 below), it is anticipated that there will be no significant adverse effects on stream temperatures due to the standard harvest prescription included in the proposed conservation strategy. Modified temperature monitoring methods for non-temperature-sensitive reaches and temperature-sensitive reaches are described after the standard temperature monitoring approach steps.

1. For the majority of Class 1 riparian harvest sites (referred to as non-temperature-sensitive sites), DNRC ~~has established~~will use the stream temperature exceedance matrix in Table 4-8 to determine criteria ~~a~~ for maximum ~~threshold of 1° Celsius (1.8° Fahrenheit)~~ increases in stream temperature (DNRC 2010), attributable to timber harvest (i.e., difference between upstream and downstream monitoring sites).

TABLE 4-8. POST-HARVEST STREAM TEMPERATURE EXCEEDANCE MATRIX FOR NON-TEMPERATURE-SENSITIVE STREAM REACHES

Pre-harvest Peak Mean Weekly Maximum Temperature	Chronic Exceedance[1]	Acute Diel Exceedance[2]
15.5° Celsius (59.9° Fahrenheit) or less	Mean weekly maximum temperature is not to exceed a 1.0° Celsius (1.8° Fahrenheit) increase for more than 25% of the monitoring period (20 days); no more than 9 days may be consecutive.	Intra-day temperatures are not to exceed 6 consecutive 30-minute interval measurements above 16.5° Celsius (61.7° Fahrenheit).
Greater than 15.5° Celsius (59.9° Fahrenheit) but less than or equal to 18.0° Celsius (64.4° Fahrenheit)	Mean weekly maximum temperature is not to exceed a 0.6° Celsius (1.0° Fahrenheit) increase for more than 10% of the monitoring period (8 days).	Intra-day temperatures are not to exceed 6 consecutive 30-minute interval measurements above 18.6° Celsius (65.5° Fahrenheit).
Greater than 18.0° Celsius (64.4° Fahrenheit)	Mean weekly maximum temperature is not to exceed a 0.3° Celsius (0.5° Fahrenheit) increase for more than 10% of the monitoring period (8 days).	Intra-day temperatures are not to exceed 6 consecutive 30-minute interval measurements above pre-harvest peak mean weekly maximum temperature by more than 0.3° Celsius (0.5° Fahrenheit).

[1] Low intensity, long duration measure determining when a physical standard has been surpassed.
[2] High intensity, short duration measure determining when a physical standard has been surpassed.

Rationale: In most cases, a change in stream temperature of less than 1° Celsius (1.8° Fahrenheit) will not adversely affect HCP fish species, particularly where upstream maximum temperatures are within the acceptable temperature range for bull trout (less than 15° Celsius [59° Fahrenheit]) (see bull trout species account available at: http://www.dnrc.mt.gov/HCP/default.asp). In addition, the ~~1° Celsius (1.8° Fahrenheit) temperature change threshold is generally~~tiered exceedance criteria approach is appropriate given increasing native fish species sensitivity to stream temperature as stream temperatures rise, the accuracy of stream temperature monitoring equipment, the natural variability inherent within any given stream reach, and the ability to statistically differentiate significant differences in stream temperatures with a limited sample size.

2. To ensure protection of native fish species from increased stream temperatures, DNRC will classify specific areas as temperature-sensitive reaches and provide additional protections during riparian harvest. This will be achieved by committing to no statistically significant (p ~~≥~~> 0.05) increase in stream temperature attributable to DNRC timber harvest activities in temperature-sensitive reaches.

   Rationale: DNRC also recognizes that there are conditions where ~~a harvest-induced~~ a measureable in-stream temperature increase ~~of less than 1° Celsius (1.8° Fahrenheit)~~ may not be acceptable. In reaches where in-stream temperatures are already elevated due to human-caused disturbance or activities, even a small increase in stream temperature may have an adverse effect on fish. For example, bull trout may not tolerate a change from 19° to 20° Celsius (66° to 68° Fahrenheit) because these temperatures are at or near their temperature tolerance range. At these high baseline temperatures, even a small increase may cause physiological and behavioral effects, disrupt rearing activities, and/or cause a barrier to migration. Therefore, DNRC has committed to identifying reaches affected by elevated stream temperatures. DNRC believes that ~~TMDLs for temperature approved by the EPA are the best available source of sufficient, credible data on in-stream impairments, and will therefore use this~~the most current EPA-approved 303(d) list is the most appropriate source of information to define temperature-sensitive reaches.

3. For all temperature monitoring activities, DNRC commits to collect pre- and post-harvest temperature monitoring for at least one full summer monitoring period (June ~~15~~19 through September ~~15~~5) (DNRC 2010). Data will be collected at sites upstream of the harvest site (control), within the harvest site if possible (to provide additional longitudinal data on stream temperature), and immediately downstream of the harvest site (treatment). Stream temperatures will be recorded at 30-minute intervals.

4. DNRC will collect pre-harvest temperature data to calculate mean weekly maximum temperature estimates for each day of the monitoring period (June ~~15~~19 through September ~~15~~5). These calculations will use a rolling 7-day average for each day of the monitoring period (with each daily data point including that day, ~~and~~ the preceding ~~6~~3 days, and the following 3 days). Calculations will occur for both the upstream (control) and downstream (treatment) temperature monitoring sites.

5. The pre-harvest data will be used to identify site-specific natural warming or cooling trends (due to reach length, tributary inflow, or groundwater discharge) that affect baseline water temperatures. The effects will be quantified by calculating the change in mean weekly maximum temperature estimates between the two monitoring sites for each day of the pre-harvest summer monitoring period. An average change in mean weekly maximum temperature for each day can be derived for reaches with two or more pre-harvest summer monitoring periods. Polynomial regression of the daily values will be used for the site-specific analysis of seasonal trends in changes in mean weekly maximum temperature in monitoring reaches. Equations defining the polynomial regression will be used to derive a single adjustment factor (change in mean weekly maximum temperature due to site-specific, non-harvest factors) for each day in the monitoring period that will be applied to the post-harvest downstream temperature data (DNRC 2010).~~The post-harvest downstream (treatment) temperature data will then be adjusted based on the baseline (pre-harvest) temperature data (DNRC 2006c).~~

6. Collection of post-harvest temperature monitoring for at least one full summer monitoring period (June ~~15~~19 through September ~~15~~5) will occur following timber harvest. Data will be collected at the same pre-harvest sites, upstream of the harvest site (control) and immediately downstream of the harvest site (treatment).

Non-temperature-sensitive Sites

The following approach will be used for temperature monitoring at all non-temperature-sensitive sites (DNRC ~~2006c~~2010):

1. DNRC will calculate the post-harvest mean weekly maximum temperature for each individual day of the monitoring period (June ~~15~~19 through September ~~15~~5) immediately following timber harvest. These calculations are based on a rolling 7-day average for each day (with each data point including that day, ~~and~~ the preceding ~~6~~3 days, and the following 3 days). Calculations will occur for both the upstream (control) and downstream (treatment) temperature monitoring sites.

2. The change in mean weekly maximum temperature between the treatment and control sites (adjusted by pre-harvest baseline temperature differences) and its plot against time will be reported. If the increase in mean weekly maximum temperature is less than ~~1° Celsius (1.8° Fahrenheit) over the entire 3-month monitoring period~~the chronic or acute criteria described in the stream temperature exceedance matrix (Table 4-8), then the temperature goal is considered to be attained for the site, and no further analysis will occur. If the increase in mean weekly maximum temperature due to timber harvest ~~exceeds 1° Celsius (1.8° Fahrenheit) within the 3-month monitoring period~~is greater than the chronic or acute criteria described in the stream temperature exceedance matrix (Table 4-8), then the temperature goal is considered to not be attained for the site, and post-harvest monitoring will continue through a minimum of one more summer monitoring period (June ~~15~~19 through September ~~15~~5).

Temperature-sensitive Sites

If the site is designated as a temperature-sensitive reach, a modified monitoring approach will be used, as summarized below (DNRC ~~2006c~~2010):

1. Prior to harvest activities, in a designated temperature-sensitive reach, a DNRC fisheries program specialist or watershed resources specialist will analyze the site-specific physical parameters of the harvest unit (topography, stream width, existing shade, etc.). The specialist will suggest appropriate modifications to the standard Class 1 harvest prescription to ensure that the goal of no statistically significant ($p > 0.05$) change in post-harvest stream temperatures is achieved. Potential additional protections that DNRC may apply include an increase in the no-cut buffer width~~,~~ or an increase in the overall RMZ width~~, or the provision of additional leave trees within the inner (streamside) edge of the partial harvest portion of the SMZ~~.

2. Using the mean weekly maximum temperature data from the post-harvest monitoring ~~(hourly or half-hourly observations adjusted for natural warming/cooling trends as discussed above)~~, DNRC will perform statistical analysis of variance to check for significant

temperature differences between the control and treatment sites. This analysis will compare the variance within days with the variance between sites. Only data points where the adjusted temperature increased from upstream to downstream will be used for the analysis. If the analysis of variance indicates no significant ($p > 0.05$) post-harvest differences between the control and treatment sites, it is assumed that the monitoring goal of no statistically significant change in post-harvest stream temperature has been achieved. If the analysis of variance indicates that there are significant post-harvest differences between the control and treatment sites ($p \leq 0.5$), the monitoring goal has not been achieved, and post-harvest monitoring will continue through a minimum of one more summer monitoring period (June ~~15~~19 through September ~~15~~5).

If monitoring results from at least five riparian harvest temperature monitoring sites (5 sites would be monitored during the 10-year period) are not available, then DNRC will continue this monitoring effort for an additional 5-year period.

4.6.1.3 Adaptive Management

The adaptive management process for LWD recruitment and in-stream shade and temperature commitments are summarized below.

Provide for LWD Recruitment

If the monitoring results from 10 or more monitored sites that are representative of DNRC operations and riparian stand types (estimated monitoring duration of 10 years) indicate that the conservation strategy is meeting the LWD recruitment objective on 80 percent of the RMZ acres harvested, DNRC will reduce the monitoring efforts to include a minimum of one ongoing LWD monitoring project through year 25 of HCP implementation, while continuing to implement the riparian conservation strategy. However, if the continued monitoring results indicate the strategy is not meeting the objective, the adaptive management process, which includes enhanced monitoring, will be implemented.

If the RMZ harvest prescriptions implemented under the conservation strategy do not meet the 80 percent target, DNRC will develop and implement a modified approach to the design of Class 1 RMZ timber harvests. Under this modified approach, stand conditions will be evaluated prior to RMZ harvests to ensure that the proposed prescriptions will retain an adequate number and size of trees to meet LWD targets. If, however, monitoring results are close to the target and/or the acres included in the analysis represented a small sample size, DNRC will continue to monitor implementation of this objective with the addition of another five monitoring sites.

The modified approach incorporates a pre-harvest LWD recruitment assessment procedure into the proposed conservation strategy. This modified approach will include the following steps:

1. Establish site-specific LWD targets using on-site stream reach baseline LWD data or local reference reach LWD data. When on-site or local reference reach data are not available, DNRC will use regional LWD targets established from reference reach data compiled for different physiographic regions across the state. Regional targets will be stratified by stream channel morphological classification.

2. Assess pre-harvest stand conditions within the project RMZ. Stand conditions will be characterized by tree diameters (at breast height) and tree density (trees per acre).

3. Use model projections of forest stand growth, mortality, and LWD recruitment to evaluate whether both pre-harvest forest stand conditions and implemented harvest prescriptions meet LWD targets established for that specific stream reach.

4. Ensure that harvest meets LWD targets on 80 percent of the RMZ acres harvested affecting Class 1 streams.

Maintaining In-stream Shade and Suitable In-stream Temperature Regimes

If monitoring results from the first 10-year monitoring period indicate that riparian timber harvest implemented under this conservation strategy is maintaining suitable in-stream temperature regimes, DNRC will reduce the monitoring efforts to include a minimum of one ongoing in-stream cover and stream temperature monitoring project at any one time through year 25 of HCP implementation. However, if the continued monitoring results indicate the strategy is not meeting the in-stream cover and stream temperature objectives, adaptive management procedures, including enhanced monitoring, will be implemented. Should adaptive management be needed, the data collected from effectiveness monitoring activities will be reviewed to develop an alternate approach to addressing shade and stream temperature. If the quantity and quality of available data are adequate, potential alternative approaches include (1) developing a predictive relationship between in-stream temperatures and shade levels and then using this relationship as a screening-level tool on riparian timber harvest (which will allow comparison of pre-harvest and predicted post-harvest stream temperatures), and/or (2) establishing a minimum post-harvest shade level based on the monitoring data, and/or (3) establishing and implementing alternative RMZ harvest prescriptions that will meet minimum post-harvest shade levels needed to meet stream temperature requirements (e.g., larger no-cut buffer or RMZ tree retention requirements).

4.6.2 Sediment Delivery Reduction Monitoring and Adaptive Management

The following subsections describe DNRC's monitoring and adaptive management commitments for the sediment delivery reduction conservation strategy.

The sediment delivery reduction conservation strategy includes both implementation monitoring and effectiveness monitoring (Table 4-6 and 4-7, respectively). Under the HCP, the HCP implementation checklist will be used to track and report implementation of the sediment delivery reduction commitments.

4.6.2.1 Implementation Monitoring

The implementation monitoring component for this strategy addresses the resource objectives of minimizing roads and reducing sediment delivery from roads and timber harvest, and includes the following components:

1. DNRC will track and report on the amount of road that is newly constructed, reconstructed, relocated, abandoned, and reclaimed within the HCP project area. This will also include providing the amount of reduction in road mileage for high-risk sites, if any. DNRC will provide the USFWS with updates for these activities in the 5-year monitoring reports.

2 Qualitative assessments, including internal BMP audits and contract administration inspections, will be conducted on all forest management projects that involve levels of road construction and reconstruction greater than 0.5 mile in length, are located within the RMZ of a stream supporting an HCP fish species, include the installation of ~~perennial~~Class 1 stream crossings, or are located on sites with high erosion risk as defined by the ARMs. BMP audits and timber sale inspections will also be completed on all timber sales and timber permits greater than 100 mbf. Up to 12 BMP audits, at least one on each DNRC administrative unit with an active timber sale program in the HCP project area, will be conducted annually. These assessments will be used to evaluate the implementation and effectiveness of all applicable BMPs. BMP audits include observations of the adequacy of drainage and buffers, the risk of sediment delivery to streams, and any occurrence of erosion.

3. Documentation of contract inspections will be completed by management foresters during routine contract administration. These will be compiled and evaluated every 5 years to determine the levels of compliance with contract specifications and requirements.

4. At the annual HCP review meeting, DNRC will update the USFWS on the status of projects related to the design and implementation of mitigation measures to reduce the risk of mass wasting in areas where new road construction or reconstruction cannot be avoided on potentially unstable slopes. DNRC will provide the USFWS with documentation of adequate road and harvest design and mitigation measures in these areas.

5. DNRC will provide the USFWS with updates on all road inventory and sediment monitoring and implementation activities and issues at the annual update and 5-year monitoring meetings. Annual updates will consist of a written summary of the status of all inventory and monitoring projects and activities and will include information such as where road inventorying and sediment monitoring was completed and the type of data collected. Each 5-year monitoring report will include the number of road miles inventoried; the number of road miles that are classified as low, moderate, and high risk; corrective actions taken for roads with a high risk of sediment delivery; and sediment monitoring analysis and results. Each 5-year monitoring report will also include an update on the status of implementation of TMDLs where applicable to the HCP project area.

4.6.2.2 Effectiveness Monitoring

Similar to DNRC's ongoing monitoring program, effectiveness monitoring for the sediment delivery reduction conservation strategy addresses whether BMPs and other mitigation measures are adequately reducing sediment delivery from new road construction, reconstruction, maintenance, use, and correctives action implemented on problem segments of existing roads, and from timber harvest, site preparation, and slash treatments. Specific effectiveness monitoring components for reducing sediment delivery from new road construction, reconstruction, maintenance, and use include the following measures:

1. Qualitative assessments, including DNRC internal BMP audits and contract administration inspections, will be conducted on all forest management activities that involve the levels of road construction and reconstruction and timber harvest defined in Section 4.6.2.1 (Implementation Monitoring). These assessments will be used to evaluate the effectiveness of all applicable BMPs.

2. DNRC will have a minimum of two ongoing quantitative sediment monitoring projects at any one time (for example, during a field season) to determine the effectiveness of BMPs and other mitigation measures. DNRC will prioritize higher-risk sites, including stream crossings, roads and timber harvest on unstable slopes, and roads adjacent to streams. Individual monitoring projects will be designed to investigate the effects of a DNRC forest management project on specific water and soil parameters and evaluate the effectiveness of BMPs and other commonly used site-specific mitigation measures. Monitoring design, methods, and protocols will be selected from established procedures that have been demonstrated to be practicable, cost-effective, and suited for addressing the project-specific monitoring objectives (MacDonald et al. 1991; Rashin et al. 1993; Dissmeyer 1994; Rashin et al. 1994; McCullough and Espinoza 1996; EPA 1997; Reeves et al. 2004; USFS 2004). Examples of quantitative monitoring types and methods that may be implemented include in-channel sediment sampling (e.g., grab samples, substrate scoring, core samples, suspended solids); sediment traps; soil condition surveys; and streambank erosion rate sampling. Higher-risk sites will be given priority for this type of monitoring.

3. DNRC will use case studies to evaluate the effectiveness of corrective actions implemented on problem segments of existing roads in reducing sediment production. In these studies DNRC will model sediment production for problems road segments both prior to and following implementation of corrective actions. Model outputs will be used to quantify sediment and determine whether percent sediment reduction targets are being met. DNRC will use results from the quantitative sediment monitoring (described above) as well as results of other applicable studies to validate model assumptions and adjust model coefficients used. These studies will be completed in discrete watershed study areas (fifth- or sixth-order HUC). Case studies would likely be completed in areas of concentrated ownership where DNRC is most active and where there is greater potential for sediment production to be reduced due to corrective actions.

4. The information collected in the case studies and site-specific quantitative monitoring projects will be extrapolated and used initially across the entire aquatic analysis unit. Following the completion of numerous case studies and after having completed a majority of the road inventories across the project area, DNRC would extrapolate across the broader project area to estimate progress and ensure the achievement in meeting the sediment reduction targets across the entire HCP project area.

5. DNRC will provide the USFWS with updates on all sediment and BMP effectiveness monitoring at the annual update and 5-year monitoring meetings. Annual updates will consist of a written summary of the status of all monitoring projects and activities and will

include information such as where monitoring was completed and the type of data collected. Each 5-year monitoring report will include detailed monitoring analysis and results.

4.6.2.3 Adaptive Management

If through the BMP audits or other qualitative assessments, DNRC determines that BMP effectiveness falls below 90 percent, the adaptive management process would be initiated. If through the quantitative assessments, the project-specific thresholds are exceeded for one project in two subsequent years, the adaptive management process would be initiated. If the results of case studies show that corrective actions are not effective in reducing sediment production from existing problem road sources by at least 50 percent, the adaptive management process would be initiated.

Through adaptive management, DNRC would revise or create new BMPs and report the changes to the USFWS.

4.6.3 Fish Connectivity Monitoring and Adaptive Management

4.6.3.1 Implementation and Effectiveness Monitoring

The fish connectivity strategy takes the DNRC Fish Passage Assessment Project described in Section 2.2.3.3 (Fish Connectivity Conservation Strategy) a step further and includes post-installation effectiveness monitoring at all new road-stream crossings where bull trout, westslope cutthroat trout, or Columbia redband trout connectivity has been facilitated (Tables 4-6 and 4-7). This monitoring will include qualitative assessments of the structure's capabilities to accommodate background ranges of different stream forms and functions. Monitoring design, methods, and protocols will be selected from established procedures that have been demonstrated to be practicable, cost-effective, and suited for addressing the project-specific monitoring objectives (USFS 2005a, 2008). Variables to be assessed at and within the road-stream crossing include substrate distribution and composition, step/pool frequency, natural distribution of habitat features, presence of channel head cutting, bank erosion, and uncontrolled scour. The qualitative assessments will be documented in site project files. The road-stream crossing structure is presumed to provide naturally occurring levels of connectivity if background ranges of stream form and functions are determined to be emulated within and immediately adjacent to the structure.

The monitoring schedule will include the following:

1. First post-construction assessment within 2 years by a DNRC water resource specialist.

   Rationale: The failure of a stream crossing structure to facilitate bull trout, westslope cutthroat trout, or Columbia redband trout connectivity will generally occur within 2 years if improperly installed. By conducting the first post-construction assessment within 2 years of installation, the flows that would generally cause a site to fail should have occurred.

2. A subsequent post-construction assessment of CMP installations will occur within 5 years following the first post-construction assessment.

Rationale: Because a stream crossing structure designed to allow connectivity will generally fail within 2 years if improperly installed, the subsequent post-construction assessment will re-check the observations found during the first post-construction assessment. This assessment will also be used as an opportunity to further evaluate the performance of road-stream crossing structures other than CMPs at fish passage sites.

3. Subsequent post-construction assessments of all other installations will occur within 10 years following the first post-construction assessment.

   Rationale: Because a stream crossing structure designed to allow connectivity will generally fail within 2 years if improperly installed, the subsequent post-construction assessment will re-check the observations found during the first post-construction assessment. This assessment will also be used as an opportunity to further evaluate the performance of road-stream crossing structures other than CMPs at fish passage sites.

4. Stream crossing structures facilitating bull trout, westslope cutthroat trout, or Columbia redband trout connectivity will be evaluated for damage after experiencing a known 25-year or greater flood event.

   Rationale: Major flood events at stream crossing structures designed to provide fisheries connectivity can severely compromise those structures' abilities to emulate streambed forms and function. Major flood events include incidents such as debris torrents and debris jams. The purpose of these evaluations are to determine if affected structures continue to (1) emulate streambed forms and function, and (2) retain the structural and design integrity to perform as expected under the conservation strategy.

DNRC will provide the USFWS with updates on all connectivity monitoring and implementation activities and issues at the annual update and 5-year monitoring meetings. Annual updates will include a summary of accomplishments, the status of ongoing projects, and schedules for planned activities. The 5-year monitoring reports will include a detailed analysis of the monitoring results.

4.6.3.2 Adaptive Management

Adaptive management for the fish connectivity strategy includes the following:

1. The best available technology and research will be used for (a) identifying new criteria or models to assess connectivity at existing road-stream crossings; (b) re-evaluating site prioritization due to updates or changes in species' status, population trends, or other information; and (c) identifying newer and more cost-effective installation methods or techniques for providing connectivity.

2. If a new installation fails to emulate streambed form and function as determined by post-installation effectiveness monitoring, the following remediation process will be implemented: (a) a new technical survey of the affected stream reach will be conducted, (b) the cause of the problem(s) will be determined within 1 year of the discovery of the failure, and (c) the site re-installation will be scheduled according to the current planning schedule.

4.6.4 Grazing Monitoring and Adaptive Management

The grazing conservation strategy represents an enhancement of the existing monitoring DNRC conducts through its licensing program on classified forest trust land. Currently, the SFLMP (DNRC 1996) and ARM 36.11.444 require DNRC to inspect all grazing licenses issued on classified forest trust lands at midterm (usually 4 to 6 years prior to expiration or renewal) and prior to their renewal date (a typical license term is approximately 10 years). DNRC typically monitors range, riparian, and streambank conditions using the methods described in the SFLMP.

4.6.4.1 Implementation and Effectiveness Monitoring

As described in Section 2.2.3.4 (Grazing Conservation Strategy), the grazing conservation strategy requires DNRC to implement new monitoring methods and procedures. Implementation monitoring for the grazing strategy requires DNRC to report on the status of implementation of the conservation commitments (Table 4-6).

Recently, redds trampling by cattle has been identified as a potential issue of concern in the HCP project area. The prevalence and severity of redds trampling by cattle on HCP project area lands is unknown. Therefore, DNRC will initiate a pilot study to determine if this impact on HCP fish species is occurring in the HCP project area. DNRC will complete a plan for the pilot study within 2 years of Permit issuance and initiate plan implementation by year 3. If redds trampling by cattle is identified as an issue for HCP fish species in the HCP project area, DNRC and the USFWS would collaborate on the development of appropriate conservation commitments to address any concerns raised by the study.

For grazing sites where corrective actions have been implemented, the strategy requires DNRC to verify that the changes have been implemented appropriately and to conduct effectiveness monitoring to confirm that the corrective actions are having the desired effect (Table 4-7). Monitoring design, methods, and protocols will be selected from established procedures that have been demonstrated to be practicable, cost-effective, and suited for addressing the site-specific conditions and monitoring objectives (BLM 1999, 2008; EPA 1993; USFS 2000, 2005b). These evaluations will occur within 1 year of implementation of corrective actions, and the following parameters will be evaluated.

1. Verify implementation of corrective actions, changes in grazing license, other changes in grazing management, or compliance with existing terms of the license.

2. Determine the effectiveness of corrective actions, newly implemented practices, and/or a new grazing strategy based on thresholds established for the corrective action, practices or strategy at the time of prescription.

At the annual HCP review meetings, DNRC will update the USFWS on the status of grazing coarse-filter grazing evaluations, the number of problem sites field verified, and the number of corrective actions implemented. DNRC will provide the USFWS with more detailed information on the results of grazing coarse-filter evaluations, the methods implemented to correct problem sites, and the effectiveness of those corrective actions in the 5-year review and monitoring report.

4.6.4.2 Adaptive Management

If improvements or changes to grazing management are determined to be ineffective in correcting problems, DNRC will (1) adjust the permittee license to facilitate progress toward meeting the corrective action objectives, and (2) continue annual effectiveness monitoring until improvements are verified to be effective.

4.6.5 Cumulative Watershed Effects Monitoring and Adaptive Management

4.6.5.1 Implementation and Effectiveness Monitoring

As summarized in Table 4-6, DNRC will conduct the following implementation monitoring as part of the CWE conservation strategy.

1. Based on the scale and scope of the proposed activity, DNRC will review and use appropriate levels of information and technology as described in the CWE conservation strategy for conducting Level 1, Level 2, and Level 3 analyses.

   Rationale: This commitment will ensure that risk assessments, project mitigation development, and action decisions are founded and consistent with the appropriate levels of information and technology.

2. Level 1, Level 2, and Level 3 analyses will be reviewed and compiled by the FMB for completeness and consistency.

   Rationale: This commitment will ensure a high level of analysis oversight and internal conservative strategy implementation monitoring.

3. DNRC will provide the USFWS with copies of Level 1, Level 2, or Level 3 analyses upon request. DNRC will also allow the USFWS to observe the CWE analysis process when logistically feasible.

   Rationale: This commitment will ensure that the USFWS retains confidence in the implementation of this conservation strategy.

CWE are the result of the collective effects of two or more independent management variables within a watershed. As such, specific CWE are extremely difficult, if not impossible, to differentiate and measure. DNRC does not have the logistical, research, or financial resources to measure potential CWE. However, DNRC is committed to monitoring the effectiveness of all other aquatic conservation strategies in the HCP, which will closely monitor independent variables such as LWD, sediment, fisheries connectivity, and stream temperature. DNRC will set water quality thresholds at levels that ensure compliance with water quality standards and protection of beneficial water uses, including HCP fish species habitat, with a low to moderate degree of risk. The USFWS will review the adequacy of threshold levels in protecting HCP fish species habitat.

For projects with high or moderate risk of CWE, DNRC will provide documentation stating which mitigation measures or alternatives were considered and/or selected for implementation. The

USFWS will review this information at the annual update and 5-year monitoring meetings and address any issues through a CMR or adaptive management process.

Additionally, DNRC will review emerging science for its applicability to effectiveness monitoring for the CWE strategy. If relevant new information becomes available, the adaptive management process described below will be used to consider modifications to the negotiated strategy.

DNRC will provide the USFWS with updates on all CWE conservation strategy implementation activities and issues at the annual update and 5-year monitoring meetings. Annual updates will consist of a list of CWE implementation activities that includes the number, type, and location of CWE analyses completed. Every 5 years, the USFWS and DNRC will meet to evaluate the effectiveness of the CWE process. The 5-year monitoring meeting will serve as a coordination effort to ensure that DNRC is providing adequate levels of mitigation for CWE.

4.6.5.2 Adaptive Management

Adaptive management for CWE will include evaluating the cumulative effects process during the 5-year monitoring meetings.

4.7 TRANSITION LANDS MONITORING

To track, monitor, and report the commitments of the transition lands strategy, DNRC will provide the USFWS with the following information:

- As soon as DNRC is aware of a proposed real estate transaction involving any HCP project area lands or planning area lands outside the HCP project area where HCP species occur (that may be added to the HCP project area), notice will be provided to the USFWS, including the proposal notice and additional relevant information including location, project details, project leader contact information, and project timeline.
- Each proposal will be discussed at annual updates and reported in applicable 5-year monitoring reports. Reports will include disclosure of the number and location of acres added to and/or removed from the HCP project area, including a statement indicating compliance with applicable HCP commitments.
- Upon request, closing documents will be made available to the USFWS.
- The status of the ~~net loss commitment~~removal of lands from the HCP project area (~~percent~~number of ~~original~~ acres removed from the HCP project area) will be included in the annual update and 5-year monitoring reports. For lands not in the NCDE or CYE grizzly bear recovery zones, CYE grizzly bear NROH, LMAs, or bull trout critical habitat areas, i~~I~~f the ~~net-loss commitment threshold is exceeded~~land removal cap is increased to 15 percent, DNRC will ~~document the amount and date when the exceedance occurred, as well as a plan to reduce the exceedance within 5 years~~notify the USFWS and provide a description of the 15,000 acres added to the HCP project area.~~ The plan to reduce the exceedance would require approval by the USFWS.~~

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Chapter

Alternatives

5 ALTERNATIVES

Under Section 10 of the federal ESA, a Permit applicant is required to describe “alternative actions to such taking.” NEPA and MEPA also require analysis of a reasonable range of alternatives. This chapter summarizes the alternatives the DNRC considered during the HCP planning process. Detailed discussions of the alternatives and how they were developed are provided in Chapter 3 (Alternatives) of the EIS for this HCP, and a detailed comparison of the alternatives is presented in Chapter 4 (Affected Environment and Environmental Consequences) of the EIS for this HCP. Other alternatives considered but eliminated from detailed study in the EIS are also discussed in Chapter 3 (Alternatives) of the EIS for this HCP.

5.1 DEVELOPMENT OF ALTERNATIVES

DNRC’s reasons for developing the HCP and applying for a Permit are described in Chapter 1 (Purpose and Need for Action) of the EIS for this HCP. In brief, DNRC is seeking incidental take authorization for HCP species in order to increase regulatory certainty and flexibility in forest management and related activities on forested trust lands, which results in greater economic viability, while also contributing to the conservation of the five HCP species and their habitats. The USFWS is required to evaluate the HCP and Permit application to ensure that (1) impacts resulting from take will be minimized and mitigated to the maximum extent practicable, and (2) HCP species habitat will be sufficiently conserved to be consistent with long-term survival needs. The process used to develop the HCP commitments is described in Section 1.3 (Development of the DNRC HCP).

DNRC, with assistance from the USFWS, used the public scoping process and the interdisciplinary planning process to identify two basic types of issues for alternatives development: ecological issues and feasibility issues. Ecological issues address management factors that can affect HCP species, such as road management and stream buffer zones. Feasibility issues include management flexibility and economic viability, such as the ability to produce a sustainable yield of timber. Some issues, such as species for inclusion in the HCP, Permit term, and HCP project area boundaries, are both ecological issues and feasibility issues.

Based on the ecological and feasibility issues identified, three alternatives representing a reasonable range of strategies were selected for detailed analysis in addition to the proposed action:

- Alternative 1 – Existing Rules and Regulations (No Action)
- Alternative 2 – Proposed HCP
- Alternative 3 – Increased Conservation HCP
- Alternative 4 – Increased Management Flexibility HCP.

Alternative 1, the no-action alternative, differs from the other three alternatives in that the USFWS would not issue a Permit. The proposed HCP (Alternative 2) represents what is intended to be the optimum balance between providing species conservation and providing flexibility and viability of

DNRC's forest management under a Permit issued by the USFWS. The other two action alternatives generally represent variations in the type and degree of species protection and in the degree of flexibility for DNRC's forest management under a Permit.

While continued technological advances in harvesting and yarding equipment will likely decrease the amount of roads needed for forest management over time, roads remain a necessary part of the managed forest landscape for the foreseeable future. Therefore, the transportation plans and anticipated amount of road building are relatively similar under each alternative.

Each of the four alternatives is described below.

5.2 ALTERNATIVE 1 – EXISTING RULES AND REGULATIONS (NO ACTION)

Alternative 1, the no-action alternative, reflects continued implementation of existing rules and regulations (Forest Management ARMs, Montana Forestry BMPs, and other conservation measures) pertaining to the five HCP species and avoidance of take. Under this alternative, the USFWS would not issue a Permit covering DNRC's forest management and related activities. Although it is recognized that the ARMs and other conservation measures may be modified over the next 50 years, it is unknown what changes would occur to existing policies and regulations. Thus, given that future changes in the ARMs, BMPs, and other conservation measures are unknown, the description of Alternative 1 consists of the existing rules and regulations, including all conservation measures, monitoring, and adaptive management programs captured in the existing rules and regulations pertinent to the five HCP species.

DNRC has not selected this alternative as the proposed action, because it does not meet the purpose or need of obtaining a Permit from the USFWS. Analysis of a no-action alternative (or no-take alternative) is recommended in the HCP Handbook (USFWS and NFMS 1996), and analysis of a no-action alternative is required under NEPA. Under NEPA, this alternative is intended to provide a baseline from which to compare the action alternatives.

5.3 ALTERNATIVE 2 – PROPOSED HCP

Alternative 2 is described in detail in Chapter 3 (Alternatives) of the EIS for this HCP and consists of implementation of all commitments contained in Chapters 2 (Conservation Strategies) and 3 (Transition Lands Strategy) of this HCP as well as the monitoring requirements outlined in Chapter 4 (Monitoring and Adaptive Management) of this HCP and the procedures outlined in Chapter 6 (Changed Circumstances). DNRC has selected this alternative as the proposed action. DNRC has determined that, of all alternatives analyzed, Alternative 2 provides the best balance between providing HCP species conservation and allowing DNRC management flexibility to fulfill its trust mandate. DNRC is confident that it can secure the funding to implement the commitments and meet the timelines proposed in Alternative 2. DNRC believes that Alternative 2 ~~best represents the methods and processes~~meets the intent of the ESA Section 10 process for avoiding, minimizing, and mitigating the impacts of take resulting from its forest management activities ~~on HCP species~~ to the maximum extent practicable.

DNRC and the Land Board are required by state law to secure the largest measure of legitimate and reasonable advantage and to provide for the long-term financial support of education when managing trust lands (MCA 77-1-202(1)(a) and (b)). DNRC is bound by this mandate in determining what is practicable when implementing conservation and forest management actions. Those actions that allow DNRC the management flexibility to best sustain its entrusted mandate at reasonable costs while meeting the needs and requirements of its conservation efforts are typically seen as the most practicable. One way for DNRC to attempt to maximize return to the trust beneficiaries within the HCP alternatives was to develop conservation strategies that would have minimal effects on bids offered for timber sales. For example, implementing a management/rest approach to provide quiet areas for grizzly bears requires additional planning on DNRC's part, but is not expected to affect bids on timber sales. To that end, under Alternative 2, costs associated with HCP implementation are primarily in the form of increased project-level planning costs that would be absorbed by existing DNRC forest management staff. Similarly, DNRC would absorb costs for training, tracking, monitoring, and reporting associated with implementation of the HCP.

Although all alternatives were designed as viable alternatives for selection, Alternative 2 surpasses all alternatives in seeking a balance between conservation and management flexibility – a balance that complies with requirements under the ESA and the DNRC trust mandate. Alternative 2 represents a series of conservation strategies that provide the USFWS conservation assurances and provide DNRC management assurances.

Under Alternative 2, the USFWS is provided assurances that DNRC will implement appropriate minimization and mitigation measures that conserve and support the recovery of HCP species. DNRC has determined that it can implement Alternative 2 and meet its trust mandate, as well as secure the funding necessary to implement the commitments and achieve the timelines identified in this HCP. This level of commitment further provides the USFWS assurances that the conservation strategies can be successfully implemented and monitored and thus conserve and support the recovery of HCP species. DNRC is provided assurances that future management activities can be sustained over time on lands where management activities might affect HCP species. DNRC is also provided assurances that it can maximize the legitimate return to the trust beneficiaries while still responsibly managing the habitats of HCP species.

5.4 ALTERNATIVE 3 – INCREASED CONSERVATION HCP

Alternative 3 includes additional mitigation measures beyond those proposed under Alternative 2. The remainder of this section describes the Alternative 3 conservation commitments that are different than Alternative 2. The commitment identification is provided for the equivalent commitment under Alternative 2. For those conservation commitments not listed below, the commitment under Alternative 3 is identical to that described under Alternative 2.

Under Alternative 3, increased conservation commitments for grizzly bear include the following:

1. GB-PR3 – DNRC-wide food storage and sanitation rules for all departmental activities (not just forest management)
2. GB-NR3 – more restrictions on motorized activities during the spring period in spring habitat within NROH
3. GB-RZ5 – more restrictions on motorized activities in or near denning habitat during the spring period within NROH and recovery zone
4. GB-RZ3 – shorter timeframe for repairing ineffective road closures within recovery zones

5. GB-ST1 – similar management as Alternative 1 for designated security core areas within the Stillwater Block
6. GB-SW2 – participation in collaborative Section 7 planning for coordination of access management and activities in the Swan River State Forest
7. GB-SC1 – no net increase in baseline total road densities for forest management projects at the administrative unit level for scattered parcels in recovery zones
8. GB-CY1 and CY3 – restrictions on numbers of vehicle trips instead of management days, as well as more spring management restrictions, within the CYE.

For lynx, increased conservation commitments under Alternative 3 include the following:

1. ~~LY-HB2 – m~~More restrictions on retention of denning habitat and sites
2. LY-HB3 – more restrictions on use of motorized forest management activities and burning near denning habitat within LMAs containing less than 10 percent denning habitat
3. LY-HB5 – increased limitations on contiguous occurrences of temporary non-suitable habitat within scattered parcels outside LMAs
4. LY-HB5 – requirements for breaks between harvest units of 100 yards of suitable habitat were possible within scattered parcels outside LMAs
5. LY-HB6 and LM1 – increased levels of potential lynx habitat maintained within LMAs and scattered parcels outside LMAs.

Several increased conservation commitments are also included for aquatics species under Alternative 3, including the following:

1. AQ-RM1 – more restrictions on harvest within Tier 1 RMZs for Class 1 streams and lakes supporting HCP species
2. AQ-SD2 – shorter timeframes to complete road inventories on all HCP project area watersheds
3. AQ-SD2 – shorter timeframes to complete corrective actions for all high-risk segments in HCP project area watersheds containing HCP fish species
4. AQ-FC1 – shorter timeframes to complete connectivity improvements for streams supporting HCP fish species
5. AQ-GR1 – shorter review cycle for grazing licenses
6. AQ-GR1 – identification of measurable targets for desired future conditions as grazing license inspection criteria
7. AQ-CW1 – requirement of Level 3 watershed analysis whenever an estimated clearcut area on an HCP watershed exceeds 25 percent.

At this time, DNRC has not selected this alternative as the proposed action. While this alternative provides enhanced mitigation for HCP species, it fails to fully address DNRC's trust mission and management constraints. For example, this alternative would reduce the potential return to the trust beneficiaries and would require additional funding to implement that DNRC is unsure it could secure. The more restrictive commitments proposed under Alternative 3 would result primarily in costs associated with foregone timber harvest rather than additional costs that could be absorbed by existing DNRC forest management staff. Additionally, DNRC is concerned that it would not be able to secure the necessary funding or meet the timelines proposed under this alternative and would find itself in violation of the Permit.

5.5 ALTERNATIVE 4 – INCREASED MANAGEMENT FLEXIBILITY HCP

Alternative 4 increases DNRC's management flexibility to implement its program, as well as the conservation commitments when compared to Alternative 2. The rest of this section describes the Alternative 4 conservation commitments that are different than Alternative 2. For those conservation commitments not listed below, the commitment under Alternative 4 is identical to that described under Alternative 2.

Under Alternative 4, increased management flexibility for grizzly bear would include the following:

1. GB-NR3 – fewer restrictions on motorized activities in spring habitat during the spring period within NROH
2. GB-RZ2 – less restrictive visual screening requirements (same as Alternative 1) in recovery zones
3. GB-RZ3 – longer inspection cycle for road closures on scattered parcels (every 2 years) within recovery zones.

Lynx management would include the following:

1. LY-LM3 – less restrictive foraging habitat retention requirements in LMAs
2. LY-HB6 and LM1 – decreased levels of potential lynx habitat maintained within LMAs and scattered parcels outside LMAs
3. LY-LM2 – higher limits on conversion of lynx habitat to temporary non-suitable habitat within LMAs.

For aquatic species, increased management flexibility would include the following:

1. AQ-RM1 – fewer harvest restrictions within RMZs
2. AQ-GR1 – less frequent monitoring of grazing effects
3. AQ-FC1 – longer timeframe for correcting fish connectivity issues (same as Alternative 1)
4. AQ-SD2 – longer timeframe for correcting sediment erosion from existing roads.

At this time, DNRC has not selected this alternative as the proposed action. DNRC proposed this alternative because it provides additional management flexibility and because DNRC has greater confidence it could secure the required funding and implement this program within the proposed timeline, which are desirable features of this alternative. However, DNRC acknowledges that it can do more to meet the issuance criteria that require them to minimize and mitigate to the maximum extent practicable, which it feels is greater exemplified by Alternative 2.

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Chapter 6 Changed Circumstances

6 CHANGED CIRCUMSTANCES

Changed circumstances are changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the USFWS, and that can be planned for (e.g., the listing of new species or a fire or other natural catastrophic event in areas prone to such events) (50 CFR 17.3). The USFWS and DNRC are required to ensure changed circumstances are identified and planned for in the HCP. The HCP Handbook (USFWS and NFMS 1996) suggests that the HCP should identify the changed circumstances and outline a process for addressing them that, when warranted, adds conservation value by reducing potential risks associated with the circumstance. This provides the USFWS and DNRC with a level of conservation certainty for predictable but unplanned events. It also gives DNRC the assurance it will not be held responsible for the full or unreasonable compensation of impacts of natural events or events beyond its control. DNRC and the USFWS identified natural events and administrative changes as the changed circumstances most relevant to the HCP.

DNRC regularly responds to natural disturbance events on trust lands by scheduling timber harvests to capture the salvage value of affected trees. Salvage harvest is a covered activity, and this activity is specifically addressed through several of the HCP commitments. It is important to understand DNRC's mandate related to timber salvage harvest because it directly influences the timeline and range of actions DNRC can consider in the context of changed circumstances.

Timber salvage harvests are conducted in accordance with MCA Section 77-5-207 Salvage Timber Program, which provides for the timely salvage logging of dead and dying timber that is threatened by insects, disease, fire, or windthrow. Because the quality of wood in dead trees deteriorates quickly, this mandate requires DNRC to move forward in a timely manner after an event occurs; therefore, salvage projects are often processed as emergency situations and the associated environmental review processes are often conducted under compressed timelines. DNRC typically prepares a MEPA EA for all salvage projects removing greater than 500 mbf of timber, and includes the development of site-specific measures to reduce or mitigate project effects on wildlife and aquatic species.

For fiscal years 2001 to 2005, fire salvage comprised 26 percent of the total harvest acreage (DNRC 2005b). Of the total volume sold in fiscal years 2006, 2007, and 2008, fire salvage comprised 1.2, 6.5, and 20.1 million board feet, respectively (2.3, 12.3, and 35 percent of the total volume sold, respectively). Salvage is expected to continue to represent a substantial portion of DNRC annual harvest volume in response to mortality from wildfires and various other causes. Given recent climate trends in Montana, DNRC anticipates that disturbance events and the need for salvage harvests will continue to be frequent, resulting in changed circumstances as they are described in this chapter.

The following sections describe the process to be followed when a changed circumstance occurs, characterize the events considered as changed circumstances, and define the triggers and responses for a changed circumstance by HCP species.

6.1 CHANGED CIRCUMSTANCE PROCESS

6.1.1 Process for Natural Disturbance Changed Circumstances

When a natural disturbance changed circumstance is triggered (see Section 6.2, Changed Circumstances due to Natural Events), DNRC will incorporate input from the USFWS through early involvement during site visits and through internal review of MEPA documentation. The goal is to foster effective interactions between the USFWS and DNRC throughout the planning process, rather than solely providing a post-planning period for review and response by the USFWS. The process involves the following steps:

1. DNRC will notify the USFWS as soon as it has determined that a changed circumstance has likely occurred.
    a. With the notification, DNRC will convey to the USFWS preliminary plans to address the situation (i.e., description of the circumstance, preliminary plans to salvage timber, initial plans for how MEPA will be addressed, approximate timelines, etc.).
    b. DNRC will also provide the schedule for fieldwork and invite the USFWS to participate in site visits with DNRC staff to inspect the affected area.
    c. The USFWS will conduct an evaluation through the use of its changed circumstance checklist (Appendix B, Document B-13 – USFWS Checklist for Changed Circumstances).
2. DNRC will conduct site visits right away to assess site conditions.
    a. DNRC is required to treat fire salvage situations as emergencies and typically has compressed timelines to complete assessments and develop project plans.
    b. The ability of the USFWS to participate in site visits will be determined after notification.
    c. For less urgent responses to changed circumstances, the timeline will be developed with additional flexibility for the USFWS to participate and respond because there is less urgency than in a fire salvage situation.
    d. To the extent feasible during the site visit, the USFWS and DNRC will collaboratively identify the mitigation measures to be addressed in the contingency plan (mitigation plan).
3. DNRC will prepare a contingency plan to address the changed circumstance.
    a. All applicable HCP commitments will be incorporated into the contingency plan, unless otherwise negotiated between the two agencies and documented in the contingency plan.
    b. The contingency plan will be incorporated into MEPA planning documentation (environmental assessment checklists, EAs, and EISs).
    c. If the USFWS is unable to participate in the site visit, DNRC will report its findings to the USFWS and solicit input on mitigation measures to be included in the contingency plan to minimize or mitigate impacts to HCP species. This may be communicated through telephone, email, or otherwise. If during this process, the USFWS desires to

review documentation, it must adhere to the project timeline established by DNRC. If the USFWS is unable to effectively participate within the proposed timeline, DNRC will proceed with development of the contingency plan, incorporating any input received from the USFWS through either the site visit or subsequent phone, email, or other documented contact. The contingency plan must be completed and agreed upon by DNRC and the USFWS within the proposed DNRC project timeline.

   d. The USFWS will review the contingency plan during DNRC internal review period of the draft MEPA document.

4. Should disputes arise regarding the contingency plan, all efforts will be made to resolve matters within the project timeline. Under circumstances where disputes cannot be resolved within the project timeline, DNRC and the USFWS will resolve matters in accordance with the dispute resolution process outlined in the implementing agreement (Appendix F of the EIS for this HCP).

5. DNRC will report its progress on implementation of contingency plans in its annual updates to the USFWS. If DNRC implements any monitoring to track (1) implementation of a contingency plan, or (2) the effectiveness of a contingency plan at conserving HCP species, DNRC will share those results with the USFWS within 1 year after project completion or as soon as practicable.

6.1.2 Process for Administrative Changed Circumstances

When an administrative changed circumstance is triggered (see Section 6.3, Changed Circumstances due to Administrative Changes), the process involves the following steps:

1. The USFWS will notify DNRC as soon as it has determined that an administrative changed circumstance has occurred, or DNRC will notify the USFWS as soon as it has determined that an administrative changed circumstance has occurred.

2. The USFWS and DNRC will cooperatively develop a course of action to address the issues raised by the changed circumstance.

3. The USFWS will initiate an evaluation through the use of its changed circumstance checklist (see Appendix B, Document B-13).

6.2 CHANGED CIRCUMSTANCES DUE TO NATURAL EVENTS

DNRC and the USFWS have identified fires, insect and disease outbreaks, wind events, mass movements, and floods~~, and climate change~~ as the natural events relevant to be addressed as changed circumstances in the HCP, particularly in light of the likelihood that some of these events may increase in scale and frequency over the Permit term due to the anticipated effects of climate change. Climate change is also identified as a changed circumstance, and the process DNRC and the USFWS will use to address issues attributed to climate change is described in this section. This section identifies the biological concerns related to these natural events and the HCP species, and for each HCP species, defines the changed circumstance (trigger) and proposed DNRC response.

6.2.1 Fires, Insect or Disease Outbreaks, and Wind Events

This section describes the nature of fires, insect or disease outbreaks, and wind events in the HCP project area, identifies how DNRC responds to these events, discloses the biological concerns for HCP species resulting from these events, and finally defines the triggers and responses by species for these events.

6.2.1.1 Fires

Fire is a natural landscape process that can have substantial effects on wildlife and aquatic habitat depending on the location, intensity, and extent of the fire. For the HCP project area, natural fire regimes range from frequent and low-intensity fires at low elevations (frequency of 6 to 30 years) to rare, high-intensity, high tree mortality fires, typically in higher elevation areas (fire frequency from 100 to 350 years) (DNRC 1996). As shown in Figure 6-1, prior to 2000, the amount of acres burned in the HCP project and planning areas was relatively stable, with occasional years, such as 1988, showing increased activity. From 1988 through 1999, only 1 year (1988) exceeded 5,000 acres burned across all three landscape scales; however, from 2000 through 2007, 3 years (2000, 2001, and 2006) have seen in excess of 5,000 acres burned in the HCP project and planning areas, and 5 years have seen over 5,000 acres of trust lands burned statewide. Comparing the trend in annual acres burned across each landscape scale shows similarity for all years except 2006, when much of the fire activity occurred on the east side of the state, outside of the HCP project and planning areas. The anticipated effects of climate change are expected to contribute to increased numbers of fires, fire severity, and duration of the wildfire season in the northern Rocky Mountains (Spracklen et al. 2009; Logan and Powell 2001; Westerling et al. 2006).

A large fire and subsequent timber salvage activities could affect grizzly bears and/or lynx by reducing the amount of available suitable habitat, reducing habitat connectivity, and reducing cover for secure movement. The primary concern for aquatic species is the increased potential for soil erosion and sedimentation in streams, and reduction of shade over streams.

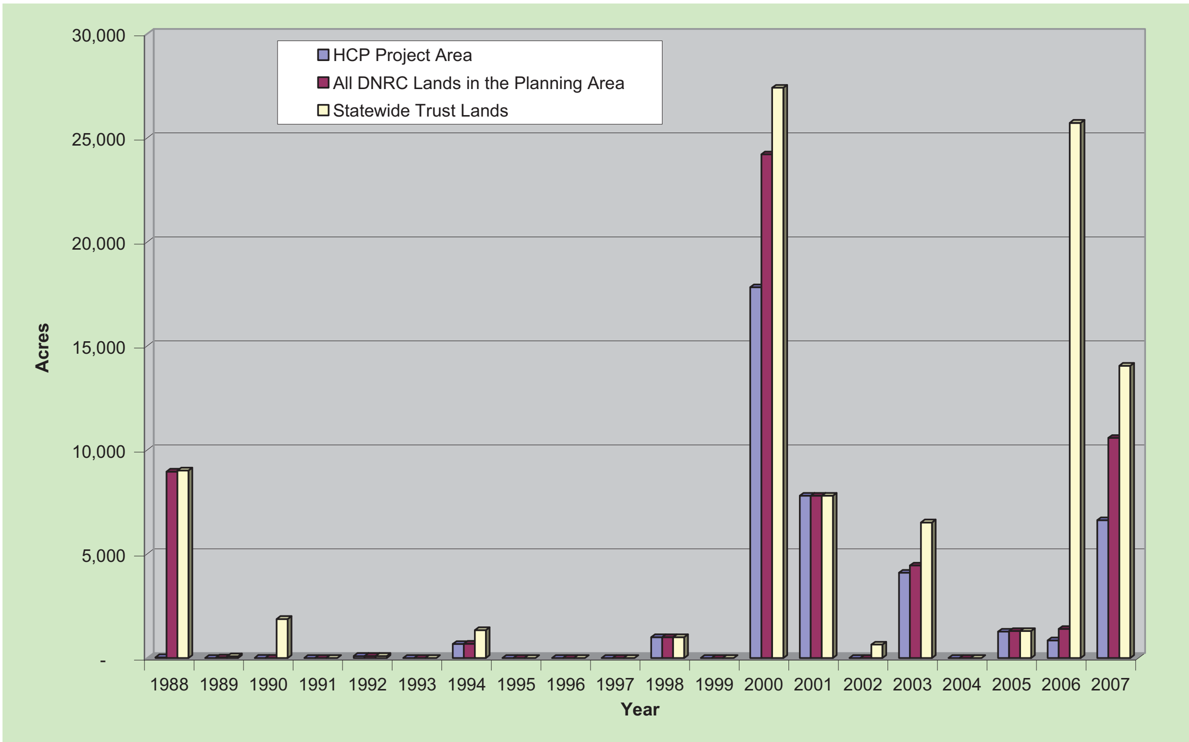

FIGURE 6-1. ANNUAL TRUST LAND ACRES BURNED FROM 1988 TO 2007

6.2.1.2 Insect or Disease Outbreaks

Like fire, severe insect and disease outbreaks can result in large-scale tree mortality, thereby converting habitat from closed-canopy forest to open areas with standing dead trees and downed logs. Forest insect and disease outbreaks are natural processes that can be exacerbated by climatic warming, drought, and fire suppression. As described for wildfires, the anticipated effects of climate change are expected to contribute to increasing trends in insect infestations. In the last several decades, the mountain pine beetle has moved into areas that were previously climatically unsuitable (Carroll et al. 2003), and it has shortened its life cycle from 2 years per generation to 1 year, resulting in large increases in population abundances (Parmesan 2006). In western Montana, the expanded range of the mountain pine beetle to higher elevations and eastward is causing widespread tree mortality (Logan and Powell 2001).

When an insect infestation or disease outbreak is identified, a timber salvage harvest may be prescribed to capture the remaining value of affected trees and/or to attempt to stem the spread of the infestation or outbreak. At times, these harvests are emergency situations requiring an accelerated schedule, but more commonly they are processed as a timber sale within the usual timelines of the MEPA process.

Defoliation from a substantial insect or disease outbreak and subsequent timber salvage activities could also affect grizzly bears and lynx by reducing the amount of available suitable habitat, reducing habitat connectivity, and reducing cover for secure movement. The primary concern for aquatic species is the increased potential for soil erosion and sedimentation in streams due to associated harvest activities ~~and~~. For all HCP species and the habitats they rely on, there is also an increased indirect risk of future fires burning with greater intensity due to creation of dead fuels.

6.2.1.3 Wind Events

Prevailing winds in Montana move from west to east and are strongest in the winter. As air flows over the Rocky Mountains and descends the eastern slopes, it is compressed and accelerated, often generating high wind speeds (GeoResearch, Inc. 1987). Microbursts associated with storm cells are another source of high winds. High winds can cause blowdown of timber in localized areas. These events and subsequent forest management activities are often small, localized projects that are typically presented as small salvage sales through a timber permit. In these instances, most HCP commitments could feasibly be implemented or could be processed as allowances as described in Chapter 2 (Conservation Strategies).

However, sizable wind events occur on the Swan River State Forest about every 3 years, with each event often resulting in damage to more than 1 million board feet of timber volume. In these instances, the salvage harvest would typically be processed as an emergency situation under a compressed MEPA timeline. The scale of these events and subsequent forest management activities may be such that additional mitigation measures should be considered through the changed circumstance process.

Blowdown from a substantial wind event could affect lynx and grizzly bear habitat suitability, habitat connectivity, and riparian cover, and it could increase the risk of fire, resulting in detrimental erosion and sedimentation to streams. Blowdown along a stream could increase the vulnerability of additional wind damage for the trees that remain.

6.2.1.4 Triggers and Responses for Grizzly Bears

Because salvage harvest is an important component of DNRC's annual harvest volume, it is a covered activity, and the conservation commitments apply to all salvage harvests. However, both parties recognize that management following large-scale fires, insect or disease outbreaks, or wind events could compromise the integrity of the rest/management strategy to provide grizzly bears secure and quiet areas free from management activities. Therefore, changed circumstances for grizzly bears related to a fire, insect or disease outbreak, or wind event are defined as:

1. A fire, insect or disease outbreak, or wind event on the Stillwater Block, Swan River State Forest, or scattered parcels in a recovery zone that requires a salvage project in a subzone(s) or parcel in rest that would take more than 151 days during the summer and fall periods to complete. Days used conducting activities during the winter period do not count against each 151-day total. A separate 151-day total applies to each subzone and each parcel in rest independently.

or

2. A second interruption of an 8-year rest period extending for greater than 30 days (needed during summer and/or fall periods) is required for the purposes of salvage.

When a changed circumstance is triggered for grizzly bears, DNRC would follow the changed circumstance process and develop project mitigations for conducting the salvage harvest. The "toolbox" of potential minimization/mitigation measures includes, but is not limited to:

- Re-starting the rest period after the project is completed
- Adding extra time to the rest period once it re-starts (9 years instead of 8, for example)
- Implementing temporary road restrictions or closures that were not part of the original travel plan
- Requiring seasonal operation restrictions
- Making adjustments to operations in adjacent subzones
- Re-scheduling adjacent operations.

6.2.1.5 Triggers and Responses for Lynx

Changed circumstances for lynx related to a fire, insect or disease outbreak, or wind event are defined as events that result in a departure from the required lynx habitat percentages. The required amounts of lynx habitat are: at least 65 percent suitable lynx habitat in LMAs; at least 20 percent winter foraging habitat in LMAs; no more than 15 percent conversion by decade in LMAs; and at least 65 percent suitable habitat on scattered parcels at the land office scale.

When a changed circumstance is triggered for lynx, DNRC will follow the changed circumstance process and develop project mitigation measures for conducting the salvage harvest. Prior to implementing the salvage harvest, DNRC will submit a contingency plan developed in conjunction with the environmental analysis to the USFWS describing how DNRC will meet the commitments for CWD and snag retention (LY-HB2)~~ and den sites attributes (LY-HB2)~~. This plan will also identify any additional lynx commitments that will be ~~(partially)~~ implemented, potentially to include LY-HB4 and LY-HB5~~, and will disclose~~. The plan will also describe silvicultural objectives and efforts planned for regenerating habitat converted to a temporary non-suitable condition by the disturbance. The contingency plan will contain pre-disturbance and post-disturbance lynx habitat maps and an assessment of habitat acres by type for the affected LMA or area. Development of this plan will be subject to the time constraints identified under the changed circumstance process (Section 6.1, Changed Circumstance Process).

If DNRC plans a subsequent green harvest in the affected areas, DNRC will submit a separate mitigation plan for the green harvest in conjunction with the EA for that project. The mitigation plan will require approval by the USFWS prior to DNRC implementing a subsequent green harvest in the affected area until such time as the original habitat amount commitments can again be achieved. The plan will be submitted to the USFWS prior to the final alternative development phase of the MEPA review. The USFWS will have 30 days to review and concur with the provisions of the plan, provide necessary revisions, and/or schedule a meeting with appropriate specialists or managers to resolve remaining issues. If the USFWS does not respond within 30 days or a mutually agreed-upon timeframe, DNRC may proceed with development of the project and implementation of the mitigation plan. Necessary revisions and resolution of issues must be completed within 60 days of DNRC notifying the USFWS of the proposal, or by a date mutually agreed to by both parties. Disagreements will be resolved using a dispute resolution process (Appendix F, Implementing Agreement, of the EIS for this HCP).

When a green harvest affects ~~mature~~winter foraging habitat in an LMA such that DNRC would not meet the 20 percent foraging habitat commitment, the feasibility of implementing the minimization/mitigation measures outlined below would be discussed and negotiated by both parties in a timely manner, considering their utility and applicability for the given circumstance. Measures in addition to those listed below may be raised by either party and implemented through mutual agreement. The measures listed below are listed in their relative order of priority. These same measures would be considered when a green harvest would affect DNRC's ability to meet the 65 percent suitable habitat commitment in an LMA or on scattered parcels; however, any suite of measures may be viable options.

- Minimize any further reduction of winter foraging habitat and suitable habitat to the extent possible.
- Defer harvest of winter foraging habitat in the Seeley and Garnet LMAs when foraging habitat falls below the 20 percent commitment.
- Retain higher percentages of winter foraging habitat in other LMAs such that any reduction of winter foraging in the affected LMA (attributed to natural disturbance and green harvest) is compensated in another LMA.
- Defer pre-commercial thinning in the affected LMA for 10 or more years after the natural disturbance event.
- Negotiate a new allowable harvest percentage for the LMA or administrative unit given the circumstances.
- Negotiate a new allowable lynx habitat percentage for the LMA or administrative unit given the circumstances.
- Negotiate a temporary deferral of other like lynx habitat acres in excess (if present) found within another nearby LMA.
- Provide 65 percent retention of post-fire suitable habitat within the LMA or scattered parcel where the harvest is proposed.
- Prepare a collaborative management/rehabilitation plan for the site (could include expeditious planting).
- For the Stillwater East and West LMAs, conduct an evaluation of the location of proposed harvests in the adjacent unaffected LMA relative to the loss of suitable habitat in the affected LMA. If feasible, examine opportunities to position harvest locations to conserve suitable habitat in areas adjacent to the affected area. The intent would not be to stop the planned harvests in the adjacent unaffected LMA. Rather, the intent would be to explore opportunities to create a buffer of suitable habitat around or adjacent to the area affected or conserve and maintain movement corridors in the remaining suitable habitat on the adjacent LMA.

Due to the importance of winter foraging habitat on the landscape for lynx, DNRC would track the amount of winter foraging habitat harvested through changed circumstances when harvest is conducted in an LMA that has fallen below the minimum 20 percent foraging habitat commitment. These acres may be subtracted from the 2,320 acres identified for this purpose following approval by the USFWS (see Section 7.2.2, Canada Lynx). See Appendix B, Document B-14 – Acres of Winter Foraging Habitat Available for Harvest under Changed Circumstances and an Example of the Process. This document describes how the acres were derived and provides an example of how both parties would proceed in this situation.

6.2.1.6 Triggers and Responses for Aquatic Species

Changed circumstances for aquatic species related to fire, insect or disease outbreaks, or wind events are defined as

a. A disturbance that meets the following two criteria:
   1. 90 percent stand mortality on 1,000 to 10,000 acres in the HCP project area within a sixth-order HUC that contains a Class 1 RMZ that supports an HCP fish species.
   2. Where 20 percent or more of the watershed area has been subject to 90 percent stand mortality.

or

b. A disturbance that meets the following three criteria:
   1. Occurs in watersheds supporting core populations of bull trout or core populations of westslope cutthroat trout[1], or supporting any populations of Columbia redband trout
   2. 90 percent stand mortality has affected 25 percent or greater of the RMZ area for Class 1 RMZs supporting HCP fish species that are located in the HCP project area within the affected watershed (sixth-order HUC)
   3. A minimum of 20 acres of RMZ was affected.

For either changed circumstance "a" or "b" DNRC will follow the changed circumstance process. Under Step 2 of the process, DNRC will conduct a project-level assessment of the post-disturbance conditions in the affected wtatershed, including an evaluation of RMZ conditions, roads, stream crossing structures, and hillslope stability. In coordination with the USFWS, DNRC will identify problem areas and develop, prioritize, and propose a schedule for the mitigation measures to address the problems. Under Step 3 of the process and within the contingency plan, DNRC will develop site-specific BMPs, corrective actions, or harvest prescriptions to address the problems identified. Potential site-specific minimization and mitigation measures may include, but are not limited to:

[1] Core habitat is currently proposed for westslope cutthroat trout and will be included in the updated State of Montana Westslope Cutthroat Trout Conservation Agreement and Memorandum of Understanding. DNRC commits to using westslope cutthroat trout priority management areas (watersheds) as a substitute for core habitat to determine whether a changed circumstance is invoked until westslope cutthroat trout core watersheds are designated.

- Modified RMZ harvest prescriptions
- Replacement of undersized culverts
- Measures to address potential erosion and/or hillslope instability, such as contour felling, seeding, planting, or waddle installation
- Road improvements to address increased surface runoff (installing more drainage features)
- Review and potential adjustment of existing grazing licenses.

6.2.2 Mass Movements

Mass movements are natural processes that generally occur on steep, erosive slopes after heavy rainfall. However, various human activities, such as road building and timber harvest, can increase the sensitivity of a given area to mass movements. Additionally, the effects of climate change, including more precipitation falling as rain instead of snow, earlier spring snowmelt, increased frequency of extreme events such as intense downpours and windstorms, and longer, hotter, and drier summers in some locations, may increase the risk of mass movements (where soils and landforms are prone to these types of events) caused by forest management activities. DNRC's response to a mass movement may include salvage of damaged trees, depending on the stability and accessibility of the site. If salvage is proposed, these events are typically small enough to be processed as a timber permit. More likely, DNRC's response would be an attempt to stabilize the site to prevent further erosion and sedimentation to sensitive streams. Mass movements are a concern for HCP fish species because sediments from landslides can enter watercourses and reduce aquatic habitat quality. If left unstabilized, mass movements can become a chronic source of sedimentation to adjacent streams.

6.2.2.1 Triggers and Responses for Grizzly Bears and Lynx

Potential effects on individual grizzly bears or lynx or their habitats resulting from mass movements are expected to be minimal and do not warrant additional mitigation measures beyond those identified in the conservation strategies. Therefore, no triggers or responses were developed for grizzly bears or lynx in the event of a mass movement.

6.2.2.2 Triggers and Responses for Aquatic Species

A changed circumstance for aquatic species related to mass movements is defined as a mass movement between 500 and 5,000 square yards in size that delivers or is at high risk to deliver sediment to a stream supporting HCP fish species.

When a changed circumstance is triggered, DNRC will follow the changed circumstance process. Under Step 2 in the process, DNRC will complete a field assessment of the mass movement within 30 days of becoming aware of the event. (If weather or ground conditions do not allow access to the site, the field assessment will be completed as soon as conditions allow.)

During the post-disturbance assessment, DNRC will

- Document the size of the mass movement.
- Determine the sediment delivery potential (i.e., delivery has occurred or is likely to occur before deposited material stabilizes).
- Assess the risks to HCP aquatic species and habitat, (i.e., probability of detrimental impacts occurring, the type of aquatic habitat at risk, and the extent, duration, and magnitude of the impact or potential impact).
- Identify the possible cause or activity that may have contributed to the mass movement and make a determination if the cause was related to DNRC's forest management activities.

For mass movements determined to be caused by DNRC's forest management activities, DNRC will develop a contingency plan as described in Step 3 of the changed circumstance process. The plan will identify opportunities to reduce or eliminate ongoing or potential impacts resulting from the event.

If the mass movement has been determined to be a natural event not associated with DNRC forest management activities, DNRC will provide the USFWS with documentation regarding the cause and development of the mass movement. In these cases, DNRC would consider participating in cooperative restoration projects as funding and resources are available.

6.2.3 Flood Events

Flooding on HCP project area lands occurs most often in years when a large snow pack melts rapidly, after large rain-on-snow events, or when isolated storm events overwhelm the drainage capacity of a water body. The anticipated effects of climate change may also lead to more frequent and intense rain-on-snow events and more early-season melting contributing to more frequent and severe winter and spring flooding. Floods are natural events within a stream ecosystem and can help to create beneficial aquatic habitats within the system when natural processes are allowed to occur.

The primary concerns in the event of a severe flood would be sedimentation of streams, erosion of stream banks, and the incapacitation of stream crossing structures.

6.2.3.1 Triggers and Responses for Grizzly Bears and Lynx

Potential effects on individual grizzly bears or lynx or their habitats resulting from floods are expected to be minimal and do not warrant additional mitigation measures beyond those identified in the conservations strategies. Therefore, no triggers or responses were developed for grizzly bears or lynx in the event of a flood.

6.2.3.2 Triggers and Responses for Aquatic Species

A changed circumstance related to a flood event is defined as:

a. A flood with a recurrence interval between 25 and 100 years occurring on blocked lands (Stillwater Block and Swan River State Forest) in a stream supporting HCP aquatic species

or

b. A flood with a recurrence interval between 50 and 100 years occurring in a stream supporting HCP aquatic species on a scattered parcel.

When DNRC becomes aware that flooding has likely occurred on the HCP project area, it will screen the event to determine whether a changed circumstance has been triggered. The screening will use data from USGS real-time stream gauging stations that drain fifth-order HUCs containing or adjacent to the HCP project area. The flow event magnitude (in cubic feet per second) for a 50-year event for each station has been defined by the USGS (Parrett and Johnson 2004). A changed circumstance has occurred if the flow magnitude has been exceeded in the HCP project area as defined above. As required in Step 1 of the changed circumstance process, DNRC will notify the USFWS that a changed circumstance has likely occurred.

Under Step 2 of the changed circumstance process, DNRC will complete a field assessment of the flood site as soon as field conditions allow or within 6 months to confirm that a changed circumstance has been triggered, unless an alternative schedule is agreed to with the USFWS. DNRC will invite the USFWS to participate in the field assessment. In developing the contingency plan (Step 3), DNRC will follow the procedures outlined in the aquatic conservation strategies and expedite the inventory (or re-inventory) of roads and stream crossings within the affected area, and update the sites identified in need of corrective actions (road repair and/or culvert repair or replacement) due to high risk of sediment delivery from the changed circumstance.

6.2.4 Climate Change

Land and water resources are vulnerable to a wide range of effects from climate change, some of which are presently occurring (IPCC 2007). These effects specific to forest ecosystems in Montana include, among others, (1) physical effects, such as droughts, floods, and glacial melting; (2) biological effects, such as increases in insect and disease infestations, shifts in species distribution, and changes in the timing of natural events; and (3) economic and social effects, such as adverse impacts on tourism, infrastructure, fishing, and other resource uses.

~~While these potential effects are known, there is not sufficient site-specific information to plan for and manage the effects of climate change at this time. The State of Montana has formed a Climate Change Advisory Committee directed to examine state level greenhouse gas reduction opportunities in all sectors in Montana, and take into consideration opportunities to "save money, conserve energy, and bolster the Montana economy." Members of the DNRC staff are participating in the Climate Change Advisory Committee. Additionally, t~~The DNRC staff is discussing the ramifications of climate change on the management of forested trust lands~~.~~; however, ~~N~~no policy or change in management has been proposed at this time (Larson and Schultz 2009). If the state issues new policies or mandates regarding climate change during the Permit term, DNRC will consult with the USFWS in accordance with Section 6.3.4 (Changes in DNRC's Rules, Laws, or Policies) prior to implementing any changes within the HCP project area.

While some trends related to climate change on the natural environment are becoming clearer, it is not fully known how the HCP species or the vegetation communities supporting habitat for the HCP species will respond to these effects. The USFWS and DNRC agree that not enough is known to prescribe potential measures for the HCP species at this time. New research and guidance materials related to the future management of state forests in light of climate change~~s~~ and potential effects of climate change on the HCP species will be a topic of discussion as necessary between DNRC and the USFWS at scheduled annual update meetings. Both parties will work together to develop appropriate responses to new research or guidance materials regarding the impacts of climate change on forest management and/or potential mitigation and minimization measures for the HCP species. Additionally, if over time, new research shows that the effects of incidental take have increased due to climate change or the HCP species are changing their habitat use, food base, or other biological needs in response to climate change such that DNRC's covered activities are affecting these new conditions, the USFWS and DNRC would address these concerns through the process described in Section 6.1.2 (Process for Administrative Changed Circumstances). Although the effects of climate change are and will be natural disturbances, the regional scale of the effects cannot be addressed through the site-specific steps included in Section 6.1.1 (Process for Natural Disturbance Changed Circumstances). Consequently, the process for addressing administrative changed circumstances will be used.

Some examples of potential responses to the effects of climate change on the HCP species include:

- Adjusting timing restrictions based on changes in seasons of use of certain habitats by the HCP species
- Adjusting boundaries of LMAs
- Adjusting mapping protocols for defining lynx habitat~~s~~
- Adjusting the commitments for protection of food sources that become increasingly important due to climate change; that is, protecting certain habitat elements for bears or lynx based on changes in resource utilization
- Prioritizing corrective actions in specific watersheds deemed critical to the recovery and survival of the HCP fish species.

6.3 CHANGED CIRCUMSTANCES DUE TO ADMINISTRATIVE CHANGES

Administrative changed circumstances may include a change in the federal status of a species, extinction of a species, or changes in DNRC's forest management program. The process for addressing these changed circumstances is described below.

6.3.1 Changes in HCP Species Listing Status

During the period that the HCP is in effect, the USFWS may list new species or change the status of an HCP species.

6.3.1.1 New Listing of a Non-HCP Species

If a non-HCP species that occurs within the HCP project area becomes a federally listed species, DNRC will

1. Avoid take of the newly listed species as required by Section 9 of the ESA,
2. Propose to the USFWS that the species be added to this HCP and Permit through an amendment,
3. Apply for a separate Permit for the newly listed species through the ESA Section 10 process, or
4. Address the conservation of the species and compliance with the ESA through other means that may be available to DNRC (such as Safe Harbor Agreements, for example).

6.3.1.2 Change in Status of an HCP Species

The status of an HCP species may change during the Permit term, including the listing of an unlisted HCP species, a change in status of an HCP species, or the de-listing of an HCP species. The process for addressing these changes is described below.

Currently, two unlisted aquatic species (westslope cutthroat trout and Columbia redband trout) are included as HCP-covered species. Should either become federally listed during the Permit term, a delayed effective date would provide for its coverage under the Permit as per Sections 4-2 and 4-3 in the HCP Handbook (USFWS and NMFS 1996). The existing HCP conservation commitments would be considered sufficient to provide adequate protection under the ESA, and DNRC would meet ESA Section 10 compliance for that species immediately, assuming that DNRC is meeting all terms of the HCP.

If the listed status of an HCP species changes during the Permit term (e.g., a threatened species becomes endangered or an endangered species becomes threatened), the USFWS will notify DNRC and may initiate the process outlined in Section 6.1.2 (Process for Administrative Changed Circumstances) if warranted.

In the case of a change in the status of a localized HCP species population (such as an HCP fish species population at the sixth-order HUC level), the USFWS and DNRC may develop mitigation measures to address declines. Examples of potential mitigation measures to address such a localized population include project timing restrictions, road closures, or deferrals of specified activities.

In the case of the CYE grizzly bear population, if the USFWS determines that the population no longer warrants endangered status, both parties would re-evaluate the application of recovery zone commitments to NROH parcels in the CYE and the more restrictive salvage allowances in the CYE. DNRC's intent is to manage lands in the CYE more consistently under the same approach as the NCDE as soon as the status of grizzly bears warrants the relaxation of commitments. Both parties would evaluate whether the grizzly bear conservation commitments can be applied in the CYE as they are in the NCDE (i.e., NROH commitments applied to NROH parcels and recovery zone commitments applied to recovery zone parcels, and similar salvage day allowances for similar-sized administrative units in the NCDE). Other options may also be explored if this is not the preferred approach at that time.

If an HCP species covered by the HCP is de-listed, DNRC and the USFWS will review the HCP conservation commitments for that species to determine if any of the commitments can be relaxed, modified, or removed from the HCP, as well as which commitments must still be met.

6.3.2 Occupation of the Bitterroot Ecosystem by Grizzly Bears

DNRC estimates that it currently owns 182 acres on scattered parcels in the BE. These lands are included in the HCP project area, but because the BE is not currently occupied by grizzly bears, only the program-wide commitments apply on these lands. In the event that the USFWS formally recognizes that the BE is occupied by grizzly bears, the USFWS would notify DNRC within 30 days of that formal determination. If known, the USFWS will also clarify for DNRC the legal recovery status of the BE population and legally recognized recovery zone boundary. Subsequently, DNRC will again assess its land ownership within the USFWS-accepted BE boundary required to meet federal recovery goals to ensure that appropriate lands are accurately identified. DNRC will provide the USFWS results of the assessment. If the legal status of the BE population is formally recognized as threatened or endangered, and HCP parcels fall within the recognized BE recovery zone boundary, DNRC would begin implementing all of the NROH commitments (those applicable are GB-NR3, GB-NR4), recovery zone commitments, and scattered parcels in recovery zones commitments for projects on HCP project area lands within the BE. NROH commitments applicable to other scattered parcels within recovery zones will apply to this ecosystem; however, no NROH lands currently exist or will be adopted under the HCP for the BE for the purpose of applying NROH commitments. Additionally, within 30 days of official notification of occupancy, DNRC would submit an official notice to the USFWS that the required commitments are in effect along with a schedule for compliance. DNRC would amend future annual updates and 5-year monitoring reports to address these scattered parcels as required in Chapter 4 (Monitoring and Adaptive Management). If minor changes are warranted, both parties would develop alternative strategies for grizzly bears in the BE under a CMR. If substantial changes are warranted, an amendment to the HCP and Permit, and subsequent additional analysis, may be required. Should the BE become occupied and DNRC lands not occur within the recovery zone boundary for that ecosystem, only the applicable program-wide conservation commitments for grizzly bears would be required.

6.3.3 Termination of the Swan Agreement

DNRC is presently a signatory party to the Swan Agreement, an existing conservation agreement for grizzly bears in the Swan Valley. Cooperators include DNRC, Plum Creek, the Flathead National Forest, and the USFWS. The Swan Agreement provides a conservation strategy framework for grizzly bears for intermingled land ownership in the valley.

DNRC will continue to implement the commitments in the Swan Agreement for grizzly bears and will continue to receive its incidental take exemption for grizzly bears under the Section 7 biological opinion associated with the Swan Agreement. Conservation commitments for the other four HCP species will be followed no matter the status of the Swan Agreement.

In the event that the current Swan Agreement is terminated, the Swan River State Forest commitments for grizzly bears described in Chapter 2 (Conservation Strategies) would be implemented as a changed circumstance under this HCP.

~~6.3.4 The Montana Working Forests Project~~

~~During the summer of 2008, as part of the Montana Working Forests Project, The Trust for Public Land and The Nature Conservancy reached an agreement to purchase approximately 3210,000 acres of Plum Creek lands in western Montana. The Trust for Public Land and The Nature Conservancy will purchase the land in three phases. The first phase was completed in December 2008. The second phase wasill be completed in January 2009 and the third will be completed in December 2010. Neither The Trust for Public Land nor The Nature Conservancy plans to retain long-term ownership or management responsibilities for the lands in the purchase agreement. Ultimately, these lands will be sold to a mix of ownerships, including state, federal, and private, such as the USFS, DNRC, MFWP, and private timber investors. Regardless of future ownership, The Trust for Public Lands and The Nature Conservancy will strive to maximize these goals of the project: protection of wildlife habitat, sustainable harvest of timber, and maintenance of public access. This initial purchase by The Trust for Public Lands and The Nature Conservancy is possibly the first of a series of purchases of Plum Creek lands that may occur in future years.~~

~~The lands included in the purchase are located in the Swan Valley, the upper Clearwater Valley near Seeley Lake, Lolo Creek Drainage, Mill Creek area near Missoula, Fish Creek Drainage, Petty Creek Drainage, Rock Creek Drainage (between Libby and the Yaak Valley), and Garnet Mountains between Potomac and Interstate 90 (http://www.montanaworkingforests.org/). The lands span fourive western Montana counties: Missoula (223,400 acres), Mineral (42,800 acres), Lake (35,500 acres), Lincoln (13,800 acres), and Powell (3,900 acres).~~

~~The project is aimed at conserving these lands because they contain important watersheds, wildlife, and working forests. The lands also provide habitat and habitat linkages for several threatened and endangered species, including grizzly bears, lynx, and bull trout. Many of the lands are low-elevation lands that are important for big game species and highly susceptible to impacts associated with human development. Montanans have long worked and recreated in these forests and under Plum Creek's ownership. The lands were accessible for hikers, hunters, snowmobilers, campers, and other outdoor enthusiasts. Maintaining the inherent working forest and habitat attributes of these lands would contribute substantially to protecting values important to Montanans.~~

~~At this time, it may be possible for the State of Montana is actively acquiring lands in the Potomac Valleyto acquire a portion of these lands to be managed under DNRC's TLMD for the benefit of the trust beneficiaries. The State may is also interested in acquireing lands in the Swan Valley to be managed under DNRC's TLMD. However, iIt is not known how many acres or the exact parcels locations of lands that DNRC wouldmight acquire. If acquired, many of these lands would be managed under the TLMD forest management program. Given their proximity to the HCP project area and their importance as habitat and habitat linkages for grizzly bears, lynx, and bull trout, it is likely that, if acquired, DNRC would consider adding these lands to the HCP project area.~~

~~In the event that DNRC decides to add these lands to the HCP project area, it will notify the USFWS of its intent. To the extent feasible, the lands would be added in accordance with the transition lands strategy outlined in Chapter 3 (Transition Lands Strategy).~~

6.3.4 Changes in DNRC's Rules, Laws, or Policies

Many procedures for implementing DNRC's forest management program are described in the SFLMP (DNRC 1996) and codified in the Forest Management ARMs. The SFLMP is reviewed every 5 years to assess the status of SFLMP implementation and effectiveness, including a recommendation on the need for significant changes. The results of the review and assessment, as well as recommendations for improvement, are documented in the SFLMP 5-year monitoring report.

During the 50-year term of the HCP and Permit, DNRC may occasionally revise the SFLMP or ARMs. A change in the SFLMP or ARMs would typically occur under the following conditions:

- The SFLMP 5-year monitoring report recommends significant changes to the plan
- New legislation is passed that is not compatible with the SFLMP
- New legislation is passed that requires development of additional ARMs or revisions
- New direction is set by the Land Board
- The FMB Chief judges that original assumptions supporting the SFLMP have significantly changed or no longer apply.

In the event of a revision of the Montana Forestry BMPs, the Forest Management ARMs, the SMZ ARMs, or any other rules, laws, or policies incorporated in the HCP

- DNRC would coordinate with the USFWS to determine if the HCP should incorporate the revision or retain the rule, law, or policy in its original form.
- The USFWS would then determine the appropriate process to modify the HCP and Permit (if necessary). Disputes between DNRC and the USFWS over adoption of proposed changes or the way a revision will be handled will be addressed through the dispute resolution process outlined in Appendix F (Implementing Agreement) of the EIS for this HCP.
- If modifications or amendments to the HCP commitments are proposed, DNRC would concurrently review the Forest Management ARMs to assess the need for revision so that there is no gap in time (or as little as possible) between HCP amendment and revisions to the applicable ARMs.
- Since the HCP would be implemented as part of the MEPA interdisciplinary planning process, MEPA has important relevance to the HCP. There is an assumption in the HCP that the current MEPA law and rules will remain in existence for the Permit term. If a change to MEPA is made that could potentially affect how implementation of the HCP

would affect the HCP species, DNRC and the USFWS would cooperatively determine a course of action, if needed, to address the change to MEPA.

6.4 UNFORESEEN CIRCUMSTANCES AND "NO SURPRISES"

Unforeseen circumstances are changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the USFWS at the time of the conservation plan's negotiation and development, and that result in a substantial and adverse change in the status of an HCP species or its habitat.

In the event of an unforeseen circumstance, "No Surprises" assurances are provided by the government through the Section 10(a)(1)(B) process to non-federal landowners. Essentially, ~~private landowners~~Permit holders with HCPs in place are assured that if "unforeseen circumstances" arise, the USFWS will not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed to in the HCP without the consent of the permittee. The government will honor these assurances as long as a permittee is implementing the terms and conditions of the HCP, Permit, and other associated documents. In effect, this regulation states that the government will honor its commitment as long as the HCP permittees honor theirs. Section 10.0 (Unforseen Circumstances and "No Surprises") of the implementing agreement (Appendix F) addresses the assurances being provided by the USFWS.

In the event that an unforeseen or extraordinary circumstance occurs, DNRC may consider additional or alternative measures commensurate with their landownership relative to the circumstance and the constraints of their program mission and mandate. Such measures may include:

- Work with adjacent landowners in a cooperative manner to address issues related to listed species conservation.
- Re-examine the conservation strategies in light of the unforeseen circumstance to determine if commitments could be reasonably modified.

Chapter

DNRC's Identification of Impacts that Have the Potential to Constitute Take under the HCP

7 DNRC'S IDENTIFICATION OF IMPACTS THAT HAVE THE POTENTIAL TO CONSTITUTE TAKE UNDER THE HCP

DNRC believes that the covered activities addressed in the HCP would not result in any "take" involving direct killing or injury of individual members of federally listed species. Therefore, further discussions of take in this HCP only relate to the potential for "harm" as defined by "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns including breeding, feeding, and sheltering" (50 CFR 17.3). DNRC also believes the risk is low that forest management activities under the HCP would modify or degrade habitat to the point that take in the form of harm to HCP species would result. DNRC considers adverse impacts resulting from pre-existing conditions to be the result of the complex interactions of historical management legacies and natural processes that do not constitute take.

DNRC acknowledges that forest management activities under the HCP have potential to impact habitat, and that some impacts may constitute habitat modification or degradation. The level of impacts that constitute habitat modification or degradation and the level of impacts that become "significant" to the point of killing or injuring an individual by disrupting normal behavioral patterns, such as breeding, feeding, or sheltering, are difficult levels to identify and quantify.

Rather than try to declare which impacts definitively constitute take, DNRC's approach to applying for this Permit is to identify the impacts that have the *potential* to constitute take. As described in the sections below addressing aquatic species, grizzly bear, and lynx, the methods and metrics for identifying impacts that have the potential to constitute take are specific to this HCP and the associated Permit and are intended only to apply to lands managed under this HCP and Permit.

DNRC presents this approach for identifying impacts that could constitute take while recognizing that evaluating take for this type of HCP, which spans a broad geographic area, is an imperfect and non-precise process, potentially influenced by an infinite number of physical and temporal variables.

7.1 AQUATIC SPECIES TAKE ANALYSIS

In this section, DNRC identifies the covered activities and associated impacts that have the potential to constitute take of the three HCP fish species – bull trout, westslope cutthroat trout, and Columbia redband trout. Because all three species have similar habitat requirements as cold-water adapted fish species, it is assumed that all three would be affected similarly. The potential effects to HCP fish species from covered activities are related to the potential changes to the key aquatic habitat factors for these species. Those habitat factors are sediment, habitat complexity (in-stream LWD), stream temperature, connectivity, and cumulative watershed effects.

The distribution and abundance of fish populations within the planning area and HCP project area are largely a function of aquatic habitat quantity and quality. These aquatic habitat parameters are influenced by many factors that directly or indirectly affect fish or their habitat. These factors include the complex interactions of natural processes, historical legacies, and covered activities. The physical mechanisms that cause impacts are highly variable in time and space. Therefore, not all of the effects to these habitat factors are necessarily attributable to covered activities, nor are all the effects from covered activities expected to necessarily constitute take (as defined under the ESA).

The general effects of covered activities on these habitat factors and the biological consequences to HCP fish species are described and analyzed in detail in Section 4.8 (Fish and Fish Habitat) of the EIS for this HCP and will not be duplicated here. As mentioned previously, DNRC believes the risk is low that covered forest management activities would modify or degrade habitat to the point that take in the form of "harm" to HCP species would result. Of the covered activities, road construction, re-construction, and maintenance, as well as maintenance, removal, and installation of stream crossing structures, have the potential to cause impacts that could constitute take of HCP fish species.

7.1.1 Impacts that Have the Potential to Constitute Take and How Potential Take Will be Quantified

This section identifies the covered activities and associated impacts that have the potential to constitute take of the three covered aquatic species.

7.1.1.1 Sediment Production and Delivery

DNRC has determined that sediment potentially produced at Class 1 road-stream crossings and sediment potentially delivered to a Class 1 stream from roads located within 300 feet of the stream are impacts that have the potential to constitute take of HCP fish species.

As described in the EIS for this HCP (Section 4.8.2.1, Fish and Fish Habitat – Sediment), increased levels of sediment can have adverse effects on fish habitats. Fine sediment deposited in spawning gravels can reduce survival of eggs and developing fry of HCP fish species. Additionally, important habitat factors for rearing fish, such as interstitial spaces in the substrate and deep pools, may be reduced or lost, thus reducing food availability and cover.

Increased levels of sediment delivery could occur during and immediately following new road construction activities and installation of new stream crossing structures. These same impacts could also occur during the implementation of corrective actions, including the installation of BMP upgrades to existing roads, replacement or removal of existing stream crossing structures, rehabilitation of existing stream crossing sites, and reclamation of existing or previously abandoned roads. The levels of sediment delivery expected would be minor and of short duration. Therefore, the potential impacts to covered species habitat would be localized, short-term, and at low risk levels.

Sediment impacts from covered road activities are addressed through the aquatic conservation strategies described in Chapter 2 (Conservation Strategies). Potential sediment impacts from covered road activities, including stream crossings and corrective actions, would be primarily minimized by designing and fully implementing appropriate BMPs. Montana Forestry BMPs contain a broad range of specific practices addressing road planning, location, drainage, construction, and maintenance, as well as stream crossing design and installation. The proper application of appropriate BMPs has been repeatedly demonstrated to minimize sediment transport and delivery from roads.

A DNRC water resource specialist will review road construction and corrective action activities and make recommendations regarding the design of site-specific BMPs and other mitigation measures. These recommendations will be integrated into the development of standards, special operating and design requirements, and other site-specific requirements contained in DNRC timber sale and road activity contracts. DNRC will administer road projects on a weekly basis to ensure that contract specifications, BMPs, and other resource protection requirements are being properly implemented.

In addition, DNRC will avoid use of existing roads in SMZs when potential impacts cannot be adequately mitigated. DNRC will relocate existing roads when use of an existing road would produce greater impacts than relocation. In addition, the SMZ law prohibits the construction of roads in an SMZ, except when necessary to cross a stream.

Installation of new crossing structures or removal and rehabilitation of abandoned crossing sites will be scheduled for July to mid-August for bull trout streams and July to November for westslope cutthroat and Columbia redband trout streams. The construction window is scheduled before bull trout spawning to avoid the entombment of eggs and embryos. This timeframe is also after westslope cutthroat and Columbia redband spawning, embryo development, and embryo emergence to avoid the entombment of eggs and embryos.

With application of BMPs and other site-specific mitigation measures, DNRC believes the likelihood is low that the amount or extent of the impact due to sediment delivery to streams occupied by HCP fish species from covered road activities would be significant enough to constitute take for the following reasons:

1. The impacts are likely to be localized and affect only limited stream segments.

2. The impacts are likely to be temporary because baseline levels of road surface generated sediment are generally restored in less than 2 years.

3. The corrective actions implemented under the HCP are expected to greatly reduce existing sediment produced by legacy road sources; therefore, the levels of sediment delivery at the watershed scale are expected to be reduced.

Overall, an improved trend in habitat quality is expected for each aquatic analysis unit throughout the Permit term, which is a key element of the HCP contributing to recovery of listed fish species.

To be clear, DNRC does not suggest that all road work within 300 feet of a stream has the potential to contribute sediment to the stream. DNRC also does not suggest that each and every contribution of sediment from this type of impact constitutes take. However, for the purpose of this HCP and

Permit, DNRC expects that any potential take from sediment delivery is most likely to occur where roads are within 300 feet of a Class 1 stream. This is intended to apply only to land specifically managed under this HCP.

DNRC will limit the potential for take associated with sediment delivery to streams by reducing sediment delivery to streams by 50 percent from problem road segments over the 50-year Permit term. This will be accomplished through a combination of (1) avoiding or minimizing impacts from activities going forward and (2) performing corrective actions to reduce potential sediment from past management legacies.

The Water Erosion Prediction Project (WEPP) model was used in the EIS analysis of this HCP to quantitatively evaluate surface runoff and BMP applications and the effect on sediment delivery for roads. The modeling was applied to specific conditions within the road network on trust lands. The WEPP model estimated sediment production and delivery from both new roads and problem segments on existing roads.

The WEPP modeling results indicate the highest sediment production values would occur in aquatic analysis units with the highest precipitation (Stillwater, Swan, and Middle Clark Fork). The HCP sediment production rate for the estimated problem road segments within each aquatic analysis unit ranges from 7 to 370 tons per year, with an average of 137 tons per year over all aquatic analysis units (see Table 4.8-19 in Section 4.8.4.2, Fish and Fish Habitat – Direct and Indirect Effects, of the EIS for this HCP). Under the HCP, the sediment produced at problem road segments will be minimized by applying corrective actions (BMPs and other HCP sediment abatement measures) during the Permit term. By the end of the 50-year Permit term, the anticipated reduction in sediment production from the problem road segments ranges from 62 to 79 percent depending on the aquatic analysis unit.

Based on these modeling results, DNRC has developed a target rate of 50 percent sediment reduction from existing road sources over the term of the Permit. DNRC expects it will be able to reduce total existing sediment production by approximately 10 percent per decade in those areas prioritized for corrective actions.

DNRC will monitor compliance with sediment reduction targets by using case studies completed in discrete watershed study areas (fifth- or sixth-order HUC). Case studies would likely be completed in areas of concentrated ownership where DNRC is most active and there is greater potential for sediment production to be reduced due to corrective actions.

The information collected in the case studies and site-specific quantitative monitoring projects will be extrapolated and used initially across the entire aquatic analysis unit. Following the completion of numerous case studies and after having completed a majority of the road inventories across the HCP project area, DNRC will extrapolate across the broader project area to estimate progress and ensure achievement in meeting the sediment reduction targets across the entire HCP project area.

7.1.1.2 Habitat Connectivity

DNRC has determined that inadequate design and improperly installed stream crossing structures could diminish connectivity to the extent that the impact could potentially constitute take of HCP fish species. Improperly installing a new stream crossing structure, improperly replacing an existing stream crossing structure, or improperly rehabilitating a site where an existing structure is being removed could diminish connectivity to the extent that the impact could potentially constitute take of HCP fish species.

A detailed description of the importance of connectivity to HCP fish species is contained in Section 4.8.2.4 (Fish and Fish Habitat – Connectivity) of the EIS for this HCP and is summarized here. The HCP fish species use different habitat characteristics for spawning, juvenile rearing, and adult rearing. Sometimes these habitat requirements necessitate the movement of fish between lake and riverine environments. The blockage of fish from any of these habitats could lead to unsuccessful spawning, increased predation, or reduced growth or survival rates. In turn, local populations could be diminished if adequate spawning and rearing areas are inaccessible.

The primary activity affecting connectivity is related to the installation, maintenance, and removal of stream crossing culverts. Improperly designed or installed culverts are typically the most universal threat to connectivity. The potential effect of fish passage barriers, mainly culverts, is impaired access of HCP fish species to spawning, feeding, and cover areas, which could constitute take. The impact of such take could include reductions in survival and production of HCP fish species in the affected watersheds.

DNRC will minimize the potential for impacts that could potentially constitute take by designing all road-stream crossing installations to simulate natural streambed form and function. The intent is to provide the same levels of connectivity to adult and juvenile trout as are provided by an undeveloped stream channel during low to bankfull flows. DNRC believes the risk is low that there would be impacts with the potential to constitute take associated with these covered activities.

DNRC estimates that there are currently 106 existing culverts within the HCP project area that are impacting fish passage to some degree, including potential access to approximately 150 miles of stream. DNRC has assigned priority levels to these crossing structures and will replace or remove all structures that are barriers to fish passage within 15 years on bull trout streams and 30 years on streams supporting westslope cutthroat trout or Columbia redband trout. This timetable will result in a culvert replacement rate of about 3.5 per year, which will ensure that the most problematic culverts are improved first, resulting in a longer period for fish to re-populate upstream areas previously blocked or restricted. Addressing these existing legacy stream crossing sites will provide for an improving trend in connectivity over the HCP project area. The improved connectivity is expected to reduce the isolation of potentially at-risk local populations and contribute to recovery of listed species.

Installation of new stream crossing structures and replacement or removal of existing stream crossing structures could result in minor and temporary increases in sediment delivery to streams supporting HCP fish species. The impacts associated with these activities are expected to be short-term and localized. See Section 7.1.1.1 (Sediment Production and Delivery) for a more detailed discussion of these impacts.

There will be minimal risk that new stream crossing structures would be ineffective at addressing fish passage either due to inadequate design or poor implementation. Under the HCP, DNRC will conduct installation effectiveness monitoring on all new and upgraded stream crossing structures to verify that those structures adequately provide the connectivity necessary for viable HCP fish populations. The monitoring schedule will include assessments at 2, 5, and 10 years following structure installation, as well as inspections after large flood events.

The HCP also incorporates adaptive management practices by using the best available technology and research to assess connectivity at existing road-stream crossings, by re-evaluating site prioritization status, and continuing to evaluate new installation methods or techniques for providing connectivity. As part of adaptive management, DNRC will commit to prescribe actions to correct deficiencies if a new installation fails to emulate the streambed form and function (as determined by post-installation effectiveness monitoring), as well as a reporting schedule with the USFWS to review and discuss HCP fish connectivity issues.

The risk of impacts to fish connectivity that have the potential to constitute take would be limited to those cases where impacts occurred due to an ineffective crossing structure after installation and prior to monitoring, during the period between monitoring events, or during the period between the discovery of an ineffective installation and the first opportunity to correct the deficiency. In any case, the risk of these impacts occurring is likely to be infrequent and isolated.

7.1.2 Impacts that Do Not Have the Potential to Constitute Take

This section identifies the covered activities and associated impacts that DNRC believes do not have the potential to constitute take of the three HCP fish species.

7.1.2.1 Potential Impacts to Habitat Complexity from Covered Activities

The EIS for this HCP (Section 4.8.2.2, Fish and Fish Habitat – Habitat Complexity) describes in detail the importance of habitat complexity to HCP fish species. In general, stream habitat complexity is often associated with LWD abundance, as wood contributes to the formation of high-quality aquatic rearing habitat (Stouder et al. 1997). LWD consists of large tree trunks and stems or root wads that fall into stream channels due to natural deterioration (i.e., disease and insect infestation), windthrow, and bank failure. In-stream LWD dissipates hydraulic energy during high-flow periods, develops and maintains in-stream habitat features (i.e., pools and gravel bars), stabilizes streambeds and stream banks by minimizing scour and erosion, and provides excellent habitat and cover diversity (Stouder et al. 1997). The effective size of LWD varies by stream width, with larger streams requiring larger wood to sufficiently alter hydrologic conditions enough to affect habitat (Meehan 1991; Overton et al. 1997).

To determine the potential effects of timber harvest in riparian areas on LWD recruitment, the EIS provides an analysis that modeled predicted recruitment rate of LWD by decade for the represented stand types examined under existing conditions. The modeled changes in LWD recruitment potential compare the HCP to a target recruitment level developed by analyzing reference LWD frequencies in unmanaged stands located on USFS land and stratified by Rosgen stream class and geographic regions. DNRC performed statistical analyses on the data to quantify LWD targets based on reference conditions in unmanaged stands. Note that LWD levels are highly variable and closely tied to the associated riparian stand conditions (Teply et al. 2007; Light et al. 1999). Based on the EIS model outputs, it is very unlikely that take will occur in the HCP project area due to riparian timber harvest resulting in depletion of LWD in streams occupied by HCP fish species.

In addition, DNRC will determine whether the proposed HCP meets the in-stream LWD target levels by monitoring a total of five or more sites with riparian harvest adjacent to streams supporting HCP fish species during the first 10 years following implementation of the HCP. DNRC has committed to having 80 percent of the Class 1 RMZ acres harvested meet LWD targets by decade. DNRC has determined that any potential impacts, if they occur at all, would likely be associated with the 20 percent of RMZ harvest acres that would not have to meet LWD targets. However, the level of impact is not expected to constitute take. Even if all 20 percent of the allowable RMZ harvest acres ended up not meeting LWD targets, the risk of actual take would still be negligible because these acres would still have a 50-foot no-harvest buffer and 50 percent retention out to ~~one SPTH~~the 100-year site index tree height, which is typically 80 to 120 feet. Based on EIS model results, these sites would still maintain high levels of riparian function, including LWD recruitment (see subsection Habitat Complexity in Section 4.8.4.2, Fish and Fish Habitat – Direct and Indirect Effects, of the EIS for this HCP).

The HCP allows for the management of a portion of the total Class 1 RMZ acreage (~~15~~20 percent of any one ~~DNRC administrative~~aquatic analysis unit) using harvest prescriptions designed to meet the minimum retention tree requirement of the SMZ Law. DNRC determined that this allowance would be limited in extent and scope and therefore not expected to have a substantial effect on LWD recruitment on streams within the HCP project area. The limited amount of RMZ area managed under these allowances would still be required to ~~retain a~~meet the SMZ Law's minimum tree retention requirement ~~of 10 trees per 100 feet of stream within the first 50 feet of RMZ. These harvests~~ and would also be required to retain all streambank trees and all downed trees lying within the stream channel (ARM 36.11.425) or embedded within the stream bank (commitment AQ-RM1). In addition, ~~extensive~~ literature reviews have demonstrated that the allowance for ~~15~~20 percent of the RMZ at the ~~administrative~~aquatic analysis unit level to be harvested is still at the lower end of the range of streamside riparian forest that DNRC would expect to be subject to stand replacement fire or other catastrophic disturbance under natural conditions.

The potential effects on habitat complexity from DNRC riparian timber harvest activities under the HCP are not expected to result in take during the Permit term. Modeled outputs of LWD based on data from monitored sites would be compared to the referenced target levels to determine whether the HCP is maintaining, exceeding, or below expected target levels. If the RMZ harvest prescriptions implemented under the conservation strategy do not meet the 80 percent target, DNRC would develop and implement a modified approach to the design of Class 1 RMZ timber harvests. This modified approach (described in Chapter 4, Monitoring and Adaptive Management) would be designed to reduce the risk of impacts from decreased LWD recruitment.

7.1.2.2 Potential Impacts to Stream Temperature from Covered Activities

The EIS for this HCP (Section 4.8.2.3, Stream Temperature and Shading) describes in detail the importance of stream temperature to HCP fish species. Briefly, stream temperature influences the behavior, growth, metabolism, and habitat utilization of fish. Most fish have specific suitable and preferred water temperature ranges, and they exhibit distinct responses to increasing or decreasing water temperatures within and outside of these preferred ranges. Water temperature also influences egg incubation rates and the corresponding fry emergence timing. Depending on their extent, such changes could affect fry survival rates either positively or negatively.

Loss of riparian overstory canopy and the associated shading provided to the stream through timber harvesting can result in elevated summer stream temperatures due to the increase in incident solar radiation that reaches the water surface (Chamberlain et al. 1991). DNRC has determined that the likelihood of adverse effects to HCP fish species from an increase in stream temperatures is negligible because DNRC's timber harvests, road systems, and grazing management in RMZs would have little to no effect on stream temperature regimes. The main reason is because the size and design of RMZs will provide a buffering effect that will be more than adequate to protect existing stream temperature. In the unlikely event of a change in stream temperature, the increase is not expected to be greater than ~~10º Celsius (50º Fahrenheit)~~1.0º Fahrenheit (0.6º Celsius). This protection is due in large part to the following: (1) the HCP commitment to retain a 50-foot no-harvest buffer immediately next to the stream supporting HCP fish species; (2) the retention of 50 percent of merchantable trees and all submerchantable trees and shrubs in the remainder of Class 1 RMZs; and (3) the adequacy of Montana's current SMZ regulations to maintain stream temperature regimes.

The analysis in the EIS shows that for most of the scenarios modeled, shade levels per decade through the Permit term resulting from the implementation of the HCP tend to increase slightly over time (see Figures 4.8-14 through 4.8-16 in Section 4.8.4.2, Fish and Fish Habitat – Direct and Indirect Effects, of the EIS for this HCP). All of the scenarios evaluated for the HCP indicate shade levels at least 10 percent greater than the established target levels. Only in certain allowances for salvage harvest of disease- or insect-infested trees could there be harvest from within the 50-foot no-harvest buffer on Class 1 streams, and salvage harvest of fire-killed trees to exceed the normal 50 percent retention requirement in that portion of a Class1 RMZ outside the 50-foot no-harvest buffer. The HCP also allows for the management of a portion of the total Class 1 RMZ acreage using harvest prescriptions designed to meet the minimum retention tree requirement of the SMZ Law. However, these allowances are limited in extent and scope and are not expected to have a substantial effect on stream shade and stream temperatures within the HCP project area.

In summary, DNRC has determined that covered activities will not result in a measurable negative effect on maximum summer or minimum winter stream temperatures, and therefore, is not likely to constitute a "take" of HCP fish species. The modeling results indicate that the HCP would be effective at maintaining the key riparian function of shading and stream temperature at a level that provides for the conservation of HCP fish species. Furthermore, DNRC has committed to ensuring there would be no more than a ~~10º Celsius (50º Fahrenheit)~~1.0º Fahrenheit (0.6º Celsius) increase in stream temperature from existing levels and has developed a monitoring program to measure any changes in stream temperature as a way to verify model outputs (see Chapter 4, Monitoring and Adaptive Management).

7.1.2.3 Potential Impacts of Covered Activities on Cumulative Watershed Effects

Cumulative watershed effects (CWE) are the collective impacts on the human environment of a proposed action when considered in conjunction with other past, present, and future actions related to the proposed action by location or generic type (MCA 75-1-220) (see Section 4.8.2.6 of the EIS for this HCP). Thus, CWE represent the collective aquatic impacts specifically affecting a wide range watershed processes. Such processes include water yield, flow regimes, channel stability, and in-stream and upland sedimentation due to surface erosion and mass wasting. CWE also refers to existing watershed conditions, relative to additional risks associated with land use management activities on specific in-stream habitat elements, including temperature, sedimentation, and habitat complexity. Therefore, CWE are important to the protection of fish populations because the effects of a covered activity might only result in an incrementally small change in habitat, but still have a substantial effect relative to the needs of a fish species.

The concept of CWE has been part of DNRC's management philosophy of forested trust lands since the early 1980s. However, CWE are exceedingly difficult to measure because the actions affecting watershed resources occur across multiple land ownerships, are temporally and spatially complex, and are typically problematic to accurately inventory and evaluate.

DNRC has identified sensitive watersheds where future DNRC harvest activities are likely to be constrained by existing or the potential for CWE. There are currently 225 sensitive parcels within classified forest trust lands in the HCP project area. About 36 percent (162 miles) of HCP fish habitat occurs in sensitive parcels (see Table 4.8-14 in Section 4.8.2.6, Fish and Fish Habitat – Cumulative Watershed Effects, of the EIS for this HCP).

DNRC evaluated and considered the impacts of CWE with respect to the potential to take HCP fish species. It is DNRC's assessment that the incremental effect of the HCP on covered species would likely be positive and not cause or contribute to negative "cumulative effects" in watersheds occupied by HCP fish species. DNRC conducts CWE assessments as part of its current forest management program and under the HCP would continue to do so. Based on the relevant baseline conditions and CWE assessments, DNRC will design projects with the necessary measures to conserve and protect HCP fish species habitat.

7.1.2.4 Summary of Potential Impacts of Covered Activities on Aquatic Species

DNRC has determined that road management and associated stream crossing activities have the greatest potential to cause impacts that could constitute take of HCP fish species. However, these impacts are expected to be isolated, minor, and short-term, and offset by the overall trend of reduced sediment delivery due to implementation of corrective actions addressing legacy road sediment sources. Levels of stream temperature, habitat complexity, and CWE are expected to be maintained during the Permit term, or have impacts that are largely negligible or not substantial enough to constitute take. Connectivity will be improved during the Permit term due to commitments addressing legacy structures.

DNRC has designed the aquatic conservation strategies in the HCP to, during the course of the Permit term, address the most important habitat factors for HCP fish species that would maintain existing baseline conditions or improve habitat conditions for HCP fish species while allowing DNRC to meet its mandate on forested trust lands. The aquatic conservation strategies include commitments that address legacy impacts that will provide an important contribution to recovery of listed fish species.

7.2 TERRESTRIAL SPECIES TAKE ANALYSIS

7.2.1 Grizzly Bears

7.2.1.1 Impacts that Have the Potential to Constitute Take of Grizzly Bears and How Potential Take Will be Quantified

This section describes the potential adverse effects on grizzly bears associated with the covered activities, including the effects with the greatest potential to constitute incidental take of bears. The primary effects of the covered activities on bears include (1) disturbance or displacement of grizzly bears attributable to roads and human activity, and (2) potential lethal control of grizzly bears from bear-human or bear-livestock conflicts.

When estimating the potential for incidental take associated with forest management activities, DNRC considers it important to recognize that results of scientific studies rarely lend themselves directly and unequivocally to precise management standards or thresholds – especially for low density species such as grizzly bears (Mace 2004). This is because scientific methods often used in most studies have narrow focus, such as null hypothesis testing. It is also difficult to design and implement a study *a priori* that examines all of the relevant physical parameters, environmental variability, and other relevant issues associated with any particular study topic or problem such that perfect management standards can be derived. Studies involving rare species are also often constrained by small sample sizes and may lack replication. Establishing definitive review standards may be further complicated when pertinent studies draw contradictory conclusions, including those documenting behavioral differences in study animals at local and/or regional scales. Managers are required under ESA to use the best available information, whether peer reviewed or not, and therefore must acknowledge a higher measure of uncertainty than may be found in published information (Mace 2004). For these reasons and others associated with environmental and temporal variability, DNRC believes these areas of uncertainty are important considerations when exploring definitive answers and conclusions regarding incidental take, particularly for large, free ranging species such as grizzly bears.

DNRC acknowledges that constructing and maintaining roads in areas inhabited by grizzly bears has the potential to degrade habitat quality and indirectly create risk for grizzly bears. However, DNRC also has limited administrative permitting authority, which may be linked to such things as mistaken identity mortalities, which accounted for approximately 12 percent of the known grizzly bear mortality in the NCDE from 1980 to 2008 (USFWS 2009). Further, DNRC can not assume the liability and responsibility under ESA for those who may potentially use DNRC roads to illegally kill grizzly bears. A conservative estimate for malicious killings of grizzly bears in the NCDE, some of which could indirectly be associated with roads, from 1980 to 2008 was 23 percent of the known mortalities (USFWS 2009). DNRC believes that the responsibility and liability for take of grizzly bears resides with the individuals that commit any illegal, malicious, or careless acts that result in the deaths of grizzly bears.

Habitat Degradation Due to Roads

DNRC's forest management activities include the construction, use, and maintenance of roads. High road densities create localized areas of avoidance for some bears, while evidence suggests that other bears may become "habituated." Habituated bears will use such habitats uninhibited but with a higher probability of human encounter, which may or may not lead to mortality or other conflicts.

Impacts that could constitute take are most likely to occur in the form of harm as a result of disturbance from roads or from alteration of habitat (high road densities) to the extent female bears appreciably under-use important habitat. Relatively high road densities may result in displacement of grizzly bears, particularly female bears from essential habitat (Mace and Manley 1993). Such under-use of habitat for long periods could lead to some level of impairment of normal breeding and feeding behavior in females. Continuous displacement from key habitats across broad scales could result in a bear's failure to obtain adequate food resources. This is particularly important for female bears, due to the potential influence on reduced fitness and either failure to breed or increased risk of cub mortality prior to or after parturition.

The effects of displacement of grizzly bears from key habitats are difficult to quantify and, in most cases, impossible to measure in terms of adverse impacts to individual bears or population numbers. DNRC does not expect direct mortalities of adult or subadult female grizzly bears as a result of displacement. DNRC does not expect direct mortality or injury from significant impairment of breeding, feeding, or sheltering of male or subadult grizzly bears as a result of displacement. On DNRC lands, high road densities persisting in some areas may contribute to conditions with greater potential to constitute take. However, grizzly bears are individualistic and display a wide variation in their tolerance of and response to human activity and road density. The best scientific and commercial data available at this time are not sufficient to determine a specific number of grizzly bears that may be affected by displacement and therefore subject to incidental take. This is due to the lack of information related to

- The number of grizzly bears living in the HCP project area
- The number of adult female grizzly bears with home ranges encompassing all or portions of any particular subunit or groups of subunits with high road densities
- The individual day- and night-time response of grizzly bears to roads across the HCP project area, particularly adult females with home ranges encompassing areas with high road densities
- Demographic parameters, such as survivorship and fecundity
- Detection of loss of cubs prior to or after parturition
- A comprehensive understanding of all causative factors associated with mortalities of grizzly bears.

The degree to which incidental take may be occurring is also difficult to measure. Failure of females to breed, or loss of cubs prior to or after parturition, are very difficult factors to identify, and specific causes for such problems are even more difficult to discern. Therefore, in such cases where take is difficult to enumerate, the USFWS uses surrogate measures of the potential for take. Thus, for this analysis DNRC will use open road density (ORD) and total road density (TRD) values on its lands as a surrogate measure of impacts with the potential to constitute incidental take. The moving windows method (USFS 1995a) of density calculation was used for DNRC blocked lands, whereas due to data limitations, simple linear density calculation was used for scattered parcels within grizzly bear recovery zones. Available information indicates that female grizzly bears display appreciable under-use of habitat near roads and areas of high road densities (Mace and Manley 1993). This research provided a composite home range for female grizzly bears that survived to adulthood to successfully produce cubs. From this home range information, the USFWS derived the surrogate measures of ORD, TRD, and security core thresholds to approximate resulting levels of incidental take. DNRC recognizes that the USFWS considers the following conditions within the federally designated grizzly bear recovery zones as impacts that could constitute take in the form of "harm:"

- In the NCDE, harm occurs when the precise ORD exceeds 1 mi/mi^2 in over 19 percent of a BMU subunit. A BMU subunit represents the approximate size of an average annual female home range (about 50 square miles) (USFS 1995b). Mace and Manley (1993) demonstrated that when precise ORD exceeded 1 mi/mi^2 of habitat, adult grizzly bear use of habitat declined from expected use. It is reasonable to assume that some level of under-use of habitat may occur before essential behavior patterns are significantly impaired to the point of causing injury or death to individual bears. Mace and Manley (1993) also demonstrated that adult females using home ranges encompassing some area of ORD greater that 1 mi/mi^2 were able to survive and produce cubs. Nineteen percent of the adult female composite home range in the South Fork study area had ORD exceeding 1 mi/mi^2.

- In the CYE, harm occurs when the precise ORD exceeds 1 mi/mi^2 in over 26 percent of BMUs based on the scientific recommendations in Wakkinen and Kasworm (1997).

- In the NCDE, harm occurs when the precise TRD exceeds 2 mi/mi^2 in over 19 percent of a BMU subunit. Findings from Mace and Manley (1993) also suggested that when TRD exceeded 2 mi/mi^2 of habitat, use of habitat by all sex and age classes of grizzly bears significantly declined from expected. It is reasonable to assume that some level of under-use of habitat may occur before essential behavior patterns are appreciably impaired to the point of causing injury or death to individual grizzly bears. Research has also demonstrated that adult females using home ranges encompassing some area of TRD greater than 2 mi/mi^2 were able to survive and produce cubs. Nineteen percent of the adult female composite home range in the South Fork study area had TRD exceeding 2 mi/mi^2.

- In the CYE, harm occurs when the precise TRD exceeds 2 mi/mi^2 in over 33 percent of BMUs based on the scientific recommendations in Wakkinen and Kasworm (1997).

- In the NCDE, harm occurs when security core is less than 68 percent of a BMU subunit. Mace and Manley (1993) demonstrated that roadless areas or areas with less than 1 mi/mi^2 of access routes comprised a significant portion of adult female grizzly bear home ranges. Sixty-eight percent of the composite home range of adult females in the South Fork study area was security core.

- In the CYE, harm occurs when security core comprises less than 55 percent of the BMU based on the scientific recommendations in Wakkinen and Kasworm (1997).

For this HCP (acknowledging the difficulties in precisely evaluating incidental take described above), blocked lands in the HCP project area that exceed the maximum recommended TRD or ORD within BMU subunits in the NCDE are those acres with the potential to constitute take. In this manner, road density acreages are used as "best estimates" of the impacts that could constitute take for this HCP. Potential for incidental take associated with security core on DNRC lands is discussed below (see subsection Secure Habitat and Quiet Areas in Section 7.2.1.3, Impacts Determined to Not Constitute Take of Grizzly Bears).

Tables 7-1 and 7-2 identify the BMU subunits with DNRC ownership in the Stillwater Block and Swan River State Forest. The tables also disclose the current percentages of the subunits exceeding recommended ORDs and TRDs, and the anticipated percentages of subunits exceeding recommended ORDs and TRDs under the HCP for all ownerships, as well as the percent of DNRC ownership under the HCP that would exceed recommended ORDs and TRDs.

For the DNRC blocked lands component of the HCP, DNRC is requesting incidental take coverage for potential impacts that could occur on a total of 69,812 acres on which the ORD of 1 mi/mi^2 would be exceeded over the Permit term (Table 7-1). Similarly, DNRC is requesting incidental take coverage for potential impacts that could occur on a total of 87,661 acres on which the TRD of 2 mi/mi^2 would be exceeded over the Permit term (Table 7-2).

For scattered parcels, DNRC is requesting incidental take coverage for its ownership (17,439 acres) within grizzly bear subunits in the NCDE (Tables 7-3 and 7-4). While these tables show that currently only 8,818 acres and 4,992 acres of DNRC ownership exceed the linear ORD of 1 mi/mi^2 and TRD of 2 mi/mi^2, respectively, potential incidental take may occur where future increases in TRDs on DNRC acreage contribute to a BMU subunit exceeding the federal road density standard for the NCDE (19 percent). This may occur for ORDs because, while DNRC has committed to no net increase in baseline open road miles, HCP road density commitments for scattered parcels are applied at the administrative unit level. This means that open roads may change location on the landscape and affect different BMU subunits over time. Increases above federal standards may also occur for TRDs on this subset of HCP project area lands because there are no caps on TRD required under the HCP commitments for scattered parcels.

Incidental take and compliance with the terms of the HCP and Permit on scattered parcels in the NCDE will be implemented and monitored at the administrative unit level. DNRC will limit incidental take associated with open roads on scattered parcels in the NCDE by not exceeding open road miles by administrative unit as described under HCP commitment GB-SC1 (see Chapter 2, Conservation Strategies) and as depicted in Table 7-5. DNRC will limit incidental take associated with total roads on scattered parcels in the NCDE by ~~not exceeding~~limiting the acreage on which the TRD standard of 2 mi/mi^2 ~~TRD on more than~~would be exceeded to 17,439 acres during the Permit term. This acreage ~~and allowance~~ may be increased in the future should additional lands be added and managed under the HCP.

IG WINDOWS ORDs WITHIN GRIZZLY BEAR SUBUNITS CONTAINING BLOCKED LANDS UNDER ING CONDITIONS AND THE HCP AT YEAR 50

	Existing Condition (All Ownerships)		HCP – Year 50			
Unit, BMU, Subunit	BMU Subunit Acres	Percent of BMU Subunit Exceeding 1 mi/mi^2 ORD	Percent of BMU Subunit Exceeding 1 mi/mi^2 ORD (All Ownerships)	Acres of HCP Project Area Lands within BMU Subunit (Percent of All Ownerships)	Percent of HCP Project Area Lands Exceeding 1 mi/mi^2 ORD	Acres of HCP Project Area Lands Exceeding 1 mi/mi^2
		30.4	**33.2**	**90,672**	**50.4**	**45,834**
ead BMU		***20.0***	***20.0***	***383***	***11.0***	***42***
	28,607	20.0	20.0	383 (1.3)	11.0	42
		31.7	***32.2***	***326***	***3.6***	***12***
	47,487	31.7	32.2	326 (0.7)	3.6	12
		37.6	***44.2***	***74,323***	***52.4***	***38,967***
	34,559	47.3	47.9	14,365 (41.6)	72.2	10,371
	40,860	33.9	39.1	32,923 (80.6)	43.6	14,353
	32,201	32.0	46.8	27,035 (84.0)	52.7	14,243
ead BMU		***24.2***	***24.9***	***15,640***	***43.0***	***6,813***
	25,249	15.5	15.5	413 (1.6)	0.0	0
	33,658	24.8	24.5	1,807 (5.4)	12.1	220
	31,366	31.3	32.9	13,420 (42.8)	49.1	6,593
		27.2	**33.1**	**39,699**	**60.6**	**23,979**
		25.2	***28.9***	***27,285***	***50.8***	***13,782***
	27,602	25.0	31.6	5,894 (21.4)	87.8	5,173
	29,047	24.6	27.8	3,067 (10.6)	85.9	2,634
	29,883	25.8	27.4	18,324 (61.3)	32.6	5,975
		29.7	***38.4***	***12,414***	***82.1***	***10,197***
	30,992	30.5	32.4	177 (0.6)	35.0	62
	37,666	29.0	43.3	12,237 (32.5)	82.8	10,135
					Total Potential Take Acres Associated with ORD	69,812

ving windows method per USFS (1995a).

IG WINDOWS TRDS WITHIN GRIZZLY BEAR SUBUNITS CONTAINING BLOCKED LANDS UNDER
ING CONDITIONS AND THE HCP AT YEAR 50

Unit, BMU, g Subunit	Existing Condition (All Ownerships) BMU Subunit Acres	Percent of BMU Subunit Exceeding 2 mi/mi^2 TRD	HCP – Year 50 Percent of BMU Subunit Exceeding 2 mi/mi^2 BMU (All Ownerships)[1]	Acres of HCP Project Area Lands within BMU Subunit (Percent of All Ownerships)	Percent of HCP Project Area Lands Exceeding 2 mi/mi^2 TRD	Acres of HCP Project Area Lands Exceeding 2 mi/mi^2
		35.7	**35.7**	**90,672**	**57.2**	**87,660**
ead BMU		***25.5***	***25.8***	**383**	**5.0**	**19**
	28,607	25.5	25.8	383 (1.3)	5.0	19
		17.7	***18.6***	***326***	***0.1***	***0***
	47,487	17.7	18.6	326 (0.7)	0.1	0
		56.5	***57.3***	***74,323***	***58.4***	***43,422***
	34,559	82.4	83.0	14,365 (41.6)	79.6	11,432
	40,860	33.8	34.4	32,923 (80.6)	42.1	13,866
	32,201	58.3	58.7	27,035 (84.0)	67.0	18,124
ead BMU		***23.0***	***22.2***	***15,640***	***54.1***	***8,441***
	25,249	30.1	30.4	413 (1.6)	0.1	0
	33,658	13.5	13.4	1,807 (5.4)	57.0	1,030
	31,366	26.9	25.0	13,420 (42.8)	55.2	7,411
		56.7	**57.5**	**39,699**	**90.2**	**35,778**
		51.8	***52.4***	***27,285***	***86.5***	***25,580***
	27,602	61.0	61.0	5,894 (21.4)	97.6	5,752
	29,047	48.0	49.4	3,067 (10.6)	100.0	3,067
	29,883	46.7	47.4	18,324 (61.3)	80.6	14,761
		63.1	***63.8***	***12,414***	***98.3***	***12,198***
	30,992	47.8	49.0	177 (0.6)	66.5	118
	37,666	75.8	76.1	12,237 (32.5)	98.7	12,080
					Total Potential Take Acres Associated with TRD	87,661

ving windows method per USFS (1995a).

TABLE 7-3. ORDs BY BMU SUBUNIT IN THE NCDE FOR ALL OWNERSHIPS AND SCATTERED PARCELS

DNRC Administrative Unit and BMU	BMU Subunit	BMU Subunit Acres (All Ownerships)	Percent of Subunit Exceeding 1 mi/mi^2 ORD (All Ownerships)[1]	Acres of HCP Project Area Lands within Subunit (Percent of All Ownerships)	Acres of HCP Project Area Lands within Subunit Exceeding 1 mi/mi^2 Linear ORD[2]
Kalispell Unit Subtotal		**179,788**		**7,076 (4.0)**	**3,977**
Hungry Horse	Peters Ridge	25,109	52	742 (3.0)	158
Lower North Fork Flathead	Cedar Teakettle	31,704	26	481 (1.5)	0
Mission Range	Crane Mtn	36,692	32	85 (0.2)	0
Rattlesnake	South Fork Jocko	49,187	NA	631 (1.3)	631
Sullivan	Noisy Red Owl	37,096	20	5,137 (13.8)	3,188
Stillwater Unit Subtotal		**147,501**		**2,284 (1.5)**	**647**
Lower North Fork Flathead	Lower Big Creek	30,343	19	82 (0.3)	0
Stillwater River	Stryker	40,860	34	5 (0)	1
Upper North Fork Flathead	Ketchikan	23,911	17	1,097 (4.6)	646
Upper North Fork Flathead	Lower Whale	19,020	36	1,100 (5.8)	0
Upper North Fork Flathead	Red Meadow Moose	33,367	25	198 (0.6)	0
Clearwater Unit Subtotal		**216,105**		**4,778(2.2)**	**1,967**
Monture Landers Fork	Alice Creek	70,175	10	1,194 (1.7)	716
Monture Landers Fork	Arrastra Mountain	69,256	17	1,696 (2.4)	420
Monture Landers Fork	Red Mountain	76,674	23	1,888 (2.5)	1,251
Missoula Unit Subtotal		**49,187**		**2,464 (5.0)**	**1,807**
Rattlesnake	South Fork Jocko	49,187	NA	2,464 (5.0)	1,807
Helena Unit Subtotal		**84,931**		**639 (0.8)**	
Dearborn Elk Creek	Falls Creek	84,931	NA	639 (0.8)	0
			Total Acres	**17,439**	**8,818**

NA - Not available.

[1] Data for the Clearwater Unit is based on a December 11, 2008, moving windows analysis provided by Pat Shanley, District Biologist, Lincoln Ranger District. ORD by subunit for other Units based on the annual (2007) moving windows analysis under A19 for the Flathead National Forest.

[2] Road densities on DNRC lands determined using a linear road density calculation.

TABLE 7-4. TRDs BY BMU SUBUNIT IN THE NCDE FOR ALL OWNERSHIPS AND HCP PROJECT AREA LANDS

DNRC Administrative Unit and BMU	BMU Subunit	BMU Subunit Acres (All Ownerships)	Percent of Subunit Exceeding 2 mi/mi^2 TRD (All Ownerships)[1]	Acres of HCP Project Area Lands within Subunit (Percent of All Ownerships)	Acres of HCP Project Area Lands within Subunit Exceeding 2 mi/mi^2 Linear TRD[2]
Kalispell Unit Subtotal		**179,788**		**7,076 (4.0)**	**2,186**
Hungry Horse	Peters Ridge	25,109	25	742 (3.0)	158
Lower North Fork Flathead	Cedar Teakettle	31,704	24	481 (1.5)	0
Mission Range	Crane Mtn	36,692	60	85 (0.2)	0
Rattlesnake	South Fork Jocko	49,187	NA	631 (1.3)	0
Sullivan	Noisy Red Owl	37,096	20	5,137 (13.8)	2,028
Stillwater Unit Subtotal		**147,501**		**2,482 (1.5)**	**1**
Lower North Fork Flathead	Lower Big Creek	30343	25	82 (0.3)	0
Stillwater River	Stryker	40,860	34	5 (0)	1
Upper North Fork Flathead	Ketchikan	23,911	3	1,097 (4.6)	0
Upper North Fork Flathead	Lower Whale	19,020	17	1,100 (5.8)	0
Upper North Fork Flathead	Red Meadow Moose	33,367	17	198 (0.6)	0
Clearwater Unit Subtotal		**216,105**		**4,778 (2.2)**	**2,805**
Monture Landers Fork	Alice Creek	70,175	16	1,194 (1.7)	716
Monture Landers Fork	Arrastra Mountain	69,256	19	1,696 (2.4)	420
Monture Landers Fork	Red Mountain	76,674	18	1,888 (2.5)	1,031
Missoula Unit Subtotal		**49,187**		**2,464 (5.0)**	
Rattlesnake	South Fork Jocko	49,187	NA	2,464 (5.0)	638
Helena Unit Subtotal		**84,931**		**639 (0.8)**	**0**
Dearborn Elk Creek	Falls Creek	84,931	NA	**639 (0.8)**	0
			Total Acres	**17,439**	**4,992**

[1] Data for the Clearwater Unit is based on a December 11, 2008, moving windows analysis provided by Pat Shanley, District Biologist, Helena National Forest. TRD by subunit for other Units based on the annual (2007) moving windows analysis under A19 for the Flathead National Forest.

[2] Road densities on DNRC lands determined using a linear road density calculation.

TABLE 7-5. EXISTING OPEN ROAD MILES IN THE HCP PROJECT AREA IN THE GRIZZLY BEAR RECOVERY ZONES AND CYE NROH

Land Office and Unit Office by Recovery Zone	Open Road (Miles)[1,2]
NWLO Recovery Zone	**205.6**
Kalispell Unit NCDE	17.8
Libby Unit CYE	3.5
Plains Unit CYE	11.8
Plains Unit NCDE	N/A
Stillwater Unit NCDE	1.8
Swan Unit NCDE	N/A
NWLO CYE NROH	**45.7**
Libby Unit CYE	38.0
Plains Unit CYE	7.7
SWLO Recovery Zone	**21.4**
Anaconda Unit NCDE	N/A
Clearwater Unit NCDE	16.8
Missoula Unit NCDE	4.1
CLO Recovery Zone	**0.2**
Conrad Unit NCDE	N/A
Helena Unit NCDE	0.2

N/A = not applicable. There is no such land area in the given unit.

[1] n the original 2006 analysis, the status of several segments of road in the CYE were "unknown," necessitating their inclusion in the "open" road class. Upon recent (2008) field review of open roads in the CYE, it was determined that many of these roads are part of larger road systems across USFS and private industrial lands that are restricted to public access by gates and barriers on other ownerships. Therefore, these roads are managed as restricted. Further details on current road status on CYE lands is provided below in Section 7.2.1.2, Incidental Take in the Cabinet-Yaak Ecosystem.

[2] DNRC and the USFWS recognize that landscape-scale datasets have errors in road lengths and locations. Thus, as errors in road data are detected and better information becomes available, DNRC will report the information to the USFWS. Given sufficient evidence provided to the USFWS from DNRC, these baseline values will be adjusted to reflect the improvement in the information. Additionally, change in road status due to easements will not count against the baseline conditions when tracking increases in road miles at the administrative unit level.

Source: DNRC (2008a).

DNRC also acknowledges that the NCDE population of grizzly bears is increasing and expanding its range (Kendall et al. 2009), which encompasses not only NROH but may also include other HCP project area lands (i.e., the remaining non-recovery-zone/non-NROH lands) in the future. The USFWS considers NROH and other HCP project area lands not essential for the recovery of grizzly bears; however, future road building on scattered parcels in these areas may at some time during the Permit term cause impacts that could constitute take of grizzly bears. The likelihood that DNRC's actions on these scattered parcels would constitute take is anticipated to be low given the small area associated with a scattered parcel compared to the overall home range of a grizzly bear and because generally DNRC restricts public motorized access on most roads on scattered parcels. Nonetheless, some minor potential for impacts that could constitute take remains. Therefore, DNRC is requesting take coverage on 400,690 acres of the HCP scattered parcels outside of recovery zones on NROH and other non-recovery-zone scattered parcels over the Permit term.

Bear-human and Bear-livestock Conflicts

Bear-human or bear-livestock conflicts could result in death or harm to a grizzly bear. DNRC believes the likelihood is extremely low that its staff, contractors or grazing licenses would cause a conflict requiring removal of a bear from the population for the following reasons:

1. There has never been a documented case of a direct conflict with DNRC staff or contractors and grizzly bears that resulted in a bear's death.

2. The probability of such an adverse outcome will be minimized through implementation of the HCP conservation commitments described in Chapter 2 (Conservation Strategies), including training people working in bear habitat (GB-PR1), firearms restrictions (GB-PR2), sanitation (GB-PR3), and livestock management restrictions (GB-NR5 and GB-RZ4), as well as commitments that provide visual screening and cover (GB-PR6, NR4, RZ2).

However, the potential for take cannot be completely eliminated because DNRC has considerable ownership in grizzly bear habitat and because bears are currently relatively abundant in the NCDE (Kendall et al. 2009). To approximate a number of potential grizzly bears that might be affected as a result of covered activities, an analysis was conducted that considered known grizzly bear mortalities in the NCDE and causes during the last 28 years (USFWS 2009). To conduct the analysis, several assumptions were required

- DNRC manages a similar proportion of its acreage for grazing purposes as other major land owners and land management agencies associated with the NCDE.

- Grizzly bear mortalities occur on all ownerships due to similar causes in relative proportion to the availability of a particular ownership within the NCDE.

- Similar land management activities conducted by all other major land owners and land management agencies are likely to influence bears at the same rates. That is, similar forest management activities, such as setting up timber sales, logging, and managing livestock allotments, are likely to affect bears similarly whether they are conducted by DNRC, the USFS, or by private industrial land managers, etc.

The specific mortality causes in the NCDE described by the USFWS (2009) deemed most similar to those that DNRC activities might result in with the potential to take grizzly bears were (1) livestock-related mortalities, and (2) mortalities related to human self defense (Table 7-6). For the analysis, the total number of bears that died related to these combined causes in the NCDE (n=59) was divided by 28 years to derive a value for average bear deaths per year (2.1) for the entire ecosystem. This value was then multiplied by the proportion of DNRC land ownership in the NCDE (3.6 percent), and finally multiplied by 50 years – the life of the HCP and term of the Permit. The resulting number of 3.78 bears, given the assumptions above, is the number of bears that could be lost to the population given general characteristics of the types of activities, land area involved, and duration (in years) of the activities. Therefore, rounding this number up, DNRC requests take associated with up to four bears within the NCDE and all other remaining HCP project area lands (excluding the CYE) over the Permit term. Loss of these bears may result in reduced recruitment in the NCDE if the affected bears are females. For the reasons stated above, DNRC expects this loss to be unlikely.

TABLE 7-6. ~~POTENTIAL GRIZZLY BEAR MORTALITY CAUSES AND~~ EVALUATION OF INCIDENTAL TAKE OF GRIZZLY BEARS RELATED TO COVERED FOREST MANAGEMENT ACTIVITIES ON DNRC LANDS USING POTENTIAL MORTALITY CAUSES KNOWN FOR THE NCDE FROM 1980 TO 2008

Statistic or Calculation	Result
Livestock-related Mortalities from 1980 to 2008 in the NCDE	29
Self-defense-related Mortalities from 1980 to 2008 in the NCDE	30
Total number of bears killed during 28 years due to self-defense- and livestock-related causes	59
Long-term average number of bears per year that died in the NCDE due to these causes	2.1
DNRC portion of the potential annual mortality given its 3.6% ownership within the NCDE	0.0756
Level of “take” requested in bear family groups over the 50-year Permit term	3.78

Source for mortality data for the NCDE: USFWS (2009).

7.2.1.2 Incidental Take in the Cabinet-Yaak Ecosystem

On February 12, 1993, the USFWS issued a 12-month finding of warranted for endangered status but precluded by other listing actions for grizzly bears in the CYE (58 FR 8250-8251). The population is currently considered to contain about 30 to 40 individuals. Given the population status and risk factors associated with the CYE recovery zone, the USFWS has formally stated that the mortality objective for this ecosystem is zero. Given the greater risk and sensitivity of this ecosystem, DNRC worked with the USFWS to develop conservation commitments that will avoid incidental take of grizzly bears. This is reflected specifically in grizzly bear conservation commitments GB-CY1, GB-CY2, GB-CY3, GB-CY4, and GB-CY5, which require higher levels of conservation to further minimize any adverse effects.

No take is anticipated within the CYE (both RZ and NROH) for the following reasons:

- DNRC has few active grazing licenses (n=4) in the CYE, with no history of bear management actions, and no new grazing licenses would be authorized.
- DNRC lands comprise less than 0.5 percent of the land area within the CYE.
- While Table 7-7 shows that DNRC exceeds 1 mi/mi^2 ORD on five of its nine scattered parcels in the CYE recovery zone, true ORDs on DNRC lands are very low within the CYE. Most roads in the CYE are managed as restricted by DNRC. However, for the purposes of its analysis, DNRC has included as “open” all roads with USFS or Plum Creek easements even if they are managed as restricted. This is because, at some future time, due to the existing easements, DNRC could be forced to open the roads to meet the needs of the easement holders (i.e., the USFS or Plum Creek).
- Four grizzly bear BMUs in the CYE where DNRC has ownership do not meet scientific recommendations for ORDs (Table 7-7). Where the BMU does not meet the ORD scientific recommendations, DNRC will not increase open roads under the HCP and therefore would not contribute to further changes in the BMU.

TABLE 7-7. ORDs BY BMU IN THE CYE FOR ALL OWNERSHIPS AND HCP PROJECT AREA LANDS

DNRC Administrative Unit and BMU	BMU Acres (All Ownerships)	Percent of BMU Exceeding 1 mi/mi² ORD (All Ownerships)[1]	Acres of HCP Project Area Lands within BMU (Percent of All Ownerships)	Acres of HCP Project Area Lands within BMU Exceeding 1 mi/mi² Linear ORD[2]
Libby Unit				
Newton	64,284	42	266 (0.4)	266
Spar	71,472	27	642 (0.9)	0
Callahan	43,449	27	663 (1.5)	663
Cedar	30,804	14	10 (0.0)	10
Snowshoe	65,230	19	1,278 (2.0)	0
Plains Unit				
Bull	81,719	37	311 (0.4)	0
Wanless	23,705	39	733 (3.1)	643
Vermilion	68,533	33	266 (0.4)	265
Mount Headley	152,394	38	1,998 (1.3)	1,877
		Total Acres that Exceed 1 mi/mi² Linear ORD		**3,724**

[1] Moving windows ORD by BMU based on 2008 data provided by Lee Brundin, Wildlife and Fisheries Biologist, Kootenai National Forest. Shaded cells represent subunits that do not meet the scientific recommendation for no more than 33% of a BMU with greater than 1 mi/mi² ORD.
[2] Road densities on DNRC lands determined using a linear road density calculation.

- Four grizzly bear BMUs where DNRC has ownership do not meet scientific recommendations for TRDs (Table 7-8). For the Newt, Spar, and Wanless BMUs, which do not meet the TRD recommendations, DNRC's ownership meets the scientific recommendations and does not contribute to exceeding the scientific recommendations. For the Mount Headley BMU, which does not meet the TRD recommendations, all but 6 percent of DNRC's ownership (which is 1.3 percent of the BMU) is roaded such that any increases in restricted roads on the remaining 6 percent of DNRC's ownership would not contribute to a measurable change for the BMU.

- Under the HCP, the need for any new roads would be highly scrutinized, and any new roads would be managed as temporary roads or restricted.

- Displacement and associated adverse effects that may occur due to anticipated increases in TRDs as presented in the EIS for this HCP would be offset by the application of DNRC recovery-zone-level standards on nearby NROH parcels. Commitments applied in the NROH that would offset displacement impacts associated with minor increases in restricted roads within the CYE recovery zone include (1) the 8-year rest requirement for each parcel following 4 years of commercial activity, (2) more restrictions on administrative motorized activities in spring habitat during the spring season, (3) additional restrictions on the size and duration of smaller salvage projects, (4) recovery-zone-level provisions for visual screening along open roads, and (5) consideration of important habitat elements and high use areas for bears. These commitments are in addition to other NROH commitments that would also minimize displacement, such as the requirements for maintaining 600 feet to cover in harvest units and retaining cover near RMZs and WMZs. Application of these measures will minimize the overall effects such that they do not constitute take.

- Potential adverse effects on bears from helicopter use would be avoided in the CYE through implementation of commitment GB-CY5 in the recovery zone. This commitment requires DNRC to design flight paths to be more than 1 mile from scattered parcels in rest or in federally designated security core areas. Additionally, for scattered parcels in recovery zones and NROH, short-duration activities such as weed control or aerial seeding that use helicopters would be limited to less than 48 hours in duration.

TABLE 7-8. TRDs BY BMU IN THE CYE FOR ALL OWNERSHIPS AND HCP PROJECT AREA LANDS

DNRC Administrative Unit and BMU	BMU Acres (All Ownerships)	Percent of BMU Exceeding 2 mi/mi^2 TRD (All Ownerships)[1]	Acres of HCP Project Area Lands within BMU (Percent of All Ownerships)	Acres of HCP Project Area Lands within BMU Exceeding 2 mi/mi^2 Linear TRD[2]
Libby Unit				
Newton	64,284	30	266 (0.4)	0
Spar	71,472	27	642 (0.9)	0
Callahan	43,449	26	663 (1.5)	663
Cedar	30,804	9	10 (0.0)	10
Snowshoe	65,230	15	1,278 (2.0)	0
Plains Unit				
Bull	81,719	26	311 (0.4)	0
Wanless	23,705	33	733 (3.1)	0
Vermilion	68,533	22	266 (0.4)	0
Mount Headley	152,394	36	1,998 (1.3)	1,798
		Total Acres that Exceed 2 mi/mi^2 Linear TRD		**2,471**

[1] Moving windows TRD by BMU based on 2008 data provided by Lee Brundin, Wildlife and Fisheries Biologist, Kootenai National Forest. Shaded cells represent subunits that do not meet the scientific recommendation for no more than 26% of a BMU with greater than 2 mi/mi^2 ORD.
[2] Road densities on DNRC lands determined using a linear road density calculation.

7.2.1.3 Impacts Determined to Not Constitute Take of Grizzly Bears

Helicopter Use

Helicopters can disturb grizzly bears and/or displace them from preferred areas (McLellan and Shackleton 1989a). On an infrequent basis, DNRC contractors use helicopters to access harvested timber in otherwise inaccessible terrain and/or areas in which road construction and maintenance are not feasible. From 1998 to 2005, the statewide annual amount of DNRC's harvest units logged using helicopter equipment ranged from approximately 160 to 320 acres per year (DNRC 2005b),which corresponds to a range of 2 to 4 percent based on an approximate statewide total harvest of 8,000 acres per year. A portion of these units would have occurred on HCP project area lands within grizzly bear recovery zones.

Over the past 2 years (2008 to July 2010), no DNRC timber sales included helicopter logging units. On rare occasions, DNRC may use helicopters to accomplish other various short-duration forest management activities, such as weed control, aerial seeding, and moving large pieces of equipment or materials to remote or rugged locations. Such administrative activities are of short duration (i.e., 1 to 2 days of operating time). While helicopter use for forest management is infrequent, the associated disturbance can have adverse effects on grizzly bears.

Research findings regarding helicopter disturbance have been mixed (USFS and USFWS 2009), and associated effects can be influenced by a number of factors, including the (1) proximity of the action to the species, (2) distribution of the activity across the landscape, (3) timing of the activity, (4) nature of the effect, (5) duration of the disturbance, (6) frequency of the disturbance, (7) intensity of the disturbance, and (8) severity of the disturbance. Evaluation of the frequency, altitude, and duration of helicopter trips are key considerations for evaluating potential effects on grizzly bears.

According to a 2009 guide developed by the USFS and USFWS (2009) to address activities involving helicopter use on federal lands, the following levels of effects are likely based on altitude, frequency, and duration:

- Flights more than 500 meters (1,640 feet) above ground level with no landings are likely to have minimal effects on grizzly bears regardless of their frequency and duration.
- Low-altitude flights less than 500 meters (1,640 feet) above ground level are likely to elicit a response by bears, which may result in adverse effects to varying degrees depending on their frequency and duration.

In areas where grizzly bears are present, helicopter yarding associated with DNRC's logging activities are likely to disturb bears because flights tend to occur less than 500 meters (1,640 feet) above ground level, activities typically involve frequent trips for several days up to several months at a time, and flights usually require periodic service landings. Some HCP commitments that would help avoid or minimize effects of ground-based harvest on grizzly bears would also help avoid or minimize effects due to helicopters. These commitments include the den site and denning habitat protections provided by commitments GB-PR5 and GB-RZ5, the spring management restrictions in commitment GB-NR3, and the mandatory rest periods in commitments GB-ST2, GB-SW3, and GB-SC2.

Implementing commitment GB-PR8 would further avoid or minimize potential for disturbance and displacement from important habitats for grizzly bears, particularly those associated with quiet areas in rest and federally designated secure habitat. Effects on grizzly bears attributable to DNRC's helicopter activities would likely be minor under the HCP for the following reasons:

1. The nature of helicopter disturbance in areas important for grizzly bears is infrequent on a program basis. Each year, very few projects contain helicopter harvest units applied across the broad 548,500-acre project area.

2. The nature of the disturbance type occurs within small geographic areas when it does occur. Statewide, approximately 160 to 320 localized acres on average would be harvested annually using helicopters, and only a portion of those would occur in areas important for grizzly bears.

3. When forest stands are logged using a helicopter, the associated disturbance is usually initiated and completed within one 3- to 6-month operating season; thus, the activity occurs infrequently and is of relatively short duration.

4. Abundant forest cover is frequently present in western Montana where helicopter logging activities would take place, which may ameliorate effects on bears with nearby home ranges (McLellan and Shackleton 1989a).

While short-term helicopter disturbance can be intense for an individual bear(s) using a local area, the long-term effect of the activity provides considerably less risk than similar ground-based yarding methods requiring new road construction or existing road systems. While the applicable HCP commitments may not completely eliminate adverse effects of helicopters on grizzly bears, DNRC anticipates that such effects would not constitute take. In areas where grizzly bears are present and where DNRC would conduct short-duration activities that use helicopters for administrative purposes, those activities may disturb bears because flights would tend to occur less than 500 meters (1,640 feet) above ground level with repeated trips and landings. However, because these activities would be brief and of short duration (less than 2 consecutive days), they would be unlikely to adversely affect grizzly bears, particularly given measures contained in commitment GB-PR8. Another important consideration is that most short-duration forest management activities that use helicopters, such as weed control, prescribed burning, and aerial seeding, would often result in longer-term vegetative habitat improvements for grizzly bears. DNRC anticipates that effects of helicopters that may remain after the implementation of all applicable HCP commitments would not constitute take of grizzly bears.

Displacement or Disturbance in Spring Habitat

Forest management activities conducted in spring habitat during the spring season could result in bears being disturbed or displaced from preferred habitats during this important period of nutritional stress. Upon emerging from their dens in spring, grizzly bears are nutritionally stressed. As a result, their habitat use patterns during the spring are driven by the need to maximize energy intake. Activities that displace bears from spring foraging habitat may adversely affect their ability to consume adequate amounts of food in a short amount of time.

The HCP commitments will prohibit commercial forest management activities, pre-commercial thinning, and heavy equipment slash treatment during the spring period in spring habitat in recovery zones and NROH. Restricting DNRC activities in these areas during critical seasons will avoid adverse effects on bears in these important habitat areas.

While some low-intensity activities will be allowed (such as tree planting, sale preparation, noxious weed management, etc.) and commercial forest management activities will be allowed within 100 feet of open roads, these activities are typically of short duration and must be conducted during narrow time periods in spring or provide indirect benefits to bears. Therefore, while these activities may disturb bears, they will not result in permanent displacement of bears from crucial habitat nor will they prevent bears from meeting their nutritional needs to a degree that would constitute take.

Denning and Post-denning Habitat

Mechanized forest management activities and/or the presence of humans near denning habitat, den sites, and post-denning habitat may result in physiological stress or den abandonment.

The HCP will implement commitments prohibiting mechanized operations within 0.6 mile of known active, occupied den sites. Where specific information on den sites is available, (e.g., for bears that are subjects of radio-tracking studies, etc.), this measure will avoid the risk of physiological stress to denning bears.

Because no consistent, formal survey efforts will be dedicated to locating den sites, it is possible that forest management activities may occur near undetected, occupied dens. However, the likelihood that this would occur is extremely low since it is not feasible to conduct most forest management activities in denning habitat (slopes greater than 45 percent at elevations greater than 6,300 feet) during the denning season, when snow depths are still high. Under all action alternatives, components of commitments GB-ST2, GB-SW3, and GB-SC2 will also restrict motorized activities above 6,300 feet, further reducing potential for physiological stress to any denning bears on or nearby trust lands.

DNRC has determined that the likelihood of adverse effects on bear den sites is discountable because known sites would be avoided and there is a low likelihood of activities being conducted in denning habitat in the denning season. Thus, no take is anticipated.

Secure Habitat and Quiet Areas

Reducing the amount of area where grizzly bears are relatively safe from disturbance and encounters with humans may result in disturbance, displacement, habituation, and an elevated risk of human-caused mortality.

The HCP will implement the concept of "quiet areas" to provide bears safe areas away from disturbance and potential encounters with humans. Under the HCP, quiet areas are defined as areas periodically free from commercial activities, including subzones or scattered parcels in rest, where commercial activities are restricted following periods of active management, or areas where management activities are restricted in certain key habitats during important seasons of the year. The Swan Agreement, under which DNRC and neighboring landowners cooperatively limit management activities following periods of active management in BMU subunits, provides an example of managing for quiet areas.

This approach represents a departure from the idea of providing secure habitat for grizzly bears. Secure habitat for grizzly bears is specifically defined by the IGBC (1998) as areas that are at least 0.3 mile from any open road or motorized trail and receive no motorized use of roads or trails during the period they are considered secure habitat (typically at least 10 years). Security "core" habitat is a habitat management concept that some national forests have adopted to help grizzly bears meet life requisites. This concept establishes large blocks of habitat (several thousand acres) relatively free from human activity and disturbance. Since national forests manage multiple BMUs, they are more capable of managing core habitat. Desirable amounts of core habitat on federal lands exceed 50 percent of a BMU subunit. Conversely, DNRC manages very small portions of a few

BMUs and only portions of several BMU subunits. Thus, to manage for security core habitat on DNRC blocked lands would severely restrict management on substantial proportions of DNRC lands for decades at a time. Further, to manage for core on isolated, scattered parcels would be biologically irrelevant given the scale of grizzly bear home ranges (about 50 square miles), and the inability to control or restrict the activities of other landowners on surrounding lands.

DNRC believes that the rotation of commercial activities in combination with restrictions on commercial activities in spring habitat in the spring period and no net increases in ORDs in rested subzones would allow bears to meet their habitat requirements in a setting with a reduced risk of bear-human conflicts such that potential adverse effects on bears would not result in take.

DNRC acknowledges that the HCP will allow interruptions within rested subzones and parcels. A rested subzone or parcel could be interrupted for minor projects, for up to 30 days, on an annual basis. The effects of these interruptions have been reduced by minimizing the total number of days that can be used and by prohibiting these projects within the spring period in spring habitat such that they would not result in take of grizzly bears.

A rested subzone or parcel could also be interrupted for salvage purposes for up to 150 days. DNRC will mitigate the potential adverse effects of conducting salvage within a rested subzone by (1) forgoing unused days in other subzones (i.e., DNRC would not use its allowable 30 days on other rested subzones), (2) restarting the 8-year rest period, and (3) developing a site-specific mitigation plan addressing potential effects on bears through habitat considerations, timing restricts, and transportation management and access. These mitigations would reduce the adverse effects on grizzly bears such that they would not result in take.

Within the Swan River State Forest, DNRC will be allowed to operate a gravel pit more than 0.25 mile from an open road in a rested subzone. When this occurs, DNRC will mitigate the potential effects on bears by (1) minimizing the distance of the pit from the open road, and (2) to the extent possible, ceasing activities on all allowable remaining pits while the pit in the rested subzone is active. The localized nature of the impact of gravel pits in combination with the proposed mitigations would reduce adverse effects on bears such that they would not result in take.

Hiding Cover

Activities that reduce the potential for vegetation to conceal a grizzly bear can lower effective bear use of habitat and render bears more vulnerable to human-caused mortality (Servheen et al. 1999).

Adequately concealing bears and reducing their risk of detection is addressed through provisions for hiding cover and in the design of cutting units. Currently, within the Swan River State Forest and the Stillwater Block, DNRC is required to retain no less than 40 percent of trust lands in any BMU subunit in hiding cover. Under the HCP commitments, DNRC will no longer retain target amounts of hiding cover in BMU subunits in the Stillwater Block or Swan River State Forest. However, DNRC still expects to provide adequate hiding cover for bears in bear habitat as demonstrated in the EIS analysis for this HCP (see Table 4.9-17 in subsection Habitat Modification in Section 4.9.3.2, Grizzly Bears – Environmental Consequences). This analysis shows that, in the absence of a commitment to retain 40 percent hiding cover within BMU subunits, DNRC's operations will still adequately retain hiding cover for bears.

Additionally, the HCP commitments will require DNRC to design cutting units to reduce visual detection of bears. These commitments require DNRC to

1. Provide visual screening in riparian areas and in wetlands on all HCP project area lands (GB-PR6).

2. Design new harvest units to retain visual screening for bears by ensuring that vegetation or topographic breaks are no more than 600 feet from any point in the unit in recovery zones and NROH (GB-NR4).

3. Leave up to 100 feet of vegetation between open roads and clearcut or seed tree harvest units, with some allowances in recovery zones (GB-RZ2).

While some disturbance and bear-human encounters may occur in the HCP project area, DNRC believes the combination of available hiding cover in the HCP project area and modifications to cutting unit designs to visually screen bears will sufficiently reduce the likelihood and degree of detection such that potential adverse effects on bears would not result in take.

Habitat Elements

Habitat features consistently described in the literature as favored by bears include avalanche chutes, fire-mediated shrub fields, whitebark pine stands, wetlands, riparian areas, and unique congregation or feeding areas. Management activities that reduce the effectiveness of such areas to provide forage, or reduce use of these important places during important seasons, could adversely impact the nutritional condition of bears.

Under the HCP, for projects in recovery zones, DNRC will develop mitigations that minimize impacts to important habitat features, including avalanche chutes, whitebark pine stands, wetlands, riparian areas, berry fields, and unique congregation or feeding areas. Mitigations will typically involve scheduling activities to occur while bears are not likely to be using an area or locating roads or skid trails to conserve important vegetative features, such as berry patches or dense stands or thickets that provide visual screening for likely feeding areas. Riparian areas and avalanche chutes will be similarly protected through the program-wide commitment that restricts road construction in these important areas.

As a result, the risk of adverse effects on foraging opportunities in key sites will be reduced such that these areas would continue to provide foraging habitat during important seasons. No take is anticipated.

Habitat Linkage

Forest management activities may result in increases in human access and reductions in forest cover in areas situated within or between existing large blocks of relatively secure habitat, resulting in adverse effects on habitat linkage for grizzly bears.

For the purposes of this analysis, linkage refers to movements across highways or between populations or geographic areas, and within defined linkage areas (USFS 2007; USFWS et al. 1995;

Servheen et al. 2001). With the exceptions of the Stillwater Block and Swan River State Forest, DNRC's ability to influence linkage areas is relatively limited by ~~the amount of land in the HCP project area (approximately 2 percent) and distribution of lands~~its small amount of land ownership compared to the federal land base and the scattered nature of those lands in western Montana (Tables 4.9-8 and 4.9-9 in Section 4.9.3.1, Grizzly Bears – Affected Environment, and Figures D-18A, B, and C in Appendix D, EIS Figures, of the EIS for this HCP).

The Stillwater Block and the Swan River State Forest are important land areas with high value for linkage, and linkage zones have been formally identified within these areas (USFWS et al. 1995; Servheen et al. 2001).

To ensure the integrity of linkage areas, the areas must contain adequate cover and experience limited human disturbance or development. Within the Stillwater Block and the Swan River State Forest, several commitments will ensure the integrity of linkage areas. These include: (1) incorporation of seasonal restrictions on roads; (2) limits on amounts of open and restricted roads; (3) annual inspects of road closures and timely repairs; and (4) maintenance of large, quiet areas that would facilitate use by grizzly bears during important seasons. Additionally, the commitments for visual screening and limited road construction within riparian areas and avalanche chutes will further reduce potential effects on the integrity of linkage areas. Therefore, while DNRC will continue to harvest timber and build roads within linkage areas, the effects of these activities have been sufficiently reduced such that bears could continue to successfully use these linkage areas in the HCP project area. Thus, no impacts related to habitat linkage would be anticipated that would occur at a level or degree that would result in take.

Increased human development, particularly in key areas, is one of the most crucial risk factors that can influence effective linkage for grizzly bears. This topic is addressed in more detail in the next subsection, Human Development and Transition Lands.

Human Development and Transition Lands

Increased human development in areas occupied by grizzly bears is one of the most crucial risk factors that can influence grizzly bears and effective linkage. Constructing and/or authorizing developments on DNRC lands are not covered activities under the HCP. However, the transition lands strategy described in Chapter 3 (Transition Lands Strategy) provides for the removal and addition of lands managed under the HCP. More specifically, this strategy allows the disposal of 10,990 acres of HCP project area land over the Permit term within grizzly bear recovery zones and/or bull trout core habitat. While DNRC may dispose of some lands in areas of high importance for HCP species, the transition lands strategy contains provisions requiring DNRC to first offer to other agencies and conservation organizations an opportunity to make an offer for fee title purchase or for some other conservation instrument (such as a conservation easement) during a required 60-day period. Indirect effects to grizzly bears and habitat linkage could occur following the disposal of some HCP project area lands. While indirect effects associated with human development could occur on any HCP project area property sold, subsequent development activities are not actions authorized or regulated by DNRC, nor would they be considered covered activities under this HCP. Similarly, should DNRC decide to develop and lease an HCP project area parcel, such DNRC actions would not be covered activities under this HCP. Upon transfer of deeds and ownership, the actions of a second party that could potentially adversely effect grizzly bears or other HCP species would not be DNRC's liability. Thus, no take of grizzly bears is anticipated.

7.2.2 Canada Lynx

This section describes the potential adverse effects on lynx associated with the covered activities, including those impacts that have the potential to constitute incidental take of lynx. The primary effects of the covered activities on lynx relate to changes in forest successional stages and structure that affect key habitat requirements, including overall availability of suitable habitat, foraging habitat, den site attributes, and habitat connectivity (movements within and between home ranges) or linkage (movements across highways or between populations or geographic areas). Some covered activities may also disturb lynx den sites.

Similar to the evaluation of impacts that could result in incidental take of grizzly bears described above, DNRC believes it is important to recognize that there are many environmental and temporal factors making it difficult to precisely estimate incidental take of lynx. As with grizzly bears, results of scientific studies rarely lend themselves directly and unequivocally to precise management standards or thresholds. This is because scientific methods often used in most studies have narrow focus, such as null hypothesis testing. Particularly in the case of lynx, local studies have also been constrained by small sample sizes, and there are current gaps in information that clearly establish how much habitat in various structural conditions is required by individual lynx to survive and reproduce in western Montana. For these reasons and others associated with environmental and temporal variability, DNRC believes these areas of uncertainty are important considerations when deriving answers and conclusions regarding incidental take for a medium-sized, free-ranging species, such as lynx.

7.2.2.1 Impacts that Have the Potential to Constitute Take of Canada Lynx and How they Will be Quantified

Reduction in Acreage of Foraging Habitat

Habitat conditions and food availability, particularly in winter, are likely primary limiting factors for lynx in western Montana (Squires 2005b, personal communication, 2009, personal communication). Forest management activities may temporarily convert stands that serve as foraging habitat to stands that do not serve as foraging habitat for a decade or more, thus, lowering prey abundance for lynx and increasing their risk of starvation.

Currently, biologists do not agree on the minimum amount of lynx foraging habitat required within a female's home range for successful reproduction and rearing of young. Lacking clear standards, DNRC adopted the guidelines from WADNR (2005) to establish a requirement for maintaining 20 percent foraging habitat within LMAs. See Chapter 2 (Conservation Strategies) for a description of the species-specific commitments. The commitment to retain a minimum of 20 percent of total potential lynx habitat as foraging habitat within LMAs represents an increase in the percentage of habitat managed as foraging habitat over current practices. Under existing ARMs, DNRC is currently required to maintain 10 percent foraging habitat on blocked lands (the Stillwater Block and Swan River State Forest).

Pre-commercial thinning can reduce horizontal cover critical to maintaining the snowshoe hare prey base (USFWS 2007:42). In summer, lynx broaden their habitat use to include younger forest stands with an abundance of shrub cover (Squires et al. 2010, in press). This shift is attributed to hares being abundant in young stands with deciduous vegetation providing high levels of horizontal cover. Reducing this horizontal structure would likely reduce an area's carrying capacity for snowshoe hares (USFWS 2007:42).

Under the HCP, DNRC will continue to conduct pre-commercial thinning. However, the HCP commitments will ensure that thinned stands will retain 20 percent of the treatment area in unthinned dense patches, and it requires that a subcomponent of shade-tolerant tree species be retained to ~~that~~ provide horizontal cover attributes and ~~will also~~ encourage development of horizontal cover attributes over time. ~~Thinned stands will not be counted toward the requirement to retain a minimum of 20 percent foraging habitat within an LMA.~~ DNRC typically will not pre-commercial thin more than 1,500 acres per year in potential lynx habitat in the HCP project area.

As stated above, the minimum number of foraging acres required in a home range for a female lynx to breed and successfully raise young in western Montana is not known. While DNRC's commitments under the HCP will retain a minimum of 20 percent winter foraging habitat within LMAs and retain some foraging viability in thinned stands, harvesting foraging habitat may result in adverse effects on lynx. This conclusion is primarily attributed to (1) ~~the potentially large amount of foraging habitat that could be harvested under the HCP (as shown in Table 4.9-20 in Section 4.9, Wildlife and Wildlife Habitat, of the Draft EIS for this HCP, current levels of foraging habitat range from 28 to 76 percent of total potential habitat and could be reduced to 20 percent of total potential habitat);~~habitat conditions in winter are likely a primary limiting factor for lynx, and (2) ~~ongoing~~ pre-commercial thinning ~~, which~~ reduces horizontal cover critical to maintaining snowshoe hare productivity in ~~these~~summer foraging habitats.

These adverse effects would be temporary, but may affect lynx productivity or kitten survival. To be clear, DNRC does not suggest that all reduction of foraging habitat would have an adverse effect on lynx resulting in take. However, for this HCP and Permit, DNRC recognizes that the USFWS will consider any reduction in foraging habit as an impact that could constitute take; therefore, DNRC is requesting incidental take coverage for those acres within LMAs where foraging habitat may be reduced (from 28 to 76 percent of total potential lynx habitat to 20 percent of total potential lynx habitat as depicted in Table 7-9).

Given this assessment, the analysis depicted in Table 7-9 implies that all 54,720 acres could be harvested within the first year following implementation of the HCP, which is possible but not practicable. Harvest at this intensity is not practicable due to DNRC's mandate to maintain a sustainable harvest and its requirements to comply with other Forest Management ARMs and HCP commitments such as LY-LM2, which requires DNRC to limit the conversion of suitable habitat to non-suitable habitat to no more than 15 percent per decade. The total of 54,720 acres also does not take into consideration additional acreages of lynx habitat with current low structural development that may grow and develop into winter foraging habitat later in the 50-year Permit term.

To help provide greater context regarding how habitat might more realistically be affected, DNRC conducted an additional analysis to provide an estimated annual harvest amount of winter foraging habitat acreage within LMAs (Table 7-10). Based on the allocation of the annual sustainable yield and the occurrence of lynx habitat, DNRC estimates it may harvest as much as 1,850 acres of winter foraging habitat annually during the Permit term. Additionally, DNRC is requesting incidental take

TABLE 7-9. EXISTING AND ANTICIPATED ACREAGES OF LYNX WINTER FORAGING HABITAT IN THE HCP PROJECT AREA BY LMA FOR WHICH DNRC IS REQUESTING INCIDENTAL TAKE COVERAGE

	Existing Conditions		Under the HCP			
Proposed LMA by Land Office	**Winter Foraging Habitat[1]**		**Total Potential Habitat in the LMA**	**Required Amount of Winter Foraging Habitat[2]**		**Potential ~~Incidental Take~~Allowable Harvest Acres of Winter Foraging Habitat[3]**
	Acres	%	Acres	Acres	%	Acres
NWLO						
Stillwater West	21,975	61.8	35,582	7,116	20.0	14,859
Stillwater East	26,065	75.6	34,468	6,894	20.0	19,171
Coal Creek	5,103	36.0	14,188	2,838	20.0	2,265
Swan	23,798	64.9	36,654	7,331	20.0	16,467
SWLO						
Seeley	2,556	57.2	4,466	893	20.0	1,663
Garnet	1,079	27.5	3,923	785	20.0	294
Total	**80,576**	**NA**	**129,281**	**25,856**		**54,720**

[1] Percentages calculated as habitat amounts proportional to total potential lynx habitat.
[2] Under the HCP, each LMA must retain 20% of total potential lynx habitat as winter foraging habitat.
[3] Calculated as the difference between existing winter foraging acres and the required amount of winter foraging habitat in the LMA under the HCP.
NA = Not applicable.

TABLE 7-10. ANALYSIS OF THE ANNUAL HARVEST ACREAGE OF LYNX WINTER FORAGING HABITAT IN THE HCP PROJECT AREA WITHIN LMAs FOR WHICH DNRC IS REQUESTING INCIDENTAL TAKE COVERAGE

LMA	**Estimated Annual Timber Volume Harvested from LMAs under Alternative 2 (million board feet)**	**Percent of Total Annual Harvest**	**Extrapolated Annual Average Acres Treated[1]**	**Estimated Percent of LMA Acres as Winter Foraging Habitat**	**Extrapolated Potential Annual Average Acres Treated[2]**
Stillwater East, Stillwater West, and Coal Creek	14.5	25.2	2,071	58.6	1,213.9
Swan River	6.8	11.8	971	59.9	581.9
Garnet and Seeley Lake	1.7	3.0	243	20.8	50.5
Total	**23.0**	**39.9**	**3,286**	**NA**	**1,846.3**

[1] Based on an average harvest intensity of 7.0 mbf per acre.
[2] Based on percent volume share and relative abundance of winter foraging habitat in LMAs.
NA = Not applicable.

coverage for its pre-commercial thinning operations in lynx habitat. DNRC estimates that an average of 1,500 acres may be treated annually in lynx habitat. The HCP commitments require that

20 percent of these acres be retained in an unthinned condition. Therefore, DNRC is requesting incidental take for approximately 1,200 acres of pre-commercial thinning operations each year during the Permit term. Given both forms of foraging habitat reduction, take coverage is requested for a combined total of annual foraging habitat equaling 3,050 acres.

If a large disturbance event reduces the lynx habitat in an LMA to near or below the minimum requirements of 65 percent suitable lynx habitat or 20 percent foraging habitat of the total potential habitat present, DNRC may need to conduct green harvest in an LMA that would reduce the standing foraging habitat below (or further below) the minimums. DNRC would plan the green harvest in collaboration with the USFWS through the changed circumstances process described in Chapter 6 (Changed Circumstances). A green harvest is only likely to occur in the event that insects and disease threaten green timber adjacent to burned areas, or some other serious management situation exists that makes it prohibitive to temporarily defer some acres until partial recovery of the affected lands can occur.

The effects of the green harvest would be short-lived (5 to 15 years), because the disturbed portion of the LMA would be growing into a suitable habitat condition, some of which would become ~~young foraging~~suitable habitat within this timeframe. The effects of the green harvest will be wholly or partially offset through the development of mitigations in collaboration with the USFWS as required under the changed circumstance process. This additional reduction of winter foraging habitat within the project area could reduce the carrying capacity for snowshoe hares in these areas, thereby potentially affecting lynx productivity or kitten survival. Therefore, DNRC is requesting an additional 2,320 acres of winter foraging habitat be available for harvest within LMAs that are below the minimum 20 percent requirement for foraging habitat due to changed circumstances. This additional incidental take would only be used if necessary in conjunction with negotiations with the USFWS under the changed circumstances process. See Chapter 6 (Changed Circumstances) for documentation regarding how this acreage was derived, as well as an example of how these additional acres are intended to be used.

7.2.2.2 Impacts Determined to Not Constitute Take of Canada Lynx

Amount of Suitable Habitat

Lynx require a mosaic of early, mature, and late-successional staged forests, some with high levels of horizontal cover and structure. Forest management activities may temporarily convert stands that serve as suitable lynx habitat to stands that do not serve as suitable habitat, until such time as they regenerate forest cover.

The HCP will require retention of 65 percent suitable habitat within LMAs and will require that no more than 15 percent of suitable habitat be converted to temporary non-suitable habitat per decade within LMAs. The HCP commitments will conserve lynx by promoting a balance of stands in various structural stages, ensuring sustainability of lynx habitat and populations on HCP project area lands for the term of the Permit. Therefore, minimal adverse effects of the covered activities on the availability of suitable habitat on DNRC lands are anticipated.

Under the changed circumstances process, DNRC would be allowed to further reduce suitable habitat within an LMA through a green harvest if the sale was needed to meet the volume requirements for a particular land office or unit or if insects and/or disease were threatening green timber adjacent to burned areas. This may result in further reduction of suitable habitat within an LMA. Further reduction of suitable habitat may have adverse effects on lynx because less area would be available to lynx for denning, foraging, and raising young. However, the effects are not expected to result in take. This is because the effects would mostly be short-lived, an additional 5 to 15 years, since burned areas would be growing into suitable habitat within this timeframe. Additionally, effects of the green salvage would be wholly, or at least partially, offset through the development of a mitigation plan in coordination with USFWS as required under the changed circumstances process.

The requirement for retention of suitable habitat on scattered parcels within an administrative unit would also benefit lynx, but in a more limited manner. This is because lynx occur at low densities and occupy large home ranges, making it impossible to achieve conservation objectives at the scale of a lynx home range on individual small parcels of land (USFWS 2007:47). However, benefits associated with small, isolated tracts of HCP project area land could be realized for lynx roaming outside their normal home ranges in search of food, for those that are dispersing and occupying habitat temporarily, and for those occupying home ranges where scattered HCP project area parcels occur within or adjacent to federal lands providing habitat for lynx at larger, functional scales.

Den Site Attributes

Timber harvest and other forest management activities in lynx suitable habitat can change the stand attributes (dense mature stands and abundant CWD) such that the stands may no longer be classified as denning habitat, and subsequently may not provide areas on the landscape that are suitable for denning lynx~~would not provide adequate denning habitat on the landscape at scales important for lynx~~.

Lynx denning requirements are described in Section 4.9.4.1 (Canada Lynx – Affected Environment) of the EIS for this HCP. Lynx rely on CWD for shelter and protection from predators. This structure is most valuable when distributed throughout the home range, on or near foraging habitat (USFWS 2007:48). Denning habitat is found in a variety of forest conditions, and suitable den site attributes occur in small pockets scattered across the landscape at relatively high densities. Lynx denning sites are not believed to be a limiting factor for lynx (USFS and BLM 2004:ROD [2007]:17; Squires 2009, personal communication).

Forest management activities, including salvage, can alter structural attributes of denning habitat by removing large downed wood. DNRC has determined that the HCP commitments to retain snags and snag recruits, in combination with the HCP commitments for CWD recruitment at the project level ~~and the requirement to retain two potential den sites per square mile in lynx habitat at the project level,~~ would ensure the maintenance of adequate lynx den sites for successfully raising young. Thus, no adverse effects on lynx are anticipated.

Connectivity and Linkage

Forest management activities may result in increases in human access and reductions in forest cover in areas situated within or between existing large blocks of relatively unfragmented habitat, resulting in adverse effects on habitat connectivity and linkage for lynx.

Section 4.9.4.2 (Canada Lynx – Environmental Consequences) of the EIS for this HCP describes the potential effects of forest management activities on the integrity of linkage areas and habitat connectivity. Under the HCP, the grizzly bear commitments that maintain hiding cover for bears and retain vegetation in riparian areas and along roads, and limit forest openings, combined with the lynx commitments to maintain connectivity in areas expected to be favored by lynx, will maintain sufficient habitat connectivity for lynx to successfully move within their home ranges and disperse. Therefore, DNRC has determined that no adverse effects on linkage areas and lynx habitat connectivity would occur.

Den Site Displacement or Abandonment

Activities near active lynx dens may disturb denning lynx and cause abandonment and mortality of young.

In general, forest management activities would not result in adverse effects on denning lynx because of the low likelihood of overlap between a harvest unit and a lynx den site. Further, the denning period is likely to be over before conditions are suitable to initiate motorized forest management activities at the elevations typically occupied by lynx. Den sites will be protected on a case-by-case basis as they are detected, which would typically occur through correspondence with local researchers that may have marked animals in the vicinity of a project. If an active den site is found, DNRC will prohibit motorized forest management activities and prescribed burning within 0.25 mile of known active den sites from May 1 through July 15, or earlier if fully vacated.

DNRC has determined that the likelihood of adverse effects on lynx dens is discountable because known sites will be avoided, and there is a low likelihood of overlap between a harvest unit and a lynx den site.

Chapter

HCP Implementation

8 HCP IMPLEMENTATION

Implementation of the HCP will be governed by the Permit and the Implementing Agreement between the DNRC and the USFWS (see Appendix F, Implementing Agreement, of the EIS for this HCP). The Implementing Agreement identifies the roles and responsibilities of each party and refers to the specific conservation and mitigation actions identified in the HCP that will be taken during the 50-year Permit term. Together, the HCP, NEPA EIS Record of Decision, Biological Opinion, and Implementing Agreement fulfill the requirements of the ESA for issuance of a Permit for listed and unlisted species addressed by the HCP.

Successful implementation of the HCP requires several steps on the part of DNRC. These steps include ensuring a commitment of funding, training DNRC staff on HCP commitments, implementing the conservation commitments, implementing a comprehensive monitoring and tracking program, and reporting to DNRC and USFWS staff on the progress of the HCP. These steps are described below.

8.1 FUNDING

One of the criteria for Permit issuance is ensuring that adequate funding is available for the HCP and all its components. Therefore, it is necessary to determine the costs for HCP implementation and identify the funding sources that will support the HCP for its 50-year term. This section identifies the costs for the various components of the HCP, describes DNRC's budgeting cycle and funding constraints, and identifies how the HCP will be funded.

8.1.1 Estimated Costs of the HCP

The estimated costs for implementing the HCP ~~is reported~~are shown in Table 8-1. DNRC estimated costs in terms of equipment, contracted services, and DNRC staff hours dedicated to implementing conservation strategies under DNRC's current rules and policies and the additional expenditures it would take to implement the requirements of the HCP.

TABLE 8-1. ESTIMATED ANNUAL COSTS OF THE HCP

Conservation Strategy	Current Program	HCP
Grizzly Bear	$48,500	$146,700
Canada Lynx	$19,400	$49,100
Aquatics		
Riparian Timber Harvest	$20,200	$34,600
Sediment Delivery Reduction	$162,400	$183,400
Fish Connectivity	$11,500	$15,100
Grazing	$18,100	$24,700
Cumulative Watershed Effects	$18,000	$22,000
TOTAL (Aquatics)	**$230,200**	**$279,800**
TOTAL (All Conservation Strategies)	**$298,100**	**$475,600**
		($177,500 increase over current)

Note: All costs are provided in fiscal year 2006 dollars. Costs presented in this table are the likely costs for year 1 and 2 of implementation. In subsequent years, implementation costs would likely decrease by 10 to 20 percent, although that does not account for inflation.

8.1.2 DNRC's Budgeting and Funding Cycle

DNRC is funded through the state general fund, state special revenues, and federal funds for certain programs. DNRC's spending authority is granted through the biennial legislative process. At the beginning of each budgeting cycle, DNRC submits its proposed budgets and spending requests for the upcoming biennium for integration into the Governor's budget (known as the Executive Budget). The Executive Budget is then reviewed by the joint subcommittees and then the House Appropriations Committee and Senate Finance and Claims Committees for possible revision and eventual passage by both the House and the Senate. Part of the Legislature's budgeting responsibilities includes authorizing the expenditure of federal funds, including grants and appropriations. When the Legislature is not in session, the Governor's Office of Budget and Program Planning reviews and approves spending authority for any new federal funds.

Because DNRC's funding level is not set by state law, and the state constitution mandates a balanced budget, a portion of DNRC's funding for each biennium depends on sufficient General Fund revenues (both estimated during the budgeting process and actual during the biennium).

Budget deficits, either due to lower-than-expected revenues or unforeseen increased expenditures in other programs, may require state agencies, including DNRC, to reduce spending below what was originally appropriated, thereby maintaining a balanced budget statewide. Conversely, for years in which revenues exceed budget needs, DNRC may request and receive additional funds appropriated from the resulting available discretionary funds.

> The "forest management program" consists of all the positions and operating resources dedicated to forest management. It includes positions at Administrative Units, Land Offices, and the Forest Management Bureau.

The TLMD and the forest management program are responsible for implementing the HCP. Both are funded from a portion of the revenues generated by land management activities and interest. The forest management program is funded from a portion of the timber sale receipts and forest improvement fees collected from timber harvest. Therefore, once the DNRC budget is approved through the legislative process, funding for the forest management program is relatively secure from statewide budget fluctuations.

The forest management program budget is included in the TLMD budget. The FMB Chief develops a budget for operating the program within the existing spending authority and submits requests for new funding for specific positions or programs, referred to as new decision packages. The existing budget and new decision packages are reviewed through an executive planning process at the division level, and all new decision packages are prioritized. The budget is then forwarded to the Director of the DNRC, who reviews the existing budgets and prioritizes the new decision packages for the entire agency. The Director then forwards the budgets to the Governor's Office of Budget and Program Planning for inclusion in the Governor's budget, where it is again reviewed and potentially re-prioritized before going before the legislature.

8.1.3 How DNRC Will Fund the HCP

While developing the conservation commitments, the DNRC staff attempted, to the extent feasible, to adapt the existing forest management program to meet the biological goals and objectives of the HCP. This approach will allow DNRC to implement much of the HCP within the existing program budget. ~~However, some elements of the HCP will require additional funding in order to fully implement them.~~ Additionally, in order to meet some of its commitments for tasks, such as addressing road sedimentation or replacing culverts to provide fish passage, DNRC will continue to seek funding through grant programs that have been successfully used under the existing program, such as the Future Fisheries Grant administered by MFWP.

DNRC understands the funding requirements and is committed to fund implementation of the HCP for the duration of the Permit. This will be reflected in the dedication of staff resources through DNRC's base biennial budget, which will continue for the duration of the Permit. DNRC will submit a budget that will be adequate to fulfill its obligations under the HCP, Permit, and implementing agreement. In its annual budget, DNRC has up to $160,000 in forest improvement funds that can be directed to HCP implementation when and if the Permit is issued. HCP funding will be relatively secure from statewide budget fluctuations, as the funding is mostly derived from timber sale receipts and forest improvement fees collected from timber harvest. Failure by DNRC to adequately fund implementation of the HCP could lead to the inability to fulfill requirements of the Permit and subsequently a suspension or partial suspension of the Permit.

In the event of a changed circumstance, DNRC will use the state forest improvement accounts and will also seek funding through alternative sources that have been successfully used under the existing program. Alternative funding sources may include Burned Area Emergency Rehabilitation funds through the USFS, Emergency Watershed Protection Funds through NRCS, Future Fisheries Funds through MFWP, and other applicable sources.

8.2 TRAINING

The strength of the HCP will lie in its implementation on the ground. Therefore, the DNRC staff responsible for implementing the HCP in timber sale planning, design, and administration will be trained in the correct and consistent application of the HCP commitments.

Specific training will include

- DNRC will develop an implementation manual and conduct trainings for all field personnel responsible for implementing and reporting on the HCP conservation commitments.
- Field personnel will be trained in the application of the HCP commitments in timber sale design and contract administration, and in the proper use and completion of the various HCP checklists, forms, and data updating.
- DNRC water resource specialists and/or fisheries biologists will be trained in the delineation and identification of RMZs and CMZs, required for implementation of commitment AQ-RM1.
- DNRC water resource specialists, fisheries biologists, and foresters will receive ongoing training in the development of contract specifications, site-specific BMPs, and other mitigation measures.

- DNRC will provide training on fish connectivity design and construction techniques for field staff responsible for fish passage installations. Training will occur early in the implementation of the HCP. Additional training will be provided as new technologies become available or there are changes in personnel.
- DNRC will develop and complete formal training on the implementation of the proposed conservation strategy for all DNRC field staff involved in the administration of grazing licenses.
- DNRC staff responsible for monitoring various aspects of the HCP commitments will be trained in monitoring protocols for consistency of application and interpretation of results.
- DNRC will provide water resource specialists with training and guidance in conducting Level 1, Level 2, and Level 3 cumulative watershed analyses. Associated training will be conducted on an annual basis, and guidance will be an ongoing process.
- DNRC will provide bear encounter avoidance training for DNRC forest management personnel within 2 years of Permit issuance.
- The FMB staff will be available to the field personnel as needed for training or project-specific assistance for implementing the HCP.

Training tools and training programs will be developed during the final phase of the Permit application process (Final EIS and Records of Decision) and will continue into the initial period of HCP implementation.

Several HCP commitments specifically require involvement of applicable specialized biologists. For example, if DNRC chooses to interrupt a grizzly bear rest period for salvage purposes, a DNRC wildlife biologist will be required to submit minimization and mitigation measure recommendations to the project leader. DNRC is committed to recruiting qualified foresters, biologists, water resource specialists, and managers for its forest management program. DNRC will provide its staff with ongoing training on topics relevant to HCP implementation and encourage staff to participate in professional organizations.

8.3 IMPLEMENTING THE CONSERVATION COMMITMENTS

Following approval of the HCP and issuance of the Permit, a transition period will be required to complete projects in progress prior to issuance of the Permit and to revise the Forest Management ARMs to incorporate HCP commitments. DNRC will begin implementing the conservation commitments based on the schedule in this HCP. Table 8-2 provides a summary of the implementation schedule for the conservation commitments from Chapter 2 (Conservation Strategies).

TABLE 8-2. IMPLEMENTATION SCHEDULE FOR DNRC'S HCP CONSERVATION COMMITMENTS

Commitment		Implementation Schedule
GRIZZLY BEAR CONSERVATION STRATEGY		
PROGRAM-WIDE COMMITMENTS		
GB-PR1 Information and Education		
1	Develop brochures and, upon approval by the USFWS, implement a process for providing written brochures to contractors and their employees conducting forest management activities.	Within 1 year of Permit issuance.
2	Conduct bear encounter avoidance training for DNRC personnel.	All employees trained within 2 years of Permit issuance. New personnel trained within 1 year of hire; refresher training every 5 years for veteran employees.
GB-PR2 Firearms Restriction		Upon Permit issuance.
GB-PR3 Food Storage and Sanitation		Upon Permit issuance.
GB-PR4 New Open Road Construction in ~~Riparian Zones~~RMZs, WMZs, and Avalanche Chutes		Upon Permit issuance.
GB-PR5 Active Den Site Protection		Upon Permit issuance.
GB-PR6 Retention of Visual Screening at Riparian and Wetland Management Zones		Upon Permit issuance.
GB-PR7 Noxious Weed Control at Gravel Pits		Upon Permit issuance.
GB-PR8 Helicopter Use		Upon Permit issuance.
NON-RECOVERY OCCUPIED HABITAT COMMITMENTS		
GB-NR1 New Open Road Construction		Upon Permit issuance.
GB-NR2 Granting of Easements		Upon Permit issuance.
GB-NR3 Spring Management Restrictions		Upon Permit issuance.
GB-NR4 Distance to Visual Screening		Upon Permit issuance.
GB-NR5 Grazing Restrictions		Upon Permit issuance.
GB-NR6 Gravel Operations		Upon Permit issuance.
RECOVERY ZONE COMMITMENTS		
GB-RZ1 Habitat Considerations		Upon Permit issuance.
GB-RZ2 Visual Screening		Upon Permit issuance.
GB-RZ3 Road Closure Maintenance		Upon Permit issuance.
GB-RZ4 Grazing Restrictions		Upon Permit issuance.
GB-RZ5 Post-Denning Mitigation		Upon Permit issuance.
GB-RZ6 Granting of Easements		Upon Permit issuance.
STILLWATER BLOCK COMMITMENTS		
GB-ST1 Transportation Management		
1-4	Adhere to transportation plan map.	Upon Permit issuance.

TABLE 8-2. IMPLEMENTATION SCHEDULE FOR DNRC'S HCP CONSERVATION COMMITMENTS (CONTINUED)

Commitment	Implementation Schedule
5 Install signs indicating bear presence on main open roads (portal roads) entering the Stillwater and Coal Creek State Forests.	Installations completed no later than 2 years after Permit issuance; repairs integrated into normal course of seasonal maintenance activities.
GB-ST2 Class A Lands	Upon Permit issuance.
GB-ST3 Salvage on Rested Class A Lands	Upon Permit issuance.
GB-ST4 Class B Lands	Upon Permit issuance.
GB-ST5 Gravel Operations	Upon Permit issuance.
SWAN RIVER STATE FOREST COMMITMENTS	
GB-SW1 Transportation Management	
1-4 Adhere to transportation plan map.	Upon termination of the Swan Agreement.
5 Install signs indicating bear presence on main open roads (portal roads) entering the Swan River State Forest.	Installations completed no later than 2 years after dissolution of the Swan Agreement; repairs integrated into normal course of seasonal maintenance activities.
GB-SW2 Adjacent Landowners	Upon termination of the Swan Agreement.
GB-SW3 Active Management Followed by Rest	Upon termination of the Swan Agreement.
GB-SW4 Salvage on Rested Subzones	Upon termination of the Swan Agreement.
GB-SW5 Gravel Operations	Upon termination of the Swan Agreement.
COMMITMENTS FOR SCATTERED PARCELS IN RECOVERY ZONES	
GB-SC1 Open Roads	Upon Permit issuance.
GB-SC2 Active Management Followed by Rest	Upon Permit issuance.
GB-SC3 Salvage Projects on Rested Parcels	Upon Permit issuance.
GB-SC4 Gravel Operations on Rested Parcels	Upon Permit issuance.
CABINET-YAAK ECOSYSTEM COMMITMENTS	
GB-CY1 Minor Projects During the 8-year Rest Period	Upon Permit issuance.
GB-CY2 Salvage Projects in the CYE	Upon Permit issuance.
GB-CY3 More Restrictive Management in the Spring Period	Upon Permit issuance.
GB-CY4 Expedited Reduction of Open Road Densities for Recovery Zone Parcels	Within 5 years of Permit issuance.
GB-CY5 Helicopter Use in the CYE	Upon Permit issuance.
LYNX CONSERVATION STRATEGY	
LYNX HABITAT COMMITMENTS	
LY-HB1 Lynx Habitat Map	Upon Permit issuance.
~~LY-HB2 Den Site Attributes~~	~~Upon Permit issuance.~~
LY-HB2 Coarse Woody Debris	Upon Permit issuance.
LY-HB3 Den Site Protection	Upon Permit issuance.
LY-HB4 Foraging Habitat Attribute Retention	Upon Permit issuance.

TABLE 8-2. IMPLEMENTATION SCHEDULE FOR DNRC'S HCP CONSERVATION COMMITMENTS (CONTINUED)

Commitment		Implementation Schedule
LY-HB5 Habitat Connectivity		Upon Permit issuance.
LY-HB6 Habitat Suitability		Upon Permit issuance.
LYNX MANAGEMENT AREA COMMITMENTS		
LY-LM1 Habitat Suitability		Upon Permit issuance.
LY-LM2 Habitat Conversion Rate		Upon Permit issuance.
LY-LM3 Foraging Habitat		Upon Permit issuance.
AQUATIC CONSERVATION STRATEGIES		
RIPARIAN TIMBER HARVEST CONSERVATION STRATEGY		
AQ-RM1 Class 1 Riparian Management Zone Commitments		Upon Permit issuance.
~~AQ-RM2 Tier 2 Riparian Management Zone Commitments~~		~~Upon Permit issuance.~~
AQ-RM3 ~~Tier~~Class 2 and 3 Riparian Management Zone Commitments		Upon Permit issuance.
SEDIMENT DELIVERY REDUCTION CONSERVATION STRATEGY		
AQ-SD1 Commitments for Minimizing Forest Management Roads		Upon Permit issuance.
AQ-SD2 Commitments for Reducing Sediment Delivery from Existing Roads		
1	Complete inventories of all existing roads used for forest management activities located within watersheds supporting HCP fish species.	Within 20 years of Permit issuance.
2	Complete road inventories using current methods and procedures.	Within 20 years of Permit issuance.
3	Complete road inventories on all watersheds supporting bull trout (including core and nodal habitat).	Within 10 years of Permit issuance.
4	Complete road inventories on all watersheds supporting westslope cutthroat trout or Columbia redband trout.	Within 20 years of Permit issuance.
5	Use completed road inventories to classify segments/sites for sediment delivery risk.	Upon Permit issuance.
6	Prioritize projects by considering watershed status/characteristics.	Upon Permit issuance.
7	Prioritize corrective actions for implementation within a watershed by risk.	Upon Permit issuance.
8	Develop and implement project-level, site-specific corrective actions for road sites identified as having a moderate or high risk of sediment delivery on roads where DNRC has access and sole ownership.	As needed, upon Permit issuance.
9	Work with other cooperators to address shared ownership road segments identified as having a high risk of sediment delivery.	Upon Permit issuance.
10	Complete corrective actions on all identified high-risk sites within bull trout watersheds.	Within 15 years of Permit issuance.
11	Complete corrective actions on all identified high-risk sites in watersheds supporting westslope cutthroat trout or Columbia redband trout.	Within 25 years of Permit issuance.
12	Continue to implement road sediment source inventories and corrective actions in watersheds supporting HCP fish species.	Upon Permit issuance.
13	Incorporate the goals, targets, and prescriptions contained within approved TMDLs applicable to covered forest management	Upon Permit issuance.

TABLE 8-2. IMPLEMENTATION SCHEDULE FOR DNRC'S HCP CONSERVATION COMMITMENTS (CONTINUED)

Commitment		Implementation Schedule
	activities.	
AQ-SD3 Commitments for Reducing Sediment Delivery from New Road Construction, Reconstruction, Maintenance, and Use		Upon Permit issuance.
AQ-SD4 Commitments for Reducing Potential Sediment Delivery from Timber Harvest, Site Preparation, and Slash Treatments		Upon Permit issuance.
AQ-SD5 Commitments for Reducing Potential Sediment Delivery from Gravel Excavation, Processing, Hauling, and Use		Upon Permit issuance.
FISH CONNECTIVITY CONSERVATION STRATEGY		
AQ-FC1 Fish Connectivity Commitments		
1	Apply the fish connectivity commitments to HCP project area lands and those road-stream crossings that DNRC has access to and sole ownership.	Upon Permit issuance.
2	Provide connectivity to adult and juvenile HCP fish species during low to bankfull flows.	Initiate upon Permit issuance.
3	Inventory and assess connectivity for all existing stream crossings on known and presumed HCP fish species habitat.	Completed. DNRC to revise and update assessments as necessary.
4	Prioritize road-stream crossing improvements based on existing levels of connectivity, as well as species status and established population biological goals.	Upon Permit issuance.
5	Maintain a planning schedule of road-stream crossing sites to be addressed.	Upon Permit issuance.
6	Improve all Priority 1 sites determined to require connectivity.	Within 15 years of Permit issuance.
7	Ensure that all road-stream crossings allow connectivity of adult and juvenile HCP fish species during low to bankfull flows.	Within 30 years of Permit issuance.
8	Every 5 years, one-sixth of all sites that do not meet objectives of the fish connectivity conservation strategy will be improved (or have final plans and designs for improvements).	Upon Permit issuance.
9	Select designs of road-stream crossings on streams supporting HCP fish species based on stream channel form and function, costs, sedimentation, and anticipated use.	Upon Permit issuance.
10	Include additional mitigation measures when constructing road-stream crossings on streams with HCP fish species.	Upon Permit issuance.
GRAZING CONSERVATION STRATEGY		
AQ-GR1 Aquatic Grazing Commitments		
1-12	Review all grazing licenses at license renewal and midterm, including evaluation of riparian parameters, evaluation of noxious weeds, and identification of potential problem areas. Field-verify potential problem sites, prioritize them for improvements, develop site-specific corrective actions, and evaluate corrective actions for effectiveness	Upon Permit issuance.
13	Develop and complete formal training on the implementation of this conservation strategy for all DNRC field staff involved in the administration of grazing licenses.	Within 1 year of Permit issuance, followed by refresher training every 5 years; within 1 year of hire for new personnel.
14	Provide grazing licensees with information training opportunities and education outreach materials.	Upon Permit issuance.

TABLE 8-2. IMPLEMENTATION SCHEDULE FOR DNRC'S HCP CONSERVATION COMMITMENTS (CONTINUED)

Commitment	Implementation Schedule
AQ-GR1 Aquatic Grazing Commitments (continued)	
Redds Trampling Pilot Study	Develop and finalize plan within 2 years of Permit issuance and implement plan by year 3.
CUMULATIVE WATERSHED EFFECTS CONSERVATION STRATEGY	
AQ-CW1 Cumulative Watershed Effects Commitments	Upon Permit issuance.

8.3.1 Projects in Progress at the Time of Permit Issuance

At any one time, DNRC has several projects in various stages of development, including initial planning, public involvement, project design, environmental analysis, presentation to the Land Board, and field layout. Also at any one time, there are several open contracts with purchasers who are in various stages of implementing DNRC forest management activities.

For projects on HCP project area lands that have been initiated prior to Permit issuance and for which the MEPA decision document is signed after Permit issuance, DNRC will, to the extent practicable, incorporate ~~all~~ applicable conservation commitments contained in the HCP. For projects on HCP project area lands that have been initiated after Permit issuance, DNRC will incorporate all applicable conservation commitments contained in the HCP.

For projects on HCP project area lands for which the MEPA decision document was signed prior to Permit issuance, DNRC and the USFWS ~~will~~may review the projects to assess whether they, for all intents and purposes, are in compliance~~, or can reasonably be brought into compliance through minor changes in project design,~~ with the HCP conservation commitments~~ prior to implementation~~. Projects that are deemed to be in compliance will be covered by the Permit. Projects that are deemed not to be in compliance will not be covered by the Permit. DNRC will strive to have ~~all~~as many projects as reasonably practicable comply with the HCP by the time of Permit issuance; however, it may not be possible due to contract commitments, operational constraints, and/or the unknown date of Permit issuance, which may preclude the possibility of even minor changes. DNRC estimates there could be up to 10 projects in progress at the time of Permit issuance that are not in compliance with the Permit.

8.3.2 Revision of the Forest Management ARMs

The Forest Management ARMs (36.11.401 through 450) contain rules for the mitigation of impacts for threatened, endangered, and sensitive species. ~~Concurrent with publishing the Final EIS~~Upon receiving the Permit, DNRC will ~~propose adoption of the HCP by reference through~~publish a proposal notice in the Montana Administrative Register in accordance with the MAPA rulemaking process to adopt the HCP as an administrative rule by reference. The MAPA process will require approximately 6 months from the initial proposal to adoption of the HCP rule. The MAPA process is outlined in MCA 2-4-301 through 315. The MAPA process requires DNRC to publish a notice to propose the rule and schedule a public comment period and public hearing. After the public comment period, DNRC will ~~adopt the rule, issue a concise statement of the principal reasons for and against its adoption (based on public comments), and~~publish an adoption notice in the Montana Administrative Register and include responses to public comments submitted during the rulemaking process. DNRC will incorporate into ~~that statement~~the adoption notice the reasons DNRC may disagree with comments ~~against its~~opposing adoption of the rule (if any are identified).

8.3.3 Conservation Commitment Schedule

DNRC will begin implementing all of the HCP conservation commitments upon Permit issuance, except for projects in progress as described above. Table 8-2 identifies the timeframe for implementing the specific commitments.

8.4 REPORTING PROCEDURES

DNRC will submit annual updates and 5-year monitoring reports to the USFWS summarizing its monitoring results, documenting its compliance with the HCP, and evaluating the effectiveness of the commitments in place. The reporting requirements and frequency for each conservation commitment are identified in Chapter 4 (Monitoring and Adaptive Management) (Tables 4-2, 4-4, 4-6, and 4-7). This section describes DNRC's tracking and reporting procedures for the HCP. Reporting and tracking will ensure that current information is available to generate reports and assess the success of implementation and effectiveness of conservation commitments. Tracking and reporting is intended to facilitate communication with internal staff and USFWS personnel.

8.4.1 Internal DNRC Reporting

The FMB will serve as the clearinghouse for all tracking and reporting requirements related to the HCP. All environmental documents, HCP implementation checklists, and timber sale contracts completed by the field offices will be submitted to the FMB for review. Data from the checklists will be assembled into a database for compilation into annual updates and 5-year monitoring reports to the USFWS. As projects are implemented, data on habitat changes, road improvements, and road building or decommissioning will be reported to the FMB for entry into the central GIS database. This central database can be queried to track programmatic habitat commitments, such as the 65 percent suitable lynx habitat requirement for each LMA and land office.

8.4.2 Reporting to the USFWS

DNRC will submit to the USFWS annual updates and 5-year monitoring reports (as described in Chapter 4, Monitoring and Adaptive Management) to demonstrate Permit compliance and progress on implementation of the HCP. (Some specific conservation commitments also require reporting or a check-in with the USFWS at the time a specific issue occurs).

Annual updates will be summaries of DNRC's accomplishments for the previous fiscal year (July 1 to June 30). The updates will be submitted to the USFWS by September 30. A meeting to review the annual update together will be scheduled no later than 30 days after submittal of the update.

Meeting minutes from the annual update will be distributed by DNRC for review and approval by the USFWS no later than 15 days from the date of the meeting.

Every 5 years after Permit issuance, DNRC will prepare a report containing results of monitoring efforts for the reporting period (previous 5 fiscal years). The report will be submitted to the USFWS by September 30. A meeting to review the 5-year monitoring report together will be scheduled no later than 30 days after submittal of the report. Meeting minutes from the annual update will be distributed by DNRC for review and approval by the USFWS no later than 15 days from the date of the meeting.

During annual updates and the 5-year monitoring report reviews, DNRC will also report (1) any errors, exceptions, unplanned events, encounters or take observed in relation to its projects; (2) the results of research projects DNRC has funded or staffed; ~~and~~ (3) any changes in permit lands as outlined in the transition lands strategy (Chapter 3); and (4) progress on any contingency plans implemented for changed circumstances.

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Chapter

Data Sources Used in HCP Development

9 DATA SOURCES USED IN HCP DEVELOPMENT

To develop the conservation strategies and subsequently analyze the effect of the HCP in the associated EIS, DNRC has designed and developed a series of models, databases, programs, and analyses using the Environmental Systems Research Institute's ArcGIS suite and the Microsoft Office suite that incorporate information from a number of agencies. The primary data source used was DNRC's SLI database, which is described in Section 1.3.3.2 (Use of DNRC Resources). The SLI database is a dynamic database, whereby inventories are conducted on an annual basis and the database is subsequently updated. Because the scientists negotiating the HCP commitments needed to work from a fixed set of data, the decision was made to use the data from the 2004 SLI database. The date of other data layers used for both HCP development and EIS analysis are cited in the tables displaying the data or are described in this chapter. Given the time required for preparing and finalizing the EIS/HCP, some estimates of stand conditions or habitat conditions have likely changed. At the end of the first year after Permit issuance, along with annual reporting requirements, DNRC will provide an update to the USFWS on habitat conditions in the HCP project area for the purposes of continued monitoring and tracking of the HCP commitments. The updates in the data layers and stand conditions in the HCP project area are not expected to change the conclusions reached in this HCP or associated EIS analysis.

9.1 BACKGROUND AND PURPOSE

Each dataset contained in DNRC's HCP database used the most up-to-date data available at the time of development. To document dataset sources and the limitations of those datasets, DNRC has generated a complete list of metadata for each dataset used in the HCP. This information is stored in digital form as part of each dataset maintained in DNRC's HCP database. As an overview of the datasets used for the HCP, this narrative identifies types of datasets used, sources of those datasets, models developed, limitations of datasets and types, and basic analyses used to quantify environmental conditions.

9.1.1 Types of Datasets Used

A wide range of dataset types was used to estimate current conditions and the effects of the proposed HCP alternatives analyzed in the EIS. Types of datasets used in these analyses included both geospatial and tabular formats to identify a wide range of environmental conditions related to DNRC's ownership. Geospatial data types included both vector and raster data formats, such as ArcGIS coverages, shapefiles, geodatabase features, and grids, along with other spatial data types, such as tagged image files, ERDAS imagine files, and digital elevation models. Tabular data types included a wide range of file formats, such as Excel, Access, dBase, comma-separated values, tab delimited files, and Sequel Server.

9.1.2 Sources of Data

A variety of data sources were used to generate DNRC's master HCP database. These data sources included: DNRC; the USFWS; the USFS; USGS; Montana Natural Heritage Program (MNHP); MFWP; Montana NRIS; Montana Fisheries Information System (MFISH); and Mason, Bruce and Girard (MB&G).

9.1.3 Data Limitations

Data limitations of individual datasets are described in each dataset's metadata. In general, all results generated from analyses performed for the HCP are limited to the spatial and attribute accuracy of each dataset. In many cases, datasets were created at differing scales, thereby introducing additional error. Datasets acquired from agencies other than DNRC were assumed to be complete and representative of the best available data. To DNRC's knowledge, none of the spatial data used in the HCP has been surveyed, and acreages calculated from those datasets are estimates based on the best available information.

9.2 DATA

The DNRC HCP database contains multiple GIS data layers used for or generated by HCP analyses. Many of these layers within the HCP database were acquired from agencies other than DNRC. Because of topology issues associated with many of these layers, DNRC developed a cleaning algorithm to remove all overlapping polygons, slivers, duplicate arcs, dangling nodes, etc. Additionally, all acquired GIS data layers projected in a coordinate system differing from Montana State Plane North American Datum 1983 meters were projected to that coordinate system using ArcGIS projection tools. The primary spatial data layers used by DNRC to complete the HCP analyses are listed below in Table 9-1.

TABLE 9-1. PRIMARY SOURCE GIS DATA LAYERS USED FOR HCP ANALYSES

Name	Data Type	Description	Original Source
BASE FEATURES DATASET			
City_NRIS	polygon	City boundary	NRIS
County_DNRC	polygon	County boundary	DNRC
HUC_5	polygon	Fifth-order hydrologic unit boundaries	NRIS
HUC_6	polygon	Sixth-order hydrologic unit boundaries	NRIS
Lakes_24K_100K	polygon	Lakes	DNRC
Landoffice_DNRC	polygon	DNRC land offices	DNRC
Montana_DNRC	polygon	State boundary	NRIS
Parcels_DNRC	polygon	DNRC land ownership	DNRC
Planning_ Area_DNRC	polygon	HCP planning area boundary	DNRC
Roads_DNRC	line	Roads in Montana	DNRC
SLI_MBG_2005	polygon	Forest stands within DNRC ownership	DNRC

TABLE 9-1. PRIMARY SOURCE GIS DATA LAYERS USED FOR HCP ANALYSES (CONTINUED)

Name	Data Type	Description	Original Source
Stream_24K_100K	line	Streams	DNRC
Units_DNRC	polygon	DNRC administrative units	DNRC
STAND-LEVEL TABLES			
Form_B	table	Regeneration component of each DNRC forested stand	DNRC
sli_data_2005_MBG	table	Stand characteristics of DNRC's forestlands	MB&G / DNRC
AQUATIC FEATURES DATASET			
Articgrayling_august2003	line	Streams with arctic grayling present	NRIS - MFISH
bull_august2003	line	Streams with bull trout present	NRIS - MFISH
Bull_core	polygon	Bull trout core habitat	USFWS
Bull_critical_habitat	line	Streams identified as critical habitat for bull trout	USFWS
bulltrout_core_tsp83_100k_fw &p	vector polygon	Bull trout core polygons defined in the 2000 restoration plan for bull trout	MFWP
Bull_critical_streams	line	Streams identified as critical for bull trout	USFWS
EIS_aquatic_planning_units	polygon	Aquatic analysis area boundaries	DNRC
fish_on_DNRC	line	Streams with HCP fish present	DNRC
Mfish_surveyed_no_fish	line	Streams not surveyed for fish presence	NRIS - MFISH
Redband_august2003	line	Streams with redband trout present	NRIS - MFISH
TMDL_02_Lake	polygon	Lakes listed for TMDL in 2002	NRIS
TMDL_02_Streams	line	Streams listed for TMDL in 2002	NRIS
TMDL_04_Lake	polygon	Lakes listed for TMDL in 2004	NRIS
TMDL_04_Streams	line	Streams listed for TMDL in 2004	NRIS
Westslope_august2003	line	Streams with westslope cutthroat trout present	NRIS - MFISH
Yellowstone_august2003	line	Streams with Yellowstone cutthroat trout present	NRIS - MFISH
TERRESTRIAL FEATURES DATASET			
CEM_roads	vector line	Road layer used for cumulative effects model (CEM) analysis	DNRC and USFS
Developed_sites_linkage	vector polygon	Development layer used for identifying habitat linkage	USGS / DNRC
Eagle_nests_nhp	vector points	Eagle nest locations	MNHP
Elk_winter_range	vector polygon	Elk winter range areas	NRIS
FED_LAU	vector polygon	Federal lynx analysis units (LAU)	USFS

TABLE 9-1. PRIMARY SOURCE GIS DATA LAYERS USED FOR HCP ANALYSES (CONTINUED)

Name	Data Type	Description	Original Source
Fed_lynx_habitat	vector polygon	Federal lynx habitat defined by USFS	USFS
griz_recovery_zones	vector polygon	Grizzly bear recovery zones	USFS / USFWS
griz_units	vector polygon	Grizzly bear management units and sub-units	USFS / USFWS
Lynx_critical_habitat	vector polygon	Critical habitat for lynx	USFS
Lynx_management_areas	vector polygon	DNRC's lynx management areas	DNRC
Moose_winter_range	vector line	Moose winter range areas	NRIS
Motorized_access_roads	vector line	Road layer used to calculate motorized road densities	DNRC / USFS
Mule_deer_winter_range	vector polygon	Mule deer winter range areas	NRIS
Stewardship_layer	vector polygon	Land ownership within Montana	NRIS
SVGBCA_linkage_zones	vector polygon	Locations of Swan Agreement linkage zones	USFS / USFWS
Transportation_Plan_zones	vector polygon	DNRC's transportation planning zones	DNRC
White_tail_deer_winter_range	vector polygon	White tail deer winter range areas	NRIS
wolf_packs_1999_2005_clean	vector	Locations of wolf pack territories from 1999-2005 (no overlapping polygons)	NRIS
wolf_packs_1999_2005_ overlapping_polygons	vector	Locations of wolf pack territories from 1999-2005 (overlapping polygons)	NRIS
Wolf_recovery_zones	vector polygon	Wolf recovery zones	NRIS

9.3 ANALYSES AND MODELS

GIS-based analyses were used to estimate current resource conditions and potential impacts on those resources under the HCP alternatives. All analyses were performed using ArcGIS (versions 9.1 and 9.2), ArcGIS Spatial Analyst extension, or Microsoft Excel. The majority of analyses consisted of basic overlays and summary techniques (e.g., clip, union, intersect, identity, erase, buffer). Some analyses required the development of programmatic scripts. All scripts were written in the Python programming language, run within ArcGIS as a script, and are stored within a geo-processing toolbox named *DNRC_Tools* and toolset named *HCP*. The HCP toolset consists of four sub-toolsets named *Buffering, Cover Estimates, Density_Measures,* and *Topology*. Each script within each respective toolset provides a brief description of that script's function and requires a user specified set of input parameters to generate the desired outputs.

9.3.1 Buffering Toolset

The *Buffering* toolset contains two Python scripts that perform a large buffering routine and a multi-ring buffering routine. These scripts were developed to perform buffers on large datasets and generate a series of non-overlapping buffer rings. These scripts were used for both terrestrial and aquatic analyses.

9.3.2 Cover Estimates Toolset

For terrestrial analyses, four scripts were developed within the *Cover Estimates* toolset to separately identify potential grizzly bear cover, lynx cover, habitat linkage, and bald eagle habitat.

9.3.2.1 Grizzly Cover Script

The *Grizzly Cover* script identifies DNRC lands that provide hiding cover for grizzly bears.

9.3.2.2 Habitat Linkage Script

The *Habitat Linkage* script identifies locations that provide connectivity between large patches of forested habitat. This script was designed based on the methodologies described in Servheen et al. (2001).

9.3.2.3 Lynx Cover Script

The *Lynx Cover* script identifies lynx habitat types within DNRC lands.

9.3.2.4 Potential Bald Eagle Habitat Script

The *Potential Bald Eagle Habitat* script identifies potential nesting habitat for bald eagles.

9.3.3 Density Measures Toolset

The *Density_Measures* toolset contains three scripts that separately identify Cumulative Effects Model (CEM) outputs, lengths within a polygon, and motorized road densities.

9.3.3.1 Length within Polygon Script

The *Length within Polygon* script calculates the length of and the portion of a line feature located within each feature in a polygon layer. This script was used for both aquatic and terrestrial analyses.

9.3.3.2 Moving Windows Road Density Script

The *Moving Windows Road Density* script quantifies the percent area allocated to open road density, total road density, and security core categories based on the methodologies described in *Protocol Paper: Moving Window Motorized Access Density Analysis & Security Core Area Analysis for Grizzly Bear* (USFS 1995a).

9.3.4 Topology Toolset

The *Topology* toolset contains one script that removes duplicate arcs, overlapping polygons, and slivers from a data layer. This script was used to clean up all GIS data layers within the HCP database.

Chapter

References

10 REFERENCES

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Chapter 11

Glossary

11 GLOSSARY

100-year site index tree height – The average height predicted by site index curves for 100-year-old dominant or co-dominant tree species representative of the cover type in a given stand.

124 permit – A permit required under the Montana Stream Protection Act for any project that requires the construction of new facilities or the modification, operation, and maintenance of an existing facility that may affect the natural existing shape and form of any stream or its banks or tributaries. Montana Fish, Wildlife and Parks issues and administers the 124 permit under the regulatory authority of the Montana Stream Protection Act. The Act states that fisheries resources are to be protected and preserved in their natural state except as may be necessary and appropriate after considering all factors involved. The 124 permit process ensures that plans to modify fisheries resources (e.g., stream channel, stream banks, etc.) either eliminate or diminish potential adverse effects to those fisheries resources.

303(d) listings – Section 303(d) of the federal Clean Water Act requires states to assess the condition of their waters to determine where water quality is impaired (does not fully meet standards) or threatened (is likely to violate standards in the near future). The result of this review is the 303(d) list, which must be submitted by each state to the U.S. Environmental Protection Agency every other year. The 303(d) list in Montana is administered by the Montana Department of Environmental Quality.

Abandoned road – A road that is impassable due to effective closure but has drainage structures that have not been removed. Under this HCP, an abandoned road will not receive motorized use for low-intensity forest management activities or commercial forest management activities.

Active gravel pit – Any gravel pit or rock source that has excavation, processing, hauling, and/or other uses in a given calendar year. Motorized use of active pits may vary considerably from very limited low use to continuous motorized operation and hauling.

Active subunit – A bear management unit subunit in which DNRC is actively conducting commercial forest management activities.

Adaptive management – The process of monitoring the implementation of conservation measures, then adjusting future conservation measures according to what was learned. Adaptive management can also include testing of alternative conservation measures, monitoring the results, and then choosing the most effective and efficient measures for long-term implementation.

Animal unit – An animal unit is one mature cow of approximately 1,000 pounds and a calf up to weaning, usually 6 months of age, or their equivalent.

Animal unit month (AUM) – The amount of forage required by an animal unit for 1 month.

Bankfull depth – The depth of water in a stream as measured from the surface to the channel bottom when the water surface is even with the top of the stream bank.

Bankfull flows – The bankfull flow stage corresponds to the discharge at which channel maintenance is the most effective; that is, the discharge at which moving sediment, forming or removing bars, forming or changing bends and meanders, and generally doing work that results in the average morphologic characteristics of channels.

Bear – The grizzly bear (*Ursus arctos horribilis*).

Bear management unit (BMU) – A federally defined sub-designation within a grizzly bear recovery zone used for habitat evaluation and population monitoring (*Grizzly Bear Recovery Plan*, USFWS 1993).

Bear-resistant – Secured in a hard-sided camper, vehicle trunk, cab, hard-sided dwelling, hard-sided storage building, approved bear-resistant container, within an effective electric fence, or suspended with the bottom of the item at least 10 feet up and 4 feet out from an upright support.

Best management practice (BMP) – A practice or combination of land use management practices that are used to achieve sediment control and protect soil productivity and prevent or reduce non-point pollution to a level compatible with water quality goals. The practices must be technically and economically feasible and socially acceptable.

Best management practice (BMP) audit – An established monitoring and reporting process conducted both internally by DNRC (internal BMP audits) and by third parties (statewide BMP audits) to evaluate and document the implementation and effectiveness of BMPs applied on individual DNRC timber harvesting operations and associated site preparation, slash disposal, road construction, and road maintenance activities.

Blocked lands – Areas where parcels owned by DNRC are within proximity to one another. Blocked lands consisting of more than 15,000 acres, or a series of parcels in a checkerboard pattern, or parcels situated in proximity to one another or that lie adjacent to each other and form small- to medium-sized blocks. For the purposes of this HCP, blocked lands refer to those lands exhibiting these characteristics within the Swan River, Stillwater, or Coal Creek State Forests.

Bear management unit (BMU) subunit – A federally defined sub-designation of a BMU that approximates a female grizzly bear's home range; BMU subunits are used for habitat evaluation and population monitoring.

Board foot – A unit for measuring wood volumes. One board foot is a piece of wood 1 foot long, 1 foot wide, and 1 inch thick (144 cubic inches). This measurement is commonly used to express the amount of wood in a tree, sawlog, or individual piece of lumber. A thousand board feet is abbreviated mbf.

Borrow (source or site) – Small sources of gravel, rock, or fill material within 0.25 mile of open or restricted roads. Sizes of borrows can range from small, disturbed areas associated with the removal of several cubic yards of material up to larger areas of 1 acre. For the purposes of the HCP commitments, the number of borrows is not limited when associated with allowable road construction and/or road maintenance activities.

Bottomless arch culvert – A three-sided culvert that allows a natural stream bed in order to achieve substrate and stream flow conditions similar to undisturbed channel conditions.

Box culvert – A concrete (pre-cast or cast-in-place) or metal rectangular culvert, which can be countersunk in the stream bed to provide substrate that emulates natural conditions.

Broadcast burning (also referred to as slash burning) – A controlled burn, where the fire is intentionally ignited and allowed to proceed over a designated area within well-defined boundaries for the reduction of fuel hazard after logging or for site preparation before planting.

Browse (noun) **–** That part of leaf and twig growth of shrubs, woody vines, and trees available for animal consumption.

Bull trout nodal habitat – Bull trout nodal habitat is a designation developed by the MBTRT during preparation of the Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin (MBTRT 2000). Nodal habitats are those used by sub-adult and adult bull trout as migratory corridors, rearing areas, and overwintering areas and for other critical life history requirements.

Carrying capacity – The maximum livestock stocking rate possible without inducing permanent or long-term damage to vegetation or related resources. The stocking rate may vary from year to year in the same area as a result of fluctuating forage production.

Changed circumstance – Changed circumstances means changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the Service and that can be planned for (e.g., the listing of new species, or a fire or other natural catastrophic event in areas prone to such events) (50 CFR 17.3).

Channel migration zone (CMZ) – The width of the flood prone area at an elevation twice the maximum bankfull depth.

Classified forest trust lands – Montana state trust lands are legally assigned to one of four land use classes. The four classes are grazing, agricultural, forest, and other (which includes administrative sites, cabin sites, commercial leases, military sites). The basis for classification is to ensure that lands are used to best meet the Land Board's trust and multiple-use responsibilities and that no lands are sold, leased, or used under a different classification than that to which they belong.

Coarse-filter approach (**terrestrial**) – An approach to maintaining biodiversity as described in the State Forest Land Management Plan (DNRC 1996) that involves maintaining a diversity of structures and species composition within stands and a diversity of ecosystems across the landscape. The intent is to meet most of the habitat requirements of most of the native species. Compare with **fine-filter approach**.

Commercial forest management activities – Timber harvest and salvage harvest activities, ~~(~~which include~~s~~ ~~ground and aerial~~ logging, yarding (including tractor, cable, and helicopter types), ~~and~~ hauling~~)~~, road construction, and road reconstruction.

Connectivity (fish) – Connectivity is the capability of different life stages (e.g., adult or juvenile fish) of HCP fish species to move among the accessible habitats within normally occupied stream segments. For example, a culvert or dam may reduce connectivity by preventing or impeding upstream or downstream migration. For this HCP, the objective for connectivity will focus exclusively on road-stream crossings.

Connectivity (lynx) – Stand conditions where sapling, pole, or sawtimber stands possess at least 40 percent crown canopy closure, in a patch greater than 300 feet wide.

Conservation commitment – Specific actions and requirements comprising conservation strategies.

Conservation strategy – A collection of conservation commitments intended to meet the goals and objectives of an HCP.

Cost-share agreement – An agreement between the State of Montana and the USFS Region 1 whereby both parties agree to share in the land costs and road construction and maintenance of mutually used roads in a manner commensurate to the amount of lands being accessed. The resulting agreement is formalized by an exchange of documents issued by each party. The agreement requires that the USFS determine the tributary area being accessed by said road system, and then picking up any third-party shares when there is third-party usage within said road system. Due to other applicable federal laws, the USFS becomes the controlling party of any roadway over state trust lands, with an assumption of liability, maintenance, and future access requests to third parties. The cost-share agreement referred to herein is specifically applicable to the Master Cost Share Agreement, known as the "Montana Master Share Agreement," and not any other cost-share agreement that the State of Montana or the USFS may periodically enter into independently.

Contingency plan – A plan similar to a mitigation plan, but specifically in response to a changed circumstance that is collaboratively prepared by DNRC and the USFWS. The contingency plan will identify all HCP commitments to be incorporated into projects in response to a changed circumstance and additional commitments negotiated by the two parties. The resource specialist reports prepared in support of the MEPA documentation may also serve as the contingency plan.

Cooperative management response (CMR) – A process by which minor adjustments can be made to improve the HCP or to clarify HCP language.

Covered activities – Otherwise legal activities covered by the HCP and incidental take permit. For this HCP, covered activities include selected DNRC forest management activities related to timber harvest, roads, and grazing licenses. Covered activities include commercial forestry activities (e.g., timber harvest, salvage harvest, thinning, slash disposal, prescribed burning, site preparation, reforestation, weed control, fertilization, and inventory); forest management road construction, reconstruction, maintenance, use, and associated gravel quarrying for road surface materials; grazing licenses on classified forested trust lands (see definitions for **grazing license** and **grazing lease**); and roaded access.

Crown closure – The percentage of the ground surface covered by vertical projection of tree crowns. Synonymous with canopy cover and crown cover.

Den site (lynx) – Natural or man-made piles at least 8 feet in diameter of slash and downed logs, which are at least 3 feet tall at their highest point will be considered as potential den sites. Potential den sites must be situated greater than 300 feet from open or restricted roads.

Disturbance regime – A *disturbance regime* for an area comprises all of the various disturbances that may occur. There typically would be several types of disturbances, each characterized in terms of its type, size, spatial distribution, frequency, magnitude, and other spatial and temporal characteristics.

Effectiveness monitoring – Monitoring performed to determine whether the HCP conservation commitments being implemented are having the desired biological effect on the given resource or species.

Endangered Species Act (ESA) – The Endangered Species Act (16 USC 1531et seq.), as amended, and its implementing regulations. The ESA is federal legislation that provides a means to ensure the continued existence of threatened or endangered species and the protection of critical habitat of such species.

Engineered substrate – Stream bottom material, such as gravel and cobbles, mechanically placed within a stream channel or culvert to emulate the natural conditions upstream or downstream.

Fall period – The period from September 16 through November 15.

Fine-filter approach – An approach to maintaining biodiversity as described in the State Forest Land Management Plan (DNRC 1996) that is directed toward particular habitats or individual species that might not be adequately considered under a coarse filter approach to management. The habitats may be critical in some way, and the species may be sensitive, threatened, or endangered. See also **coarse-filter approach**.

Fishery – An area of water where fish are caught for recreational or commercial purposes.

Forage (noun) **–** All browse and herbage that is available and acceptable to grazing animals or that may be harvested for feeding purposes.

Ford – A dip constructed in the roadbed at a stream crossing, instead of a culvert or bridge. The stream bed should be of erosion-resistant material, or such material must be placed in contact with the stream bed.

Forested state trust lands (also referred to as forested trust lands) – Forested state lands managed by the TLMD of DNRC for the economic benefit of the trust beneficiaries and endowed institutions of Montana. These lands, totaling approximately 727,000 acres, are currently managed under the State Forest Land Management Plan and the Forest Management ARMs (36.11.401 through 36.11.450). Forested state trust lands may include trust lands classified under any of the four land use classes.

Full market value – A real estate transaction whereby the purchase price of a property equals the appraised market value.

Geographic information system (GIS) – A computer system used to store and manipulate spatial data for the purposes of producing maps and performing analyses of spatial features. Spatial data maintained within a GIS can represent point, line, and area features on the ground, such as bald eagle nests (points), roads and streams (lines), and habitat types (areas).

Gravel quarrying – As a covered activity is limited to the following actions in support of forest management activities: (1) DNRC's development and operation of gravel pits and borrow sites, and (2) DNRC's obtaining, stockpiling, hauling, and unloading gravel from DNRC or non-DNRC borrows or gravel pits. For the purposes of the HCP commitments, the number of borrows is not limited when associated with allowable road construction and/or road maintenance activities. Only medium and large gravel pits count against the allowable number of pits on a given administrative unit within grizzly bear recovery zones and NROH. See also borrow, medium gravel pit, and large gravel pit.

Grazing lease – A lease to graze livestock on trust lands that are classified grazing lands. The minimum rental rate for grazing leases is set by a formula that includes the average weighted price for beef cattle sold in Montana during the previous year. Because grazing leases are issued by the Agriculture and Grazing Management Bureau of DNRC and are not associated with DNRC forest management activities, they are not included as a covered activity under this HCP.

Grazing license – A license to graze livestock on trust lands that are classified forest trust lands. Official written permission to graze a specific number, kind, and class of livestock for a specified period on a defined allotment or management area. Because grazing licenses are associated with DNRC forest management activities, they are included as a covered activity under this HCP.

Green timber – Live trees.

Habitat type group – A system for stratifying the site potential of forest stands based on the habitat type climax vegetation classification system described by Pfister et al. (1977). The system was devised by Green et al. (1992) for the purposes of characterizing old-growth stands in the northern region of the U.S. Forest Service (including the Northern Rockies). Groupings reflect similarity of disturbance response, potential productivity, potential stocking density, potential for down wood accumulation, fire frequency, and tree species. The habitat types within each group also exhibit similar temperature and moisture regimes.

Habitat types – Forest vegetation types that follow the habitat type climax vegetation classification system developed by Pfister et al. (1977).

HCP species – The aquatic and terrestrial species covered by an HCP and incidental take permit. For this HCP, aquatic HCP species are bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*Oncorhynchus clarki lewisi*), and Columbia redband trout (*O. mykiss gairdneri*). Terrestrial HCP species are grizzly bear (*Ursus arctos horribilis*) and Canada lynx (*Lynx canadensis*).

HCP fish species (HCP aquatic species) – The fish (aquatic) species covered by an HCP and incidental take permit. For this HCP, covered fish species are bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*Oncorhynchus clarki lewisi*), and Columbia redband trout (*O. mykiss gairdneri*).

HCP project area – The lands (including lands added to the HCP pursuant to the transition lands strategy) where the covered activities occur and the lands to which the HCP's conservation commitments apply. The HCP project area includes the blocked lands consisting of the Stillwater, Coal Creek, and Swan River State Forests, as well as numerous scattered parcels throughout the NWLO, SWLO, and CLO as depicted in Appendix C, Figure C-1.

Hydrologic unit code (HUC) – For the purposes of watershed classification, a unique 11-digit number assigned to individual watersheds by the U.S. Geological Survey.

Hyporheic flow – The percolating flow of water through the sand, gravel, sediments, and other permeable soils under and beside the open streambed.

Implementation monitoring – Monitoring performed to determine whether the HCP conservation commitments are being implemented so that DNRC's covered activities remain in compliance with HCP requirements.

Implementing Agreement – Part of the application for an incidental take permit that specifies the HCP terms and conditions and legally binds the USFWS and permit holder (DNRC for this HCP) to the requirements and responsibilities of the HCP and permit.

Inactive subunit – A bear management unit subunit in which DNRC is prohibited from conducting commercial forest management activities.

Incidental take – The taking of a federally listed wildlife species, when that taking is incidental to, but not the purpose of, carrying out otherwise legal activities.

Incidental take permit (Permit) – A permit that exempts a permittee from the take prohibition of Section 9 of the Endangered Species Act (ESA), provided that a conservation plan has been developed that specifies the likely take and steps that the applicant will use to mitigate and minimize the take. A Permit is issued by the USFWS or NMFS or both under Section 10 of the ESA for non-federal applicants.

In-stream shade – The total solar energy affecting the surface of the stream in the stream reach adjacent to the timber harvest unit.

Intermittent stream – Any non-permanent (flows only for part of the year) flowing drainage feature having a definable channel and evidence of annual scour or deposition.

Internal (DNRC) best management practice (BMP) audits – An established monitoring and reporting process conducted internally by a DNRC water resource specialist, soil scientist, and fisheries biologist. The audit procedures are identical to those utilized by the third party audits (statewide BMP audits) to evaluate and document the implementation and effectiveness of BMPs applied on individual DNRC timber harvest operations and associated site preparation, slash disposal, road construction, and road maintenance activities.

Large gravel pit – A source of gravel or rock that involve 5 to 40 acres of disturbed area. Large pits receive sporadic intensive levels of use that may be relatively continuous during some operating seasons. Large pits may be activated periodically or continuously to serve as sources for multiple road maintenance and/or construction projects in a given year or across multiple years. Large pits may involve mining, crushing, sorting, and/or asphalt operations over 1 or more years. Large gravel pits are typically subject to rules, regulations, and permitting governed by the Montana Opencut Mining Act (ARMs 17.24.201 through 225) administered by the Montana Department of Environmental Quality).

Large woody debris (LWD) – Dead woody material, including logs, trees, or parts of trees that are greater than 4 inches (10 centimeters) in diameter and are located within a stream or river. Large woody debris contributes to healthy aquatic systems by providing habitat for fish and aquatic insects, supplying nutrients to the stream, trapping sediment, forming pools, and stabilizing banks and stream channels.

Level 1 watershed analysis – A watershed coarse-filter analysis relying primarily on existing data and information, and including documentation of rationale describing those variables that may contribute to cumulative watershed effects, an assessment of adverse cumulative watershed effects risk, and a description of additional detailed analysis, if required.

Level 2 watershed analysis – An evaluation of Level 1 watershed analysis results, field review of the project area, evaluation of baseline existing conditions, and a qualitative assessment of projected effects of proposed actions relative to the baseline existing conditions.

Level 3 watershed analysis – An evaluation of Level 1 and/or Level 2 watershed analysis results, field review of the project area, evaluation of baseline existing conditions, and a detailed quantitative assessment of projected effects of proposed actions relative to the baseline existing conditions.

Low-intensity forest management activities – Timber inventory, timber sale preparation, road location, road maintenance, bridge replacement, mechanical site preparation, tree planting, pre-commercial thinning, prescriptive and hazard reduction burning, patrol of fall/winter slash burns, heavy and non-heavy equipment slash treatments, monitoring, data collection, and noxious weed management, but not commercial forest management activities.

Lynx habitat – Forest lands consisting of subalpine fir or hemlock habitat types, as described by Pfister et al. (1977). Forest types may be mixed species composition (subalpine fir, hemlock, Engelmann spruce, Douglas-fir, grand fir, western larch, lodgepole pine, and hardwoods), as well as stands dominated by lodgepole pine. Moist Douglas-fir, grand fir, cedar, and Engelmann spruce habitat types where they are intermixed with subalpine fir habitat types also provide habitat for lynx.

Lynx management area (LMA) – A key geographic area in the context of DNRC ownership that is of notable importance for lynx. LMAs are delineated zones that contain DNRC lands where increased levels of lynx conservation commitments are applied. Within these areas, records indicate that lynx are likely present (or have been in the relatively recent past) or lands are considered important for maintenance of resident lynx populations.

Mass movement – The downslope movement of rock and soil, under the influence of gravity.

Medium gravel pit – A source of gravel or rock that involves 1 to 4.9 acres of disturbed area. Medium pits receive intermediate levels of use and may be activated periodically to serve as sources for multiple road maintenance and/or construction projects in a given year or across multiple years. Medium pits may involve excavating, crushing, sorting, and/or asphalt operations.

Microclimate – The physical state of the atmosphere close to a very small area of the earth's surface, often in relation to living matter, such as forests or insects.

Motorized activities – Motorized activities include chainsaw operation and timber felling, pre-commercial thinning, motorized vehicle trips associated with administrative uses, skidding and ground-based yarding operations, aerial yarding, motorized road construction and maintenance, log loading, log processing, and log hauling.

Motorized trail – A trail that is used by motorized vehicles.

Non-denning season – The time of year when grizzly bears are out of hibernation and are active. On the Stillwater Block, this means April 1 through November 30. On all other DNRC lands, this means April 1 through November 15.

Non-habitat areas (lynx) – Permanent non-forested areas such as dry forest types, rock, lakes, meadows, etc.

Non-recovery occupied habitat (NROH) (grizzly bears) – The fixed land area outside the boundaries of established grizzly bear recovery zones where one would reasonably expect to find grizzly bear use occurring during any/most years, as of 2002, as defined by Wittinger (2002).

Non-vegetated gravel pit – Previously forested areas that have fewer than 180 sapling trees per acre or less than 40 percent total stand crown closure.

Noxious weed – An unwanted plant specified by federal, state, or local laws as being especially undesirable, troublesome, and difficult to control. It grows and spreads in places where it interferes with the growth and production of native plants or desired crops.

Open road – A road without limitation on motorized vehicle use. Some open roads could be restricted for specific management reasons other than the HCP (spring breakup for example). For the purpose of calculating open road density on scattered lands, open roads include roads open year-long with uncontrolled public and administrative use; roads where status is currently unknown; roads restricted year-long or seasonally by other landowners where DNRC does not control access; and roads restricted during the winter period by DNRC that do not limit access during spring, summer, or fall periods.

Ordinary high water mark (OHWM) – The elevation marking the highest water level that has been maintained for a sufficient time to leave evidence upon the landscape. Generally, it is the point where the natural vegetation changes from predominately aquatic to upland species. For streams, the OHWM is generally the top of the bank of the channel. The OHWM is generally the elevation from which building and sewage setbacks are measured.

Other suitable habitat (lynx) – Forested habitat within lynx habitat with at least medium stocking levels (at least 40 percent crown closure) in any combination of seedling/sapling, pole, or sawtimber size classes as identified in the DNRC stand level inventory database. Other suitable habitat also includes stands of saplings that contain at least 180 stems per acre that are greater than or equal to 6 feet tall. Other suitable habitat is a subset of suitable lynx habitat but does not contain the necessary attributes to classify as winter foraging habitat or ~~young~~summer foraging habitat.

Parcel – Legally definable tract of land based on a 640-acre section. Portions of a legally described 640-acre section that are less than 640 acres but share a common boundary line (such as a NE 1/4 section and a SE 1/4 section; i.e., a 1/2 section in total) typically are considered as **one** parcel. Portions of a legally described 640-acre section that are less than 640 acres but share a common corner (such as a NE 1/4 section and a SW 1/4 section) typically are considered as **two** parcels. However, multiple 640-acre sections that share common boundary lines (or full 640-acre sections with adjoining smaller units such as an adjacent 40-acre tract) typically are considered as separate parcels. Two or more tracts within a section that are linked through boundary lines **(not** diagonally across corners) typically are considered as one parcel. Parcels may be more specifically defined for purposes such as establishing grazing animal unit months, or for identification in conjunction with acquisition, disposal, or special projects.

Perennial stream – A well-defined channel that contains water year round during a year of normal rainfall with the aquatic bed located below the water table for most of the year.

Physiographic region – A geographic region in which climate and geology have given rise to a distinct array of land forms that are notably different from those of surrounding regions.

Primary closure device – A closure device (e.g., gate, berm, barricade, tank trap etc.) designed for restricting road access situated off of an open road system that is primarily responsible for restricting access on a particular road or road system. Secondary closure devices (similarly – gate, berm, barricade, tank trap, etc.) may or may not be present on road segments behind primary closure devices.

Reciprocal access agreement – The method established by MCA 77-1-617, whereby DNRC can acquire access to isolated state trust land by exchanging an equal right on trust land. The tract(s) the state is acquiring access to must be isolated in either a legal sense (i.e., there is no legal access to the state land) or there are portions of the tract that have substantial physical restrictions that prevent access. A state tract may have legal access and be burdened by reciprocity as long as one or more state tracts obtain access through the reciprocal agreement. Rights do not have to be equal if the trust beneficiary burdened by reciprocity is compensated.

Reclaimed gravel pit – A gravel pit that has been made capable of supporting the uses those lands were capable of supporting prior to any mining activity, through any combination of the following or other means: backfilling, grading, stabilizing, or re-contouring, and re-vegetating.

Reclaimed road – A road that is impassable due to effective closure. It has been stabilized, and culverts and other drainage structures, if present, have been removed, but the road prism may remain. A reclaimed road will not receive motorized use for low-intensity forest management activities or commercial forest management activities.

Resident lynx population – A group of lynx that has exhibited long-term persistence in an area, as determined by a variety of factors, such as evidence of reproduction, successful recruitment into the breeding cohort, and maintenance of home ranges (68 Federal Register 40075-40101, July 3, 2003).

Rest period – A period during the non-denning season when project activities are restricted or prohibited to provide secure areas for grizzly bears.

Restricted road – A road that is managed to limit the manner in which motorized vehicles may be used. Restricted roads will have a physical barrier that restricts the general use of motorized vehicles. Restrictions will be man-made or naturally occurring (gates, barricades, earthen berms, vegetation that makes the road impassable, eroded road prism, rocks, etc.).

Riparian area – An area of land directly influenced by water or that influences water. Riparian areas usually have visible vegetative or physical characteristics reflecting the influence of water. Riversides and lake shores are typical riparian areas.

Riparian management zone (RMZ) – Under the Forest Management ARMs (36.11.401 through 36.11.450), an RMZ refers to the streamside buffer established when forest management activities are proposed on sites with high erosion risk or on sites that are adjacent to fish-bearing streams or lakes (ARM 36.11.425). For the purposes of this HCP, under the aquatic conservation strategies, the combined SMZ and RMZ are referred to as an RMZ, as defined in the September 2003 version of the ARMs for the Streamside Management Zone (ARMs 36.11.301 through 36.11.312).

Road – Any created or evolved access route that is greater than 500 feet long and is reasonably and prudently drivable with a conventional two-wheel-drive passenger car or two-wheel-drive pickup. See also abandoned road, open road, reclaimed road, restricted road, and temporary road.

Rosgen channel types – A classification system for rivers based on channel morphology that was developed by Rosgen (1994). Stream reaches are divided into seven major stream type categories (Aa+, A, B, C, D, DA, E, F, and G) that differ in entrenchment, gradient, width/depth ratio, and sinuosity in various landforms. The major categories can be further broken down into sub-categories based on dominant channel materials.

Salvage harvest – The removal of dead trees or trees damaged or dying because of injurious agents other than competition (such as fire, insects, disease, or blowdown) to recover the economic value that would otherwise be lost (ARM 36.11.403).

Scattered lands [scattered parcel(s)] – Any DNRC section or parcel that is not part of blocked lands. For the purposes of this HCP, blocked lands are identified within the Swan River, Stillwater, or Coal Creek State Forests.

Secondary closure device – Any closure device (e.g., gate, berm, barricade, tank trap etc.) that is secondarily restricting access and is situated on a restricted road or restricted road system behind a primary closure device.

Security core areas – Areas typically greater than 2,500 acres that during the non-denning period (1) are free of motorized access; (2) consider the geographic distribution of seasonal habitats important for grizzly bears; (3) remain in place for long periods, preferably 10 years; and (4) are at least 0.3 mile from the nearest access route that can be used by a motorized vehicle (ARM 36.11.403).

Sight distance – The distance at which 90 percent of an animal is hidden from view. On DNRC lands, this is approximately 100 feet, but may be more or less, depending on specific vegetative and topographic conditions.

Site potential tree height (SPTH) – The average maximum height for mature trees on a site, given the local growing conditions.

Spring habitat – Low-elevation sites or other sites that maintain less snow during the spring period (e.g., avalanche chutes, riparian areas, wet meadows, swamps), which are particularly important for offsetting bears' nutritional stress following hibernation. On the Stillwater Block, spring habitat is modeled using habitat value functions following Mace et al. (1999) and occurs in areas associated with roads possessing restricted status during the spring period. Spring management restrictions apply to the Stillwater Block from April 1 until June 16 within non-spring habitat, and from April 1 until July 1 within spring habitat. Spring habitat on the Swan River State Forest includes all areas below 5,200 feet in elevation. Spring habitat on DNRC scattered parcels refers to lands below 4,900 feet in elevation.

Spring period – For the Stillwater Block, this is April 1 through June 15 for non-spring habitat and April 1 through June 30 for areas within spring habitat. For lands within the Swan River State Forest and DNRC scattered parcels in recovery zones and non-recovery occupied habitat, this is April 1 through June 15.

State of Montana bull trout core habitat – A designation developed by the Montana Bull Trout Restoration Team (MBTRT), a state appointed entity, during preparation of the *Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin Montana* (MBTRT 2000). Core habitat areas are watersheds (including tributary drainages and adjoining uplands) used by migratory bull trout for spawning and early rearing and by resident bull trout for all life history requirements. Core areas typically support the strongest remaining bull trout populations of spawning and early rearing habitat within a restoration/conservation area and usually occur in relatively undisturbed watersheds. Twelve restoration/conservation areas were established in Montana and delineated by the Montana Bull Trout Scientific Group. Restoration/conservation areas have been delineated largely because of fragmentation of historically connected stream systems used by bull trout. These restoration/conservation areas essentially function as smaller, individual bull trout metapopulations. See MBTRT (2000) for additional information.

Statewide best management practice (BMP) audits – An established monitoring and reporting process conducted by third parties to evaluate and document the implementation and effectiveness of BMPs that are applied on timber harvest operations and associated site preparation, slash disposal, road construction, and road maintenance activities by various different landowner groups, including DNRC. Audits are conducted every two years by interdisciplinary teams composed of individual representing landowners, federal and state natural resource agencies, the timber industry, and conservation groups.

Stillwater Block – The blocked portions of the Stillwater and Coal Creek State Forests within the Northern Continental Divide Ecosystem recovery zone as identified in the Stillwater Block Transportation Plan Map (Appendix C, Figures C-4A and C-4B).

Stream order – A stream numbering system ranging from 1 to 6 or higher, which ranks streams beginning from the headwaters to a river terminus, and designates the relative position of a stream or stream segment in a drainage basin network. First-order streams have no discrete tributaries; the junction of two first-order streams produces a second-order stream; the junction of two second-order streams produces a third-order stream; etc.

Streamside management zone (SMZ) – A stream, lake, or other body of water and an adjacent area of varying width where management practices that might affect wildlife habitat or water quality, fish, or other aquatic resources need to be modified. SMZ encompasses a buffer strip of at least 50 feet wide on each side of a stream, lake, or other body of water, measured from the ordinary high water mark, and extends beyond the high water mark to include wetlands and areas that provide additional protection in zones with steep slopes or erosive soils.

Suitable lynx habitat – Forest stands within habitat types considered to be preferred by lynx that possess at least a medium stocking level (at least 40 percent crown closure) in any combination of seedling/sapling, pole, or sawtimber size classes as identified in the DNRC stand level inventory database. Suitable lynx habitat also includes stands that contain at least 180 stems per acre greater than or equal to 6 feet tall. On the Northern and Southwestern Land Offices, suitable lynx habitat includes the subsets of ~~young~~summer foraging habitat, winter foraging habitat, and other suitable habitat categories. On the Central Land Office, suitable lynx habitat is defined as stands occurring between 5,500 to 8,000 feet elevation that possess at least medium stocking levels (at least 40 percent stand crown closure) in any combination of pole and/or sawtimber size classes as identified in the DNRC stand level inventory database.

Summer foraging habitat (lynx) – Dense sapling stands and moderate to densely stocked poletimber stands within suitable lynx habitat that possess abundant horizontal cover.

Summer period – For the Stillwater Block, this is July 1 through September 15. For lands within the Swan River State Forest and DNRC scattered parcels, this is June 16 through September 15.

Swim performances – A measure of the swimming ability of an individual fish species. Swim performance is compared to culvert water velocities to properly size culverts so they are passable for local fish species.

Take – Regarding federally listed species, take is defined by the Endangered Species Act as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” The USFWS’ implementing regulations define harm as “an act or omission which actually injures or kills wildlife, including acts which annoy it to such an extent as to significantly disrupt essential behavior patterns, which include, but are not limited to, breeding, feeding or sheltering; significant environmental modification or degradation which has such effects.”

Temporary non-suitable habitat (lynx) – Recently harvested or naturally disturbed (e.g., burned) areas that have fewer than 180 saplings per acre at least 6-feet tall, or less than 40 percent total stand canopy cover, but have the potential to be forested suitable lynx habitat over time.

Temporary road – A low-standard road that is used for forest management which, following use, is treated in such a manner so as to no longer function as an open road, restricted road, or trail. Following their temporary usage, they may no longer be accessed for commercial, administrative, or public motorized use. Drainage structures may or may not be removed. The road prism may remain. Applicable best management practices would be implemented on these roads.

Timber permit – A commercial timber sale that does not exceed 100,000 board feet of timber, or, in cases of an emergency, such as salvage sales, does not exceed 200,000 board feet of timber.

Total maximum daily load (TMDL) – Section 303(d) of the federal Clean Water Act directs states to develop TMDLs that regulate the amount of pollutants released to water quality limited water bodies. Use of TMDLs is incorporated into an overall state strategy for bringing a polluted water body into compliance with water quality standards.

Total potential lynx habitat – The total habitat acres that are within habitat types considered to be preferred by lynx. Preferred habitat structure may or may not be present on some acreage included under this designation. Total potential lynx habitat includes the habitat subsets of (1) suitable lynx habitat and (2) temporary non-suitable habitat.

Trail – Any route longer than 500 feet that does not qualify as a "road," including those routes that conventional four-wheel-drive trucks could negotiate.

Transition lands strategy – A process, which is included as part of the Implementing Agreement, by which DNRC can allow changes in land ownership and use within the HCP project area over the 50-year Permit term.

Unforeseen circumstances – Changes in the circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the Service at the time of the conservation plan's negotiation and development, and that result in a substantial and adverse change in the status of the covered species (50 CFR 17.3).

Visual screening – Vegetation and/or topography providing visual obstruction capable of hiding a grizzly bear from view. The distance or patch size and configuration required to provide effective visual screening depends on the topography, and/or type and density of cover available.

Wetland – An area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include marshes, swamps, bogs, and similar areas.

Wetland management zone (WMZ) – A specified area adjacent to and encompassing an isolated wetland or adjacent to a wetland located next to a stream, lake, or other body of water where specific resource protection measures are implemented (ARM 36.11.403 (94)).

Winter foraging habitat (lynx) – Sawtimber stands within lynx habitat that possess multi-layering of moderate or well stocked coniferous vegetation and horizontal cover. Winter foraging habitat consists of stands that must exhibit the following minimum structural characteristics: (1) stands must occur on habitat types preferred by lynx; (2) stands must have one or more of the following species present: subalpine fir, grand fir, or Engelmann spruce; (3) stands must have at least 10 percent canopy closure in trees greater than or equal to 9 inches diameter at breast height (i.e., sawtimber category in the DNRC stand level inventory database); (4) stands must have a minimum of 40 percent total stand crown density in understory and overstory combined; and (5) stands must not occur in big game winter areas.

Winter period (bears) – The bear denning season, November 16 through March 31.

~~**Young foraging habitat (lynx)** – Conifer seedling and sapling stands within lynx habitat with an average height greater than or equal to 6 feet and a density greater than 2,000 stems per acre.~~

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Appendix

HCP Documents

LIST OF DOCUMENTS

DOCUMENT B-1. HCP CHECKLIST FOR SALVAGE PROJECTS PROPOSED FOR PARCELS IN REST WITHIN GRIZZLY BEAR RECOVERY ZONES

Pertains to Commitments GB-ST3, GB-SW4, GB-SC3, and GB-CY2.

Unit Office: __________ Proposed Project Legal Description: _____________

Acres Affected: ________ Date of Project Initiation:__ / ___/___

Likely Dates When Project Will Be Active: ________ to ________

Estimated Revenue to be Generated ($):_________________

1. Reason(s) for interrupting an established rest period (e.g. Specifically -- insects [type(s)], windthrow, disease, fire, combination, etc.):

____
____
____
____

2. Application of Mitigation Measures:

Pertains to Commitments GB-ST3, GB-SW4, GB-SC3, and GB-CY2.

Describe efforts made to reduce the duration of activity and complete necessary activities during the winter period. If the project must extend beyond the winter period, describe measures taken to accomplish the project in an expedient manner.

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____
____
____

Pertains to Commitment GB-SC3.

If project occurs on scattered lands, complete and attach an Open Road Reduction Checklist for Projects on Scattered Lands in Grizzly Bear Recovery Zones (Document B-1) and summarize results here (i.e., miles of open road closed, open road created, if necessary, with explanation as to how effects to grizzly bears were minimized).

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Pertains to Commitment GB-RZ1.

Are important habitat attributes present in the project area that can be avoided (e.g. avalanche chutes, productive berry fields, riparian zones, dens, etc.)? Explain:

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____

Pertains to Commitments GB-NR3 and GB-CY3.

Is spring habitat present on any parcel involved in this project? Given that salvage harvest is prohibited in spring habitat during the spring period, what will be the dates of operation? List any other allowable low intensity forest management activities planned in conjunction with this project that are necessary to accomplish in the spring period in conjunction with this project (please accompany these with estimated start and end dates when these activities would occur).

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____

Pertains to Commitment GB-NR4.

Can harvest units be designed so that no point within a harvest unit is greater than 600 ft. to forest cover or topographical features capable of impeding detection of bears? Was the mitigation incorporated into the project? If not, why? Explain:

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____
____
____

Pertains to Commitment GB-RZ2.

Are opportunities present and practicable to provide vegetation along open roads where intensive salvage, clearcut and/or seed tree harvesting is to occur to reduce sight distances into harvest units? If not why? Explain. If opportunities were present, provide a brief description of where and how cover was retained:

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Pertains to Commitment GB-PR6.

Are riparian zones or wetland management zones (WMZs) present within the project area? If so, were cover attributes retained consistent with the Aquatic Riparian Timber Harvest Conservation Strategy and Forest Management Administrative Rules for WMZs? Explain:

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____

Additional relevant considerations:

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____

DNRC Representative Signature: ______________________Date:______________

DOCUMENT B-2. OPEN ROAD REDUCTION CHECKLIST FOR PROJECTS ON SCATTERED PARCELS IN GRIZZLY BEAR RECOVERY ZONES

Pertains to Commitment GB-SC1 and GB-CY4.

Project Name: ______________________ Parcel Legals: T _____ R______ Sec(s) _______

Administrative Unit: ______________________ CYE or NCDE: ____________

1. Were open roads or motorized trails (includes seasonally restricted roads and motorized trails) present on this parcel or will newly constructed roads or motorized trails be left open? If "No," document that fact and sign the form below. If "Yes", continue to #2.

____

____

2. Road Lengths by Class **Pre-Project:**

a. Total Miles ____ (**Open Roads**) Roads or motorized trails open year-long with uncontrolled public and administrative use, or that have easements on them which limit DNRC's ability to control access; roads restricted year long or seasonally by other landowners where DNRC does not control access; and roads restricted during the winter period by DNRC that do not limit access during spring, summer, or fall periods.

b. Total Miles ____ (**Restricted Roads**) Roads or motorized trails with closures that are restricted yearlong.

c. Total Miles ____ (**Seasonally Restricted Roads**) Roads or motorized trails with closures, which have seasonal restrictions.

3. Road Lengths by Class **Post-Project:**

PRE-EXISTING ROADS:

a. Total Miles ____ (**Open Roads**) Roads or motorized trails open year-long with uncontrolled public and administrative use, or that have easements on them which limit DNRC's ability to control access; roads restricted year-long or seasonally by other landowners where DNRC does not control access; and roads restricted during the winter period by DNRC that do not limit access during spring, summer, or fall periods.

b. Total Miles ____ (**Restricted Roads**) Roads or motorized trails with closures that are restricted year-long.

c. Total Miles ____ (**Decommissioned Roads**) Roads or motorized trails that have been abandoned or reclaimed.

d. Total Miles ____ (**Seasonally Restricted Roads**) Roads or motorized trails with seasonal restrictions.

NEW CONSTRUCTION:

a. Total Miles ____ (**Open Roads**) Newly constructed roads or motorized trails open year-long with uncontrolled public and administrative use, or that have easements on them which limits DNRC's ability to control access; newly constructed roads restricted year long or seasonally by other landowners where DNRC does not control access; and newly constructed roads restricted during the winter period by DNRC that do not limit access during spring, summer, or fall periods.

b. Total Miles ____ (**Restricted Roads**) Newly constructed roads with closures that are restricted year-long.

c. Total Miles ____ (**Decommissioned Roads**) Newly constructed roads that were temporary roads or newly constructed roads that were abandoned or reclaimed.

d. Total Miles ____ (**Seasonally Restricted Roads**) Newly constructed roads or motorized trails with seasonal restrictions.

4. Document efforts made to coordinate closures with adjacent landowners. If coordination is not possible, explain.

____
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____
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____

5. Document below each seasonally or year-round open road and motorized trail segment that will be left open **post-project** and rationale for leaving it open. Examples of rationale for leaving roads open include the following: easements exist/road is not controlled by DNRC, social pressure to use the road and leave it open, difficulty in closing the road effectively (efforts should continue to the extent possible to make closures effective), high cost in closing the road or maintaining closure, flat ground where even if the road were closed another new road would be constructed/used by the public, road accesses lease sites, etc.

NOTE: Use the level of explanation and detail that a reasonable person would need to understand the rationale for leaving the road or motorized trail open. Include maps of each parcel in the project and label road segments by their open/restricted status above. Separately label open roads and motorized trails and reference them below in rationale.

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Signature of DNRC Project Leader: ____________________________ Date: ___________

DOCUMENT B-3. DNRC CANADA LYNX HABITAT MAPPING PROTOCOLS FOR IMPLEMENTATION OF THE HCP

R. Baty, B. Long, D. Riebe, and J. Hogland 4/12/10

INTRODUCTION

These mapping protocols are intended to aid consistent programmatic generation of lynx habitat maps for implementation of the DNRC Forest Management HCP. DNRC developed the protocols considering available literature, correspondence with John Squires (USFS research biologist), the Lynx Conservation Assessment Strategy (Ruediger et al. 2000), and USFS habitat definitions for several National Forests in Montana. DNRC also considered the complexity of DNRC ownership patterns and proximity of lynx habitat on DNRC lands to that found on federal lands in western Montana. Habitat Types selected for identifying Lynx Habitat on DNRC lands were based primarily on those used by the Lolo National Forest.

Lynx Habitat maps will be developed by the Technical Services Section for applicable Unit Offices following the habitat definitions included in the HCP and this protocol. The maps will depict the DNRC lands where conservation commitments apply. Other lands may be identified over time or omitted from consideration as lynx habitat following field verification. For Units west of the Continental Divide, preferred habitat types are used as the primary indicators of potential Lynx Habitat regardless of elevation or average snow depths. For Units east of the Continental Divide, elevation and other attributes from photo interpretation data are integrated into habitat identification due to SLI data limitations. Select habitat types serve as integrators of environmental variables and site conditions preferred by lynx. Listings of preferred Lynx Habitat types are contained in Tables 1 and 2. From this information, Total Potential Lynx Habitat is identified and filtered for inclusion in the following more specific habitat categories:

1) Suitable Lynx Habitat, which was further subdivided into the following subclasses:

a) Winter Foraging Habitat

b) ~~Young~~Summer Foraging Habitat

c) Other Suitable Habitat

2) Temporary Non-Suitable Habitat.

Lynx maps shall be updated at the project level as necessary through the process described in the HCP. Where data are unavailable to assess specific types of habitats on DNRC and nearby non-DNRC lands, aerial photograph interpretation and professional judgment may be required to assess habitat conditions.

Lynx Habitat Definition --General

Means forestlands comprised of subalpine fir or hemlock Habitat Types described by Pfister et al. (1977). Forest types may be mixed species composition (subalpine fir, hemlock, Engelmann spruce, Douglas-fir, grand fir, western larch, lodgepole pine and hardwoods), as well as stands dominated by lodgepole pine. Moist Douglas-fir, grand fir, cedar, and Engelmann spruce Habitat Types where they are intermixed with subalpine fir habitat types also provide habitat for lynx.

Lynx Habitat Filter: *If subalpine fir or hemlock habitat types (Table 1) are present on any given parcel, then other associated habitat types (Table 2) occurring on that parcel are also indicated for inclusion as "Lynx Habitat" regardless of elevation (see methods below for CLO, NELO and SLO for exceptions to this). For this purpose a "parcel" is defined as any legally describable tract up to 640 acres (i.e., an isolated 40-acre tract, 160 acre tract or 640 acre section would each be considered separate parcels). Suitable Habitat, Winter Foraging, ~~Young~~Summer Foraging, Other Habitat, and Temporary Non-Suitable Habitat are refined subsets of Total Potential Lynx Habitat based on relative stand age and structural attributes. The following Habitat Types are considered Non-Lynx Habitat because they are generally high elevation stands with low tree density (Abla-Pial/Vasc, Abla/Luhi, Tsme/Luhi, Pico/Vasc, Pial-Abla series, Laly-Abla series, Pial series). ~~Also excluded from lynx habitat were mapped winter ranges identified by DFWP for white-tailed deer, and mapped mule deer winter ranges where they overlapped with identified elk winter ranges (GIS file names and dates: WTDWR August 1997, Elk99, Muledr2004, L. Bailey, DFWP, Helena, Montana.). The rationale for doing this was that densities of competing predators (e.g., mountain lions and coyotes) are likely to be high in such areas, rendering them poorly suited for appreciable use by lynx.~~*

NWLO and SWLO Lynx Habitat

Inventory polygons that have Table 2 habitat types will be classed as lynx habitat if their boundary occurs within 2.4 miles of an inventory polygon that contains any habitat type found in Table 1. The purpose is to ensure identification of potentially suitable stands comprised of Habitat Types preferred by lynx that may be accessible to them during daily movements. This task will be accomplished by utilizing DNRC's GIS stand inventory layer. The 2.4-mile distance was selected because it approximates the average distance lynx are likely to travel during daily movements (Brainerd 1985, Squires and Laurion 2000). It also purposefully allows for inclusion of all Table 2 habitat types within two sections situated diagonally from one another.

If no lynx Table 1 habitat types occur within the parcel and Table 2 habitat types do occur within the parcel, then the polygons containing Table 2 habitat types will be classed as Total Potential Lynx Habitat acres if their stand boundaries are within 2.4 miles of USFS or BLM-identified lynx habitat. Such identified acres may also be further categorized into one or more structural associations such as Suitable Habitat, Winter Foraging, ~~Young~~Summer Foraging, Other Habitat, or Temporary Non-Suitable Habitat.

This portion of the mapping process will be accomplished by utilizing DNRC's GIS stand inventory layer and the combined BLM/USFS lynx habitat GIS map.

The Lynx Habitat filter process assigns all forested stands that had the Habitat Types listed in Tables 1 and 2. All of the following subcategories of Lynx Habitat can only occur in SLI stands that have been identified as Total Potential Lynx Habitat. All Lynx Habitat is initially labeled as Temporary Non-Suitable Habitat. SLI data is first filtered to identify Suitable Lynx Habitat. Of this pool, the SLI data is then filtered to identify Winter Foraging Habitat. The next step is to filter Suitable Habitat for stands that meet the ~~Young~~Summer Foraging Habitat definition. The remaining Suitable Habitat acres following this step that do not meet either the Winter Foraging Habitat or ~~Young~~Summer Foraging Habitat definitions are labeled as "Other Suitable Habitat." Lynx Habitat left after assignments into these categories remains labeled as Temporary Non-

Lynx Habitat. Again, Winter Foraging Habitat, ~~Young~~Summer Foraging Habitat and Other Suitable Habitat are all subsets of Suitable Habitat. Due to SLI data limitations, stands on the CLO were assigned to the Suitable or Temporary Non-Suitable Habitat categories. SLI Data Note: Form B information, specifically, average dbh and trees per acre data, were linked to the Form A data to allow filtering of seedling/sapling stand classes for minimum dbh and trees per acre lynx habitat criteria.

Suitable Lynx Habitat Filter

All stands identified as potential lynx habitat by the GIS process are filtered to determine which stands are Suitable Lynx Habitat. Poletimber and sawtimber size class stands must have ≥40% total stand crown density. Seedling/sapling size class stands require greater than or equal to 180 trees per acre that are greater than or equal to 6 feet tall. The stands qualifying as Suitable Lynx Habitat were filtered again to determine which stands were potential Winter Foraging and which stands were potential ~~Young~~Summer Foraging Lynx Habitat. All Suitable Lynx Habitat stands not qualifying as Winter Foraging or ~~Young~~Summer Foraging Lynx Habitat are classified as Other Suitable Habitat.

Foraging Habitat

Snowshoe hares inhabit various successional stages and vegetation communities. However, hares seem to consistently show preference for stands ~~(young or older)~~ that possess dense conifer or conifer/shrub understory vegetation (Hodges 2000). Squires et al. (2010, in press) found that stand conditions used by lynx varied between summer and winter. For this reason lynx foraging habitat is defined in two ways: 1) "Winter Foraging," and 2) "~~Young~~Summer Foraging." Winter Foraging Habitat is most likely to be influenced by commercial timber harvesting activities, whereas~~,~~ ~~Young~~Summer Foraging Habitat is ~~primarily~~more likely to be influenced by pre-commercial thinning.

The intent of conserving Lynx Foraging Habitat is to provide assurances that habitat likely to provide relatively high densities of snowshoe hares will be maintained through time. Habitat conditions and food availability, particularly in winter, are likely primary limiting factors for lynx in western Montana (J. Squires, USFS, pers. comm. March 17, 2005). Thus, identifying and maintaining habitat in areas occupied by lynx, which provides particular cover characteristics preferred by snowshoe hares and lynx in winter is important. Such habitat is comprised of poletimber stands and mature moist forest, typically at elevations >4,000 feet, which possesses multiple forest canopies and horizontal cover provided by conifer limbs near the snow surface. Lynx appear to prefer using and foraging within stands in winter that exhibit these characteristics (J. Squires, USFS, pers. comm. March 17, 2005). Dense, young sapling stands (>2,000 trees per acre) can provide habitat for concentrations of hares as well in western Montana (Griffin 2004). Squires et al. (2010, in press) observed appreciable lynx use of stands with 1,295 trees per acre. In these stands the sapling component averaged about 1,012 trees per acre and ranged from about 567 to 1,578 trees per acre. Pre-commercially thinned stands will typically type out as "Other Suitable Habitat" after thinning, rather than "Temporary Non-Suitable Habitat." Pre-commercially thinned stands are assumed to have potential to continue providing connectivity and lower quality foraging habitat.

Foraging Habitat Filter: (within Suitable Lynx Habitat)

<u>Winter Foraging Habitat</u>

Means sawtimber stands within Suitable Lynx Habitat that possess multi-layering of moderate or well stocked coniferous vegetation and horizontal cover. Winter Foraging Habitat is defined as stands exhibiting the following minimum structural characteristics: 1) must occur on preferred Habitat Types, 2) must have one or more of the following species present, subalpine fir, grand fir and or Engelmann spruce, 3) must have at least 10% canopy closure in trees ≥ 9 inches dbh (i.e., "sawtimber" stand size class category in SLI), 4) must have a minimum of 40% total stand crown density in understory and overstory combined.

<u>~~Young~~Summer Foraging Habitat</u>

~~Young foraging habitat is defined as conifer seedling and sapling stands within Suitable Lynx Habitat with an average dbh ≥1 inch and a density greater than equal to 2,000 stems per acre. The criteria " dbh ≥1 inch" is used to screen for stands that have a high probability of having a height greater than or equal to six feet [SSC = 9 and SAWSTK = P and ((LLTPA ≥ 2000 and LLDBH > 0) or (TPA ≥2000 and DBHB > 0))].~~

Means dense sapling stands and moderate to densely stocked poletimber stands within Suitable Lynx Habitat that possess horizontal cover. Summer foraging habitat is defined as stands exhibiting the following minimum structural characteristics: 1) must occur on preferred habitat types, 2) must have one or more shade-tolerance tree species present, (subalpine fir, grand fir, and/or Engelmann spruce), 3) must either be sapling stand of average height at least 6 feet. with > 1,500 stems per acre (SSC=7 and TPA>1500 and DBHB>0) or, 4) must be a medium-to well-stocked poletimber stand (SSC = 8, TOTSTK = M or W).

<u>Other Suitable Habitat</u>

Other Suitable Habitat is comprised of forestlands in Lynx Habitat that do not meet the above habitat definitions, but serve to provide cover to facilitate movement and acquisition of hares and alternative prey species, such as red squirrels. Habitat connectivity is a major function of Other Suitable Habitat. Other Suitable Habitat is forested habitat within Lynx Habitat with at least Medium DNRC SLI stocking (≥ 40% total stand crown closure) in any combination of seedling, sapling, poletimber and/or sawtimber size classes. Other Suitable Habitat also includes sapling stands >1 inch DBH that contain at least 180 stems per acre.

Other Suitable Habitat Filter:

Other Suitable Habitat is modeled as the Suitable Habitat that remains unassigned after Winter Foraging, and ~~Young~~Summer Foraging Habitats are assigned.

<u>Temporary Non-Lynx Habitat</u>

This classification includes seedling stands, sapling stands with <180 trees per acre, or sapling, poletimber or mature age class stands with < 40% total stand crown closure. Such stands may include recent clear-cuts, other even-aged harvest units, and stand-replacement burns that are ≤~15 years old, which are likely to develop future habitat characteristics important to lynx through forest succession.

Temporary Non-Lynx Habitat Filter: (within Lynx Habitat)

Stands identified as Stand size class = 6 (non-stocked). Stands identified as Stand size class = 7 (seedling/sapling) with less than 180 trees per acre and less than 1 inch average dbh. Poletimber stands with < 40% crown density; sawtimber stands with total crown density and sawtimber crown density < 40% (total stand and overstory stocking codes "P" and "P").

Lynx Non-Habitat

*These include stand polygons considered to not provide habitat for lynx over the long term. ~~Such areas include definable big game winter ranges in areas with relatively low winter snow accumulations, which are frequently used by high concentrations of various ungulate species and associated predators~~ ~~**regardless of Habitat Type.**~~ ~~Also e~~Excluded are ponderosa pine and dry Douglas-fir Habitat Types, limber pine Habitat Types, whitebark pine Habitat Types, lakes, rock and permanent non- forest areas.*

No Specific Filter

Program filters were not written to designate stand polygons as lynx non-habitat. Stand polygons become lynx non-habitat by default through the application of the other lynx habitat filters.

CLO, NELO, and SLO Lynx Habitat

Suitable Lynx Habitat

Stand inventory data does not contain habitat type information for these Land Offices. Forest land inventory polygons in these Land Offices will be classed as Suitable Lynx Habitat using photo-interpreted stand data where they meet the following requirements: 1) the stands are poletimber or sawtimber size classes occurring at elevations from 5,500 to 8,000 ft. with total crown density greater than or equal to 40 percent (SSC=9 or SSC=8, with code TOTSTK = M or W) and 2) they are stands that meet vegetation type and spatial requirements described in the GIS procedures below.

Note: It is assumed that all forested polygons occurring on flat, north, northeast, northwest and east aspects at elevations of 5,500 to 8,000 feet have a high probability of containing Table 1 or Table 2 Habitat Types. It is also assumed that Table 1 and Table 2 Habitat Types will have a high probability of having ≥ 40% crown density on SE, S, SW, W aspects. Less than 40% crown density indicates a high probability the habitat types are drier and are not likely to be found in Table 1 or Table 2.

GIS Procedures -- To predict where Suitable Lynx Habitat on scattered parcels may be present on the CLO, NELO and SLO, a coarse analysis of habitat availability and proximity is included in this model. Around each parcel containing habitat polygons, a 25,000-acre circle is established and within that circle at least 6,400 acres of any combination of the following GAP forest types must be present for the parcel to be considered "functional" habitat (i.e., having reasonable probability of providing enough habitat within one lynx home range to potentially support lynx).

4203 – lodgepole

4223 – Douglas-fir/lodgepole

4260 – mixed whitebark pine forest

4270 – mixed subalpine forest

4280 – mixed mesic

If at least 6,400 acres of these cover types are not present, the parcel is removed from further consideration as habitat unless the following requirement is met. Lynx Habitat polygons in parcels that are situated within 2.4 miles from USFS or BLM lynx habitat in Lynx Analysis Units (LAUs) are considered as "functional" habitat and are included on the map.

We acknowledge that this is a coarse analysis for the purpose of habitat identification. However, these forest types were chosen based on accuracy levels and composition indicated in Table 2.6 (Fuzzy Matrix Table on page 30) in the GAP Analysis Final Report and the forest type descriptions in the Montana Land Cover Atlas. The forest types selected are considered to have a high probability to provide habitat conditions preferred by lynx.

Temporary Non-Suitable Lynx Habitat

Temporary Non Lynx Habitat for these land offices that meets vegetation type and spatial requirements as described in the GIS procedures narrative above, and meet the following: are stands occurring on flat, north, northwest, northeast or east exposures that are either: 1) poorly stocked sawtimber stands <40% crown closure (SSC=9 and TOTSTK=S or P), 2) poorly stocked poletimber stands <40% crown closure (SSC=8 and TOTSTK=P), 3) seedling/sapling stands (SSC=7), or 4) are non-stocked stands (SSC=6).

Note: these parameter choices were influenced by inherent difficulties in assessing the presence and density of some stand types using photo interpretation methodologies.

Total Potential Lynx Habitat

After lynx habitat acreages are identified using the GIS modeling procedures described above, Total Potential Lynx Habitat estimates are derived by summing applicable acreages of Suitable Lynx Habitat and Temporary Non-Suitable Lynx Habitat

Preferred Lynx Habitat Type Tables Based on Types of Pfister et al. (1977)

Table 1. Subalpine fir, hemlock, and lodgepole pine habitat types considered Lynx Habitat. (Presence of stands in these types on DNRC ownership triggers the additional inclusion of stands in habitat types listed in Table 2 if present.)

Habitat Type	Codes	USFS R-1 Habitat Group
Tsuga heterophylla/Gymnocarpium dryopteris	555	5
Tsuga heterophylla/Clintonia uniflora	570, 571, 572, 573, 574	5
Tsuga heterophylla/Menziesia ferruginea	579	7
Tsuga mertensiana/Menziesia ferruginea	680, 681, 682	7

Habitat Type	Codes	USFS R-1 Habitat Group
Tsuga mertensiana/Clintonia uniflora	685, 686, 687	7
Tsuga mertensiana/Streptopus amplexifolius	675, 676, 677	8
Tsuga mertensiana/Xerophyllum tenax	710, 711, 712, 713	9
Abies lasiocarpa/Clintonia uniflora	620, 621, 622, 623, 624, 625	7
Abies lasiocarpa/Linnaea borealis	660, 661, 662	7
Abies lasiocarpa/Menziesia ferruginea	670, 671, 672, 673, 674	7
Abies lasiocarpa/Vaccinium scoparium	733	7
Abies lasiocarpa/Alnus sinuata	740	7
Abies lasiocarpa/Luzula hitchcockii	832	7
Abies lasiocarpa/Oplopanax horridum	610	8
Abies lasiocarpa/Galium triflorum	630	8
Abies lasiocarpa/Streptopus amplexifolius	635, 636, 637	8
Abies lasiocarpa/Calamagrostis canadensis	650, 651, 652, 653, 654, 655	8
Abies lasiocarpa/Vaccinium caespitosum	640	9
Abies lasiocarpa/Linnaea borealis	663	9
Abies lasiocarpa/Xerophyllum tenax	690, 691, 692, 693, 694	9
Abies lasiocarpa/Vaccinium globulare	720	9
Abies lasiocarpa/Vaccinium scoparium	730, 731, 732	9
Abies lasiocarpa/Calamagrostis rubescens	750	9
Abies lasiocarpa/Carex geyeri	790, 791, 792	9
Abies lasiocarpa/Arnica cordifolia	780	9
Pinus contorta/Purshia tridentata	910	9

Habitat Type	Codes	USFS R-1 Habitat Group
Pinus contorta/Vaccinium caespitosum	920	9
Pinus contorta/Linnaea borealis	930	9
Pinus contorta/Calamagrostis rubescens	950	9

Table 2. Habitat types considered to provide Lynx Habitat when present in DNRC parcels that also contain subalpine fir, hemlock, and lodgepole pine habitat types. (Habitat types listed in Table 1 trigger inclusion of these types as Lynx Habitat.)

Habitat Type	Codes	USFS R-1 Habitat Group
Pseudotsuga menziesii/Vaccinium globulare	280, 281, 282, 283	2
Pseudotsuga menziesii/Linnaea borealis	290, 291, 292, 293	2,3
Abies grandis/Xerophyllum tenax	510, 511, 512	3
Abies grandis/Vaccinium globulare	515	3
Abies grandis/Linnaea borealis	590, 591, 592	3
Abies grandis/Clintonia uniflora	520, 521, 522, 523, 524, 525, 526	3,4
Thuja plicata/Clintonia uniflora	530, 531, 532, 533, 534, 535	5
Thuja plicata/Aralia nudicaulis	545, 546, 547, 548	5
Thuja plicata/Gymnocarpium dryopteris	555	5
Thuja plicata/Asarum caudatum	575, 576, 577, 578	5
Thuja plicata/Oplopanax horridum	550	6
Picea/Clintonia uniflora	420, 421, 422	7
Picea/Senecio streptanthifolius	460, 461, 462	7

Habitat Type	Codes	USFS R-1 Habitat Group
Picea/Linnaea borealis	470	7
Picea/Equisetum arvense	410	8
Picea/Galium triflorum	440	8
Picea/Smilacina stellata	480	8

Technical Lynx Modeling Procedure

Below is the Python script used to identify potential lynx habitat for application of differing conservation measures described in both the DNRC Forested State Trust Lands HCP and existing Forest Management ARMs. This code works in ArcGIS 9x and is part of Montana DNRC's toolbox (file name: lynx_cover_2010_modification.py).

lynx_cover_2010_HCP_modification.py

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```
## lynx Model for HCP
## Author John Hogland
## e-mail JHogland@mt.gov
## Requires an ArcINFO or ArcView license and spatial analyst
## Developed from the procedures outlined in Baty et. al. 2008
##---------------------------
#Calculates the centroid of each polygon and returns a point file
def get_lyr_num():
    global shp_num
    vl = shp_num
    name = 'xx' + str(vl)
    nn = vl + 1
    shp_num = nn
    return name

def update_master():
    if gp.testschemalock(input_mf):
        gp.addmessage('Schema is locked. You will need to manually join shapefile ' + shp_conv + '
with the master database and delete all temporary files')
        out = False
    else:
        gp.addmessage('\nUpdating Master Database\n')
        ucur = gp.updatecursor(input_mf,'','','TAGID;LYNX_HCP;LYNX_RULE','TAGID')
        urow = ucur.next()
        scur = gp.searchcursor(shp_conv,'','','TAGID;LYNX_HCP;LYNX_RULE','TAGID')
        srow = scur.next()
        while srow:
            stg = srow.getvalue('TAGID')
            utg = urow.getvalue('TAGID')
            if stg == utg:
                urow.setvalue('LYNX_HCP',srow.getvalue('LYNX_HCP'))
                urow.setvalue('LYNX_RULE',srow.getvalue('LYNX_RULE'))
                ucur.updaterow(urow)
            else:
                gp.addmessage('TAGIDs do not match for temp file id = ' + stg + 'sli = ' + utg)
            urow = ucur.next()
            srow = scur.next()

        del srow,scur,urow,ucur
        out = True
    return out

def run_hcp():
    gp.addmessage('Running Lynx HCP model')
    set_values_blank('LYNX_HAB;LYNX_HCP')
    spatial_analysis(False)
    #Quieries for Lynx HCP
    #Suitable Habitat
    hquery1 =  'LYNX_HAB = \'LYNX HABITAT\''
    hcalc1 = 'TEMP NONSUITABLE'
    hquery2 =  'LYNX_HAB = \'LYNX HABITAT\' AND SSC = \'8\' AND (TOTSTK = \'L\' OR TOTSTK = \'M\'
OR TOTSTK = \'W\')'
    hcalc2 = 'SUITABLE HAB'
    hquery3 =  'LYNX_HAB = \'LYNX HABITAT\' AND SSC = \'9\' AND (TOTSTK = \'L\' OR TOTSTK = \'M\'
OR TOTSTK = \'W\') AND SAWSTK <> \'S\''
    hcalc3 = 'SUITABLE HAB'
    hquery4 =  'LYNX_HAB = \'LYNX HABITAT\' AND SSC = \'7\' AND AVGHTB >= 6 AND TPA >= 180'
    hcalc4 = 'SUITABLE HAB'
    hquery5 =  'LYNX_HAB = \'LYNX HABITAT\' AND SSC = \'7\' AND AVGHTB >= 6 AND TPA < 1 AND (TOTSTK
= \'L\' OR TOTSTK = \'M\' OR TOTSTK = \'W\') AND LV_USE = \'\' AND (LO = \'NW\' OR LO = \'SW\')'
    hcalc5 = 'SUITABLE HAB'
    #Winter Foraging Habitat
    hquery6 =  'LYNX_HCP = \'SUITABLE HAB\' AND SSC = \'9\' AND (' + sql1 + ') AND SAWSTK <> \'S\'
AND (TOTSTK = \'L\' OR TOTSTK = \'M\' OR TOTSTK = \'W\') AND (LO = \'NW\' OR LO = \'SW\')'
    hcalc6 = 'WINTER FORAGE'
    #Summer Forageing Habitat
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```
    hquery7 =  'LYNX_HCP = \'SUITABLE HAB\' AND SSC = \'7\' AND TPA >= 1500 AND (LO = \'NW\' OR LO 
= \'SW\')'
    hcalc7 = 'SUMMER FORAGE'
    hquery8 =  'LYNX_HCP = \'SUITABLE HAB\' AND SSC = \'8\' AND (TOTSTK = \'M\' or TOTSTK = \'W\')'
    hcalc8 = 'SUMMER FORAGE'
    #Other suitable habitat
    hquery9 =  'LYNX_HCP = \'SUITABLE HAB\' AND (LO = \'NW\' OR LO = \'SW\')'
    hcalc9 = 'OTHER SUITABLE'

    hq_list = [hquery1,hquery2,hquery3,hquery4,hquery5,hquery6,hquery7,hquery8,hquery9]
    hc_list = [hcalc1,hcalc2,hcalc3,hcalc4,hcalc5,hcalc6,hcalc7,hcalc8,hcalc9]


    #select and calculate the lynx hcp
    gp.addmessage('\nCalculating Lynx HCP Values')
    x = 1
    for q, c in zip(hq_list,hc_list):
        ucur = gp.updatecursor(shp_conv,q,'','TAGID;LYNX_HCP','')
        urow = ucur.next()
        while urow:
            urow.setvalue('LYNX_HCP',c)
            ucur.updaterow(urow)
            urow = ucur.next()
        del urow,ucur
        gp.addmessage('Finished Query ' + str(x) + ' for Lynx HCP')
        x += 1
    return

def run_rule():
    gp.addmessage('Running Lynx Rule model')
    set_values_blank('LYNX_HAB;LYNX_RULE')
    spatial_analysis(True)
    #Quieries for Lynx Rules
    rquery1 =  'LYNX_HAB = \'LYNX HABITAT\''
    rcalc1 = 'OTHER'

    #Denning Lynx Habitat
    rquery2 =  'LYNX_RULE <> \'\' AND SSC = \'9\' AND (TOTSTK <> \'P\' AND TOTSTK <> \'N\') AND 
CWDINDEX > 1'
    rcalc2 = 'DENNING'
    rquery3 =  'LYNX_RULE <> \'\' AND SSC = \'9\' AND (TOTSTK <> \'P\' AND TOTSTK <> \'N\') AND 
(VIGOR = \'3\' OR VIGOR = \'4\') AND LV_USE = \'\''
    rcalc3 = 'DENNING'

    #Mature Lynx Habitat
    rquery4 =  'LYNX_RULE = \'OTHER\' AND SSC = \'9\' AND TOTSTK = \'W\' AND LV_USE = \'\'' + ' AND 
(SAWSTK = \'M\' OR SAWSTK = \'L\')'
    rcalc4 = 'MATURE'
    rquery5 =  'LYNX_RULE = \'OTHER\' AND (ULSTK = \'W\' OR '+  'ULSTK = \'M\') AND LLDBH <= 4 AND 
(LLSTK = \'M\' OR LLSTK = \'W\')'
    rcalc5 = 'MATURE'
    rquery6 =  'LYNX_RULE = \'OTHER\' AND LV_USE <> \'\' AND LLDBH <= 4 AND (LLSTK = \'M\' OR LLSTK 
= \'W\') AND (SAWSTK = \'M\' OR SAWSTK = \'W\')'
    rcalc6 = 'MATURE'

    #DENNING/MATURE Habitat
    rquery7 =  'LYNX_RULE = \'DENNING\' AND SSC = \'9\' AND TOTSTK = \'W\' AND LV_USE = \'\'' + ' 
AND (SAWSTK = \'M\' OR SAWSTK = \'L\')'
    rcalc7 = 'DENNING/MATURE'
    rquery8 =  'LYNX_RULE = \'DENNING\' AND (ULSTK = \'W\' OR '+  'ULSTK = \'M\') AND LLDBH <= 4 
AND (LLSTK = \'M\' OR LLSTK = \'W\')'
    rcalc8 = 'DENNING/MATURE'
    rquery9 =  'LYNX_RULE = \'DENNING\' AND LV_USE <> \'\' AND LLDBH <= 4 AND (LLSTK = \'M\' OR 
LLSTK = \'W\') AND (SAWSTK = \'M\' OR SAWSTK = \'W\')'
    rcalc9 = 'DENNING/MATURE'
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    #Temp non habitat
    rquery10 =  'LYNX_RULE <> \'\' AND SSC = \'8\' AND TOTSTK = \'P\''
    rcalc10 = 'TEMP NON HABITAT'
    rquery11 =  'LYNX_RULE <> \'\' AND SSC = \'9\' AND TOTSTK = \'P\' AND SAWSTK = \'P\''
    rcalc11 = 'TEMP NON HABITAT'
    rquery12 =  'LYNX_RULE <> \'\' AND ((SSC = \'6\') OR (SSC = \'7\' AND SSTAGE = \'\' AND TOTSTK
= \'P\'))'
    rcalc12 = 'TEMP NON HABITAT'

    #Young Foraging Habitat and combinations
    rquery13 =  'LYNX_RULE = \'OTHER\' AND SSC = \'9\' AND LLTPA >= 4000 AND LLDBH >= 1 AND LLDBH
<= 4'
    rcalc13 = 'YOUNG FORAGING'
    rquery14 =  'LYNX_RULE = \'DENNING\' AND SSC = \'9\' AND LLTPA >= 4000 AND LLDBH >= 1 AND LLDBH
<= 4'
    rcalc14 = 'DENNING/YOUNG FOR'
    rquery15 =  'LYNX_RULE = \'MATURE\' AND SSC = \'9\' AND LLTPA >= 4000 AND LLDBH >= 1 AND LLDBH
<= 4'
    rcalc15 = 'YOUNG FORAGING'
    rquery16 =  'LYNX_RULE = \'DENNING/MATURE\' AND SSC = \'9\' AND LLTPA >= 4000 AND LLDBH >= 1
AND LLDBH <= 4'
    rcalc16 = 'YOUNG FORAGING'
    rquery17 =  'LYNX_RULE = \'OTHER\' AND TPA >= 4000 AND DBHB >= 1 AND DBHB < 5'
    rcalc17 = 'YOUNG FORAGING'
    rquery18 =  'LYNX_RULE = \'DENNING\' AND TPA >= 4000 AND DBHB >= 1 AND DBHB < 5'
    rcalc18 = 'DENNING/YOUNG FOR'
    rquery19 =  'LYNX_RULE = \'DENNING/MATURE\' AND TPA >= 4000 AND DBHB >= 1 AND DBHB < 5'
    rcalc19 = 'YOUNG FORAGING'

    #Form B
    rquery20 =  'LYNX_RULE <> \'\' AND SSTAGE = \'3\''
    rcalc20 = 'TEMP NON HABITAT'
    rquery21 =  'LYNX_RULE <> \'\' AND SSTAGE = \'2\''
    rcalc21 = 'TEMP NON HABITAT'
    rquery22 =  'LYNX_RULE <> \'\' AND TPA > 0 AND DBHB < 0.1'
    rcalc22 = 'TEMP NON HABITAT'


    rq_list = [rquery1,rquery2,rquery3,rquery4,rquery5,rquery6,rquery7,rquery8,rquery9,rquery10,
rquery11,rquery12,rquery13,rquery14,rquery15,rquery16,rquery17,rquery18,rquery19,rquery20,rquery21,
rquery22]
    rc_list = [rcalc1,rcalc2,rcalc3,rcalc4,rcalc5,rcalc6,rcalc7,rcalc8,rcalc9,rcalc10,rcalc11,
rcalc12,rcalc13,rcalc14,rcalc15,rcalc16,rcalc17,rcalc18,rcalc19,rcalc20,rcalc21,rcalc22]

    #select and calculate the lynx Rule
    gp.addmessage('\nCalclating Lynx Rule Values')
    x = 1
    for q, c in zip(rq_list,rc_list):
        ucur = gp.updatecursor(shp_conv,q,'','TAGID;LYNX_RULE','')
        urow = ucur.next()
        while urow:
            urow.setvalue('LYNX_RULE',c)
            ucur.updaterow(urow)
            urow = ucur.next()
        del urow,ucur
        gp.addmessage('Finished Query ' + str(x) + ' for Lynx RULE')
        x += 1

    gp.addmessage('\nFinished Calclating Lynx HCP and Rules.\n')
    return

def set_values_blank(fldshow):
    #fldshow = 'LYNX_HAB;LYNX_HCP;LYNX_RULE'
    ucur = gp.updatecursor(shp_conv,'','',fldshow,'')
    urow = ucur.next()
    while urow:
```

```
        for i in fldshow.split(';'):
            urow.setvalue(i,'')
        ucur.updaterow(urow)
        urow = ucur.next()
    del urow,ucur
    return

def spatial_analysis(bg):
    #bg = true or false
    gp.addmessage('\nStarting West Side Spatial Analysis')
    qry = 'LYNX_HAB <> \'NOT HABITAT\' AND (HABTYP = \'555\' OR (HABTYP >= \'570\' AND HABTYP <=
\'574\') OR HABTYP = \'579\' OR (HABTYP >= \'680\' AND HABTYP <= \'682\') OR (HABTYP >= \'685\' AND
HABTYP <= \'687\') OR HABTYP = \'675\' OR HABTYP = \'676\' OR HABTYP = \'677\' OR HABTYP = \'710\'
OR HABTYP = \'711\' OR HABTYP = \'712\' OR HABTYP = \'713\' OR (HABTYP >= \'620\' AND HABTYP <=
\'625\') OR (HABTYP >= \'660\' AND HABTYP <= \'662\') OR (HABTYP >= \'670\' AND HABTYP <= \'674\')
OR HABTYP = \'733\' OR HABTYP = \'740\' OR HABTYP = \'832\' OR HABTYP = \'610\' OR HABTYP = \'630\'
OR (HABTYP >= \'635\' AND HABTYP <= \'637\') OR (HABTYP >= \'650\' AND HABTYP <= \'655\') OR HABTYP
= \'640\' OR HABTYP = \'663\' OR (HABTYP >= \'690\' AND HABTYP <= \'694\') OR HABTYP = \'720\' OR
(HABTYP >= \'730\' AND HABTYP <= \'732\') OR HABTYP = \'750\' OR (HABTYP >= \'790\' AND HABTYP <=
\'792\') OR HABTYP = \'780\' OR HABTYP = \'910\' OR HABTYP = \'920\' OR HABTYP = \'930\' OR HABTYP
= \'950\')'
    input_f = gp.makefeaturelayer_management(shp_conv,get_lyr_num()).getoutput(0)
    gp.selectlayerbyattribute_management(input_f,'NEW_SELECTION',qry)
    count = int(gp.getcount_management(input_f).getoutput(0))
    if count > 0 and count != count_compare:
        gp.calculatefield_management(input_f,'LYNX_HAB','"LYNX HABITAT"')
        hcp_buff = os.path.join(tmph,'hcp_buff.shp')
        rule_buff = os.path.join(tmpr,'rule_buff.shp')
        if bg:
            tmp = tmpr
            temp2 = rule_buff
            gp.buffer_analysis(input_f,hcp_buff,'2.4 MILES','','','ALL','')
            big_game_winter(input_f)
            gp.selectlayerbyattribute_management(input_f,'NEW_SELECTION',qry)
            gp.buffer_analysis(input_f,rule_buff,'2.4 MILES','','','ALL','')
        else:
            tmp = tmph
            temp2 = hcp_buff
        gp.selectlayerbyattribute_management(input_f,'NEW_SELECTION', 'LYNX_HAB <> \'NOT HABITAT\'
AND ((HABTYP >= \'280\' AND HABTYP <= \'283\') OR (HABTYP >= \'290\' AND HABTYP <= \'293\') OR
(HABTYP >= \'510\' AND HABTYP <= \'512\') OR HABTYP = \'515\' OR (HABTYP >= \'590\' AND HABTYP <=
\'592\') OR (HABTYP >= \'520\' AND HABTYP <= \'526\') OR (HABTYP >= \'530\' AND HABTYP <= \'535\')
OR (HABTYP >= \'545\' AND HABTYP <= \'548\') OR (HABTYP >= \'575\' AND HABTYP <= \'578\') OR HABTYP
= \'550\' OR (HABTYP >= \'420\' AND HABTYP <= \'422\') OR (HABTYP >= \'460\' AND HABTYP <= \'462\')
OR HABTYP = \'470\' OR HABTYP = \'410\' OR HABTYP = \'440\' OR HABTYP = \'480\')')
        sel = gp.makefeaturelayer_management(temp2,get_lyr_num()).getoutput(0)
        gp.selectlayerbylocation_management(input_f,'INTERSECT',sel,'','SUBSET_SELECTION')
        count = int(gp.getcount_management(input_f).getoutput(0))
        if count > 0 and count != count_compare:
            gp.calculatefield_management(input_f, 'LYNX_HAB','"LYNX HABITAT"')

        gp.delete_management(sel)
        del sel
    fed_buff = os.path.join(tmp1,'fed_buff.shp')
    if os.path.exists(fed_buff):
        pass
    else:
        temp6 = gp.eucdistance_sa(input_fed,os.path.join(tmp,get_lyr_num()),'3862.237','30','','').
getoutput(0)
        temp7 = gp.greaterthanequal_sa(temp6,'0',os.path.join(tmp,get_lyr_num())).getoutput(0)
        gp.RasterToPolygon_conversion(temp7,fed_buff,'SIMPLIFY','')
    gp.selectlayerbyattribute_management(input_f,'NEW_SELECTION', 'LYNX_HAB <> \'NOT HABITAT\' AND
((HABTYP >= \'280\' AND HABTYP <= \'283\') OR (HABTYP >= \'290\' AND HABTYP <= \'293\') OR (HABTYP
>= \'510\' AND HABTYP <= \'512\') OR HABTYP = \'515\' OR (HABTYP >= \'590\' AND HABTYP <= \'592\')
OR (HABTYP >= \'520\' AND HABTYP <= \'526\') OR (HABTYP >= \'530\' AND HABTYP <= \'535\') OR
(HABTYP >= \'545\' AND HABTYP <= \'548\') OR (HABTYP >= \'575\' AND HABTYP <= \'578\') OR HABTYP =
```

```
\'550\' OR (HABTYP >= \'420\' AND HABTYP <= \'422\') OR (HABTYP >= \'460\' AND HABTYP <= \'462\')
OR HABTYP = \'470\' OR HABTYP = \'410\' OR HABTYP = \'440\' OR HABTYP = \'480\')')
    sel = gp.makefeaturelayer_management(fed_buff,get_lyr_num()).getoutput(0)
    gp.selectlayerbylocation_management(input_f,'INTERSECT',sel,'','SUBSET_SELECTION')
    count = int(gp.getcount_management(input_f).getoutput(0))
    if count > 0 and count != count_compare:
        gp.calculatefield_management(input_f, 'LYNX_HAB','"LYNX HABITAT"')
    gp.addmessage('\nFinished West Side Spatial Analysis.\nNow working on east side')

    #east side queries
    gp.selectlayerbyattribute_management(input_f,'NEW_SELECTION', '((LYNX_HAB <> \'NOT HABITAT\'
AND LYNX_HAB <> \'LYNX HABITAT\' AND (LO = \'CE\' OR LO = \'SO\' OR LO = \'NE\' OR LO = \'EA\') AND
(HABTYP = \'UNK\' or HABTYP = \'HWD\' or HABTYP = \'\')) and (G_ELEV >= 55 AND G_ELEV <= 80)) and
not ((G_AS LIKE \'' + wildcard + 'S' + wildcard + '\' OR G_AS = \' W\') AND (TOTSTK = \'N\' OR
TOTSTK = \'S\' OR TOTSTK = \'P\'))')
    gp.selectlayerbylocation_management(input_f,'INTERSECT',sel,'','SUBSET_SELECTION')
    count = int(gp.getcount_management(input_f).getoutput(0))
    if count > 0 and count != count_compare:
        gp.calculatefield_management(input_f, 'LYNX_HAB','"LYNX HABITAT"')

    gp.delete_management(sel)
    del sel
    #RECALCULATE TEMP
    gp.selectlayerbyattribute_management(input_f,'NEW_SELECTION', '((LYNX_HAB <> \'NOT HABITAT\'
AND LYNX_HAB <> \'LYNX HABITAT\' AND (LO = \'CE\' OR LO = \'SO\' OR LO = \'NE\' OR LO = \'EA\') AND
(HABTYP = \'UNK\' or HABTYP = \'HWD\' or HABTYP = \'\')) and (G_ELEV >= 55 AND G_ELEV <= 80)) and
not ((G_AS LIKE \'' + wildcard + 'S' + wildcard + '\' OR G_AS = \' W\') AND (TOTSTK = \'N\' OR
TOTSTK = \'S\' OR TOTSTK = \'P\'))')
    count = int(gp.getcount_management(input_f).getoutput(0))
    if count > 0 and count != count_compare:
        temp6 = os.path.join(tmp1,'gapcls')
        if os.path.exists(temp6):
            pass
        else:
            gp.test_sa(input_gap,'Value = 4203 OR Value = 4223 OR Value = 4260 OR Value = 4270 OR
Value = 4280',temp6)
        rows_p = gp.updatecursor(input_f)
        row_p = rows_p.next()
        counter = 1
        gp.snapraster = temp6
        temp7 = os.path.join(tmp,get_lyr_num())
        while row_p:
            poly_geometry = row_p.shape
            poly_geo = poly_geometry.TrueCentroid
            x = poly_geo.X
            y = poly_geo.Y
            l = str(x - 6000)
            r = str(x + 6000)
            b = str(y - 6000)
            t = str(y + 6000)
            ext = ' '.join([l,b,r,t])
            gp.extent = ext
            xy = str(x) + ' ' + str(y)
            gp.extractbycircle_sa(temp6,xy,'5674.56',temp7,'INSIDE')
            a_mean = float(gp.GetRasterProperties_management(temp7,'MEAN').getoutput(0))
            if a_mean >= 0.256:
                row_p.setvalue('LYNX_HAB','LYNX HABITAT')
                rows_p.updaterow(row_p)
                rest = '.\nPolygon ' + str(counter) + ' out of ' + str(count) + ' meets the
criteria'
            else:
                rest = '.\nPolygon ' + str(counter) + ' out of ' + str(count) + ' does not meet the
criteria'
            gp.addmessage('\nPercent area in the GAP categories = ' + str(a_mean * 100) + rest)
            counter += 1
            gp.delete_management(temp7)
```

```
            row_p = rows_p.next()
        del row_p,rows_p

    gp.selectlayerbyattribute_management(input_f,'NEW_SELECTION','FTYPE = \' W\' OR FTYPE = \'NF\'')
    count = int(gp.getcount_management(input_f).getoutput(0))
    if count > 0 and count != count_compare:
        gp.calculatefield_management(input_f, 'LYNX_HAB','"NOT HABITAT"')
    gp.selectlayerbyattribute_management(input_f,'NEW_SELECTION','LYNX_HAB = \'\'')
    count = int(gp.getcount_management(input_f).getoutput(0))
    if count > 0 and count != count_compare:
        gp.calculatefield_management(input_f, 'LYNX_HAB','"NOT HABITAT"')
    gp.addmessage('Finished East Side Spatial Analysis')
    gp.selectlayerbyattribute_management(input_f,'CLEAR_SELECTION')
    gp.delete_management(input_f)
    del input_f
    return

def big_game_winter(input_f):
    #Removes Big Game Layers from the Analysis
    merge = os.path.join(tmp1,'xx1.shp')
    if os.path.exists(merge):
        pass
    else:
        temp1 = gp.intersect_analysis(input_winter_range,tmpr + '\\xx0.shp','ONLY_FID','','INPUT').
getoutput(0)
        gp.merge_management(input_white_tail + ';' + temp1,merge)
    sel = gp.makefeaturelayer_management(merge,get_lyr_num()).getoutput(0)
    gp.SelectLayerByLocation_management(input_f, "INTERSECT", sel, "", "NEW_SELECTION")
    count = int(gp.getcount_management(input_f).getoutput(0))
    if count > 0 and count != count_compare:
        gp.calculatefield_management(input_f, 'LYNX_HAB','"NOT HABITAT"')
    gp.delete_management(sel)
    del merge,temp1,sel,count
    return

#-------------------------------------------------------------------------------------
# Import system modules
import os, sys, arcgisscripting, shutil

#Instantiate the geoporcessor
gp = arcgisscripting.create(9.3)
#set the license
license = gp.productinfo()
if license.lower() == 'notintialized':
    license = 'ArcView'
    gp.setproduct('ArcView')
else:
    pass
#Allow output overwrite....
gp.OverWriteOutput = 1
if gp.checkextension('spatial').lower() == 'available':
    gp.checkoutextension('spatial')
else:
    gp.addmessage('\nSpatial Analyst not avaiable.\nTry again later.')
    sys.exit()
#define input variables
input_mf = sys.argv[1]
input_fed = sys.argv[2] #federal lynx habitat
input_white_tail = sys.argv[3] #whitetail winter range
input_winter_range = sys.argv[4] #winter ranges for  mule deer and elk: mulitpart entry
input_gap = sys.argv[5] #GAP data

#check database
desc = gp.describe(input_mf)
sr = desc.spatialreference
```

```
fields = desc.fields
field_names = []
tree_press_list = []
for i in fields:
    value = i.name
    field_names.append(value.upper())
    if (value.find('SPEC') != -1 and value.find('PCT') == -1) or (value.find('SP') == 3 and value.
find('PCT') == -1):
        tree_press_list.append(value.upper())
del fields,desc
wildcard = '_'
testlh = 'LYNX_HAB' in field_names
fmess = '\nPlease select a sli layer with all needed fields'


test = 'LYNX_HCP' in field_names
if test == 0:
    gp.addmessage('\nNo LYNX_HCP Field.' + fmess)
    sys.exit()

test = 'LYNX_RULE' in field_names
if test == 0:
    gp.addmessage('\nNo LYNX_RULE Field.' + fmess)
    sys.exit()

sqllst = []
for i in tree_press_list:
    sqllst.append('(' + i +  ' = \'GF\' OR ' +  i +  ' = \' S\' OR ' +  i +  ' = \'AF\')')
sql1 = ' or '.join(sqllst)

test_list = ['G_AS','G_ELEV','SSC','TOTSTK','SAWSTK','AVGHTB','LV_USE','HABTYP','TAGID','FTYPE',
'EST_FOGI','ULSTK','LLTPA','LLDBH','TPA','DBHB','SSTAGE']
test2 = 0
missing = []
for i in test_list:
    test1 = i in field_names
    if test1 == 0:
        test2 += 1
        missing.append(i)

missing_fields = ', '.join(missing)

if test2 != 0:
    gp.addmessage('\n' + str(input_mf.split('\\')[-1]) + ':\nDoes not have the needed fields to
perform the queries. \n\nThe following fields are missing:\n  ' + missing_fields + '\n')
    sys.exit()
#calculate Lynx Habitat fields
tmp1 = os.environ.get('temp') + '\\lynx_temp'
tmph = os.path.join(tmp1,'lynxhcp')
tmpr = os.path.join(tmp1,'lynxrule')
global shp_num
shp_num = 0
if os.path.exists(tmp1):
    shutil.rmtree(tmp1,ignore_errors=True)
for i in [tmp1,tmph,tmpr]:
    os.mkdir(i)

gp.selectlayerbyattribute_management(input_mf,'ClEAR_SELECTION')
shp_conv = gp.CopyFeatures_management(input_mf,tmp1 + '\\shp_conv.shp').getoutput(0)
count_compare = int(gp.getcount_management(shp_conv).getoutput(0))
if testlh == 0:
    gp.AddField_management(shp_conv,'LYNX_HAB','TEXT')

run_rule()
run_hcp()
if update_master():
```

```
    #delete tempory files and fields
    gp.addmessage('\nDeleting temporary files...')
    for j in [tmph,tmpr,tmpl]:
        gp.workspace = j
        for i in gp.listfeatureclasses():
            gp.delete_management(i)
        for i in gp.listrasters():
            gp.delete_management(i)
        gp.refreshcatalog(j)

    shutil.rmtree(tmpl,ignore_errors=True)

else:
    gp.addmessage('Could not update master database. Check your temp directory for shp_conv.shp')

del gp
```

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DOCUMENT B-4. DNRC ROAD INVENTORY PROCEDURES

I. PURPOSE

1. Conduct field inventories to determine the status, location and condition of all existing roads occurring on State trust lands and designated shared use roads within each of the watershed project areas. Data collected will be recorded on DNRC Road Inventory Field Forms using methods outlined in Section IV (Technical Specifications) or on a Contract Supervisor approved substitute form using methods and procedures proposed by the bidder.

2. Inventory and evaluate the conditions of all stream and other drainage feature crossing structures which occur on State trust lands and designated shared use road within each watershed project area. Data collected will be recorded on a DNRC Stream/Drainage Feature Crossing Inventory Form using methods outlined in Section IV (Technical Specifications) or on a Contract Supervisor approved substitute forms using methods and procedures proposed by the bidder.

3. Delineate the location of each inventoried road segment, crossing structure and stream reach on a project area reference map.

4. Produce a Road Inventory Summary Report for each project area. This report shall summarize road conditions, and identify concerns and opportunities for restoration activities in each project area.

II. TECHNICAL SPECIFICATIONS

1. Verify location and status of all existing roads which occur on State Trust parcels (DNRC parcels) within each watershed inventory project area. Use base maps provided by DNRC to determine the location of DNRC parcels included in project area. Update base maps to indicate actual road locations and road status if it differs from those on base maps.

   a. The following classification will be used to characterize road status:

      1. Open
      2. Gated
      3. Closed-other (concrete barrier, guard rail closure)
      4. Closed-bermed
      5. Abandoned/brushed-in
      6. Reclaimed

2. Map additional roads located within or adjacent to the DNRC parcel which are not delineated on the existing base maps. Adjacent roads are defined as those roads that are in physical contact with the DNRC parcels ownership boundary on the ground.

3. All roads located within DNRC parcels shall be inventoried and evaluated using a DNRC Road Inventory field form or Contract Supervisor approved substitutes provided by the bidder.

   Roads to be inventoried are to be divided into individual road segments for evaluation. Roads will be divided into segments at intersections, road junctions, or whenever road engineering standards and/or overall conditions change. A road should also be split into segments when there are substantial changes in the landscape that the road is located on such as: soils or geologic parent materials, slope position, steepness of side slopes, road grade or other topographic features. Each road segment is evaluated and summarized as a separate entry on the Road Inventory Field Form or approved substitute form.

   Some abandoned or older low standard roads may be difficult to locate and evaluate due to topography, re-vegetation, or lack of discernable road prism. The Contract Supervisor will take these conditions into consideration when apply this standard. Gross error will always be penalized.

4. The maximum road length to be delineated and evaluated as an individual road reach is 1 mile (5,280 feet). The minimum road length to be delineated and evaluated as an individual road segment shall be 1/10 of a mile (528 feet) with the exception of stream and drainage feature crossings. Crossing structures and associated road approaches shall be delineated and evaluated as an individual road segment even if it involves less than 1/10 mile (528 feet) of linear road distance.

5. Each individual road segment will be evaluated for the following characteristics: road status, road segment length, average road width, presence of road surfacing materials, average cut and fill height, average cut and fill slope, soil type and geologic parent material, slope position, road conditions, and recommendations. These evaluations are to be documented on a copy of the DNRC Road Inventory Field Form or approved substitute. All data fields contained on the form must be completed. These evaluations are to be completed using the following instructions or approved alternative procedures and methods:

   a. Determine the length of each road segment in feet or miles (rounded to the 1/10 mile) by use of measuring tape, hip chain, string machine, odometer, or indirect measurements from map or aerial photography.

   b. Road width shall be determined by measuring the distance from the toe of the cut slope to the top of the fill slope. Average road width shall be determined by estimating the average of several measured widths which are representative of an individual road segment.

   c. Presence or absence of road surfacing material shall be noted for each road segment. Surface material shall be classified and noted as being:

1. None – no surfacing;
2. Native – materials with high rock content;
3. Pit run gravel;
4. Crushed gravel; or
5. Asphalt.

d. Estimate average cut slope height for each road segment in feet.

e. Estimate average cut and fill slopes ratios for each road segment. Use conventional run:rise slope ratios.

f. Determine geologic parent material for each road segment. If geologic parent material varies within a road segment already at minimum allowable length, record the more prevalent class occurring within that segment. Classify geologic parent material into one of the following groups:

1. Granitic
2. Metamorphic (gneiss & schist)
3. Metasediment (Belt)
4. Limestone – Dolomite
5. Volcanic
6. Soft/Hard Sediment
7. Tertiary Valley fill
8. Alluvium
9. Lacustrine
10. Glacial Till

g. Classify soil types using Standard NRCS Soil Survey soil series or NRCS detailed map unit names, or by documenting general observations regarding soil depth, texture and rock content.

h. Determine slope position by classifying the general location of each road segment on the landscape. Specify one of the following classes: ridge top, mid-slope, lower slope, bench, valley bottom or streamside management zone (SMZ).

i. Evaluate the condition of each road segment in regards to the presence and extent of surface erosion, fill slope and cut slope vegetation, fill slope or cut slope erosion, existing mass failures, existing or potential sediment delivery to streams, ephemeral drainage features or other water resources.

j. Evaluate the condition of all ditch drainage systems, catch basins and ditch relief structures, and road surface drainage features located within each road segment.

k. List recommended road maintenance needs, road improvements or mitigations measures which address problem identified concerning road or drainage feature conditions.

6. Complete evaluations of all existing stream and drainage feature crossings structures located on DNRC administered trust lands using a DNRC Stream Crossing/Drainage Feature Inventory Form with the following instructions:

   a. Assign a unique identifying code to each crossing structure evaluated. Record crossing code as well as other general data concerning the location of each crossing structure on a DNRC Stream Crossing/Drainage Feature Inventory Form and on a copy of the project area reference map.

   b. Cross reference the location and code of each crossing structure on the corresponding Road Inventory Form covering that road system. Delineate each crossing structure and adjacent road approaches as an individual road segment.

   c. Record stream class determined according to the classification system used under the Montana Streamside Management Zone Law and Rules (77-5-302 MCA). Note those drainage features which are not classified as a stream, lake or other body of water under Montana SMZ Law and Rules.

   d. Record crossing type on Stream Crossing Inventory Form. Crossing types other than culvert and bridge, may include: unimproved fords, improved fords, abandoned or removed crossings, and crossing constructed from native materials.

   e. Summarize stream channel characteristics and conditions at crossing site in space provided under section titled “Other features”.

   f. Document observations concerning crossing size, capacity, function, and condition for each individual crossing on the DNRC Stream/Drainage Feature Crossing Inventory Form. Complete cross section and plan view sketches in diagram boxes provided on form.

   g. Color print photographs are required of all stream crossing structures. Photographs of the structure shall be taken from both the upstream and downstream views of the crossing. Photographs shall be of adequate resolution, contrast, brightness and scale so that the structure and drainage feature are clearly visible.

   h. Complete “Recommendations” section of form by noting any recommended maintenance, improvements or mitigations measures designed to address problem areas. Problem areas include: improper sizing, inadequate capacity, road surface or fill erosion, bank erosion, channel scour, channel instability and fish passage barrier.

7. Verify location and status of all shared-use roads that are identified on each watershed project base map provided by DNRC. Update maps to indicate actual road locations and actual status if it differs from those on maps.

8. Inventory and evaluate all roads designated as shared-use roads on project area base map using a DNRC Road Inventory Field Forms or Contract Supervisor approved substitutes provided by the bidder. Roads will be inventoried using the same procedures outlined under the instructions for evaluating roads located on DNRC administered lands.

9. Complete evaluations of all existing stream and drainage feature crossings structures located on designated shared use roads on the DNRC Road Inventory Field Form. Note: A DNRC Stream/Drainage Feature Crossing Form is not required for crossing structures located on shared use roads.

    a. Delineate each crossing structure and adjacent road approaches as an individual road segment. Assign a unique identifying code to each crossing structure. Record crossing code as well as other general information concerning the type, size and condition of the crossing structure on the DNRC Road Inventory Field Form.

    b. Record the location of each crossing structure on the corresponding Project Area Reference Map. Label each location with the appropriate identifying code.

III. WATERSHED PROJECT AREA SUMMARY REPORT INSPECTION PROCESS

Each Watershed Project Area Summary Report will be inspected by the Contract Supervisor. The report will be checked for accuracy and completeness by comparing the information contained in the report against the technical requirements contained in the contract, data on field forms and the project reference map.

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-5. DNRC ROAD INVENTORY FIELD FORM

oject:________________ Watershed:__________________ Road Name / Number:_____________ Status:

Parent Material	Surface Material	Road Grade	Avg. Width	Avg Cut Height	Cut Slope Ratio	Avg Fill Height	Fill Slope Ratio	Road Segment Description and Condition	Recommendations - Improvements and Mitigation Measures

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DOCUMENT B-6. GRAZING FIELD EVALUATION FORM

SEC: TWN: RNG: LEASE #: COUNTY:

LEGAL DESCRIP: : EXPIRES:

COMMERCIAL NAME:

LAST: FIRST: MI:

ADDRESS:

CITY: STATE: ZIP:

PHONE:

VALUE - GRAZING: SHARE - AGRICULTURE:

AGRICULTURE: CRP:

PAST FIELD FINDINGS		PRESENT FIELD FINDINGS	
	TOTAL ACRES		
	AGRICULTURE		TYPE OF CROP(S):
	CRP		SPECIES:
	HAY		SPECIES:
	GRAZING		USE:
	GRAZING UNUSED		
	UNSUITABLE		EXPLANATION:
	OTHER		EXPLANATION:
	AUMs		GRAZE: CROP/HAY AFTERMATH:

RENEWAL LEASE TERM: 10 YR. ___ 5 YR. ___ OTHER: ___YEAR(S)

RESTRICTED GRAZING SEASON: FROM ________ TO

____

DEVELOPMENTS NOTED: POWERLINE ______________ ROAD ______________ MISSILE CABLE________________

PHONE CABLE ________________ PIPELINE ________________ OTHER

____

MINERAL ACTIVITY:

____

AREA OFFICE RECOMMENDATION ON LAND USES:

____

FOLLOWUP ACTION REQUIRED: YES ________ NO ________

MANAGEMENT PLAN: YES ________ NO ________

TYPE:

OTHER ACTION NEEDED:

____

WHO WAS CONTACTED? ____ PHONE _____ LETTER

_____ PERSONAL_____ LAND USE SPECIALIST: ____

SALINITY PROBLEMS/EXISTING OR POTENTIAL: LAND USE _____________________________

LOCATION ___________________

SURROUNDING LAND USE: ACRES ________________________

CONTROL METHODS:

NOXIOUS WEEDS:

LOCATION:

CONTROL:

___

UNTILLED & SUITABLE FOR AGRICULTURE: ACRES ____________ LOCATION______________________________

___

EROSION PROBLEMS:

___

RIPARIAN AREA HEALTH:

___

UTILIZATION: UNUSED SLIGHT MODERATE FULL CLOSE SEVERE EXTREME

0% 0-20% 20-40% 40-50% 50-60% 60-80% 80-100%

___

TREND: UPWARD ______________ DOWNWARD ______________ STATIC ______________

___

MANAGEMENT NEEDS ON ANY PART, OR USE, OF THIS TRACT

DATE OF APPRAISAL: ________________

RANGE EVALUATION

P% = PRESENT; C% = CLIMAX; COMPOSITION % BY WEIGHT

(May be clipped or estimated)

SITE NUMBER ONE			**SITE NUMBER TWO**			**SITE NUMBER THREE**		
RANGE SITE			RANGE SITE			RANGE SITE		
ACRES			ACRES			ACRES		
SPECIES:	P%	C%	SPECIES:	P%	C%	SPECIES:	P%	C%
DECREASERS			DECREASERS			DECREASERS		
INCREASERS			INCREASERS			INCREASERS		
INVADERS			INVADERS			INVADERS		
%COMPOSITION	100%	%	%COMPOSITION	100%	%	%COMPOSITION	100%	%
Cond. Class XXX			XXX		XXX			

SITE NUMBER FOUR			SITE NUMBER FIVE			SITE NUMBER SIX		
RANGE SITE			RANGE SITE			RANGE SITE		
ACRES			ACRES			ACRES		
SPECIES:	P%	C%	SPECIES:	P%	C%	SPECIES:	P%	C%
DECREASERS			DECREASERS			DECREASERS		
INCREASERS			INCREASERS			INCREASERS		
INVADERS			INVADERS			INVADERS		
%COMPOSITION	100%	%	%COMPOSITION	100%	%	%COMPOSITION	100%	%
Cond. Class XXX			XXX	XXX				

PRESENT RATING					POTENTIAL RATING			
SITE	ACRES	AUMs/AC	TOTAL AUM		SITE	ACRES	AUMs/AC	TOTAL AUMs
No. 1					No. 1			
No. 2					No. 2			
No. 3					No. 3			
No. 4					No. 4			
No. 5					No. 5			
No. 6					No. 6			
TOTAL ACRES	**TOTAL AUMs**							

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DOCUMENT B-7. MONTANA DNRC SUPPLEMENTAL GRAZING EVALUATION FORM AND INSTRUCTIONS

For Use on Classified Forest Trust Lands

TWN: RNG: SEC#: LICENSE #: AREA/UNIT:

LEGAL DESCRIPTION:

EXPIRATION DATE: INSPECTION DATE: EVALUATOR:

COMMERCIAL NAME:

LAST: FIRST:

ADDRESS:

CITY: STATE: ZIP:

PHONE:

CURRENT GRAZING MANAGEMENT:

1) HAS THE PARCEL BEEN GRAZED IN PAST YEAR? YES _____ NO _____

2) # OF LIVESTOCK GRAZING PARCEL:

3) SEASON OF USE (MONTHS):

4) GRAZING SYSTEM:

HAS A MANAGEMENT PLAN BEEN DEVELOPED?

IF YES, DESCRIBE SPECIAL REQUIREMENTS:

DESCRIBE OVERALL TRACT CONDITION (GENERAL DESCRIPTION):

<u>*PREVIOUS CONDITION CLASS:</u> **<u>*CURRENT CONDITION CLASS:</u>**

*Document previous and current average condition class across all range sites evaluated.

Previous		Current	
Excellent (75-100)	_____	**Excellent (75-100)**	_____
Good (50-75)	_____	**Good (50-75)**	_____
Fair (25-50)	____	**Fair (25-50)**	____
Poor (0-25)	_____	Poor (0-25)	_____

RIPARIAN AREAS:

1. STREAM NAME(S): ____

2. STREAM(S) CLASS: NONE_____ CLASS 1_____ CLASS 2_____ CLASS 3_____ LAKE_____ OBW_____

3. OTHER RIPARIAN OR WETLAND (SPECIFY TYPE):

FISHERIES STATUS (UNKNOWN –or– SPECIES PRESENT):

<u>RIPARIAN FIELD EVALUATIONS:</u>

LENGTH OF STREAM/RIPARIAN AREA EVALUATED (Estimate Distance in Feet) _______________________

N ↑

Sketch the location of streams and riparian areas on the tract and delineate the reach evaluated.

STREAMBANK DISTURBANCE: ESTIMATED % __________

RIPARIAN FORAGE UTILIZATION: (CIRCLE ONE)

UNUSED	SLIGHT	MODERATE	FULL	CLOSE	SEVERE	EXTREME
0%	0-20%	20-40%	40-50%	50-60%	60-80%	80-100%

RIPARIAN BROWSE UTILIZATION: (Indicate% of total composition in each utilization class)

__ Woody Species Not Present

__ % None - 0-5% of the available second year and older leaders are browsed.

__ % Light - >5-25% of the available second year and older leaders are browsed.

__ % Moderate - >25 - 50% of the available second year and older leaders are browsed.

__ % Heavy - >50% of the available second year and older leaders are browsed.

__ % Dead - 100% of canopy is dead.

__ % Unavailable - Provides no browse below 1.5 m in height, or unavailable due to location.

Σ Total 100%

RIPARIAN WOODY SPECIES AGE CLASS: (Indicate% of total composition in each age class)

__ Woody Species not present

__ % Seedling - 1 individual stem

__ % Young/ Sapling - 2 to 10 stems

__ % Mature - More than 10 stems

__ % Decadent - > 30% of canopy is dead

__ % Dead - 100 % of canopy is dead

Σ Total 100%

ARE NOXIOUS WEEDS PRESENT? YES _____ NO _____

IF YES, COMPLETE INVENTORY FORM AND NAME THE THREE MOST PREVALENT SPECIES:

OTHER COMMENTS REGARDING OVERALL HEALTH OF RIPARIAN AREA:

RECOMMENDATIONS:

INSTRUCTIONS FOR COMPLETING THE DNRC SUPPLEMENTAL GRAZING EVALUATION FORM ON CLASSIFIED FOREST LANDS

The methods utilized for completing the Supplemental Grazing Evaluation Form are essentially the same for both license renewal and mid-term evaluations. Instructions for completing the supplemental form, including evaluation of riparian forage utilization, riparian browse utilization, riparian shrub age class distribution and streambank disturbance, and all other requested information are contained in the following section:

Location / Licensee

This section of the supplemental form duplicates the information already completed at the top of the existing Field Evaluation Form. It includes a legal description, lease #, expiration date, and name and address of the holder of the grazing license. It is essential to complete this information, despite its duplication, just in case the supplemental form is separated from the DNRC Field Evaluation Form.

Current Grazing Management

This section of the supplemental form is meant to summarize and provide insight into the existing grazing management. Indicate whether or not the parcel has been grazed during the past year. If the parcel has not been grazed in the past year, estimate the last year grazed. Estimate the number of livestock currently grazed on the parcel and allotted season of use. Indicate and describe any specific or unique grazing techniques or systems utilized by the licensee and any special requirements or restrictions that have been placed on the license.

Tract Condition

For renewals, summarize overall tract condition based on the results of the detailed range evaluation completed on page 2 of the DNRC Field Evaluation Form. For mid-term evaluations use an ocular assessment of tract conditions to compare current range condition to the results of the previous detailed range evaluation completed at last renewal inspection. Note if tract condition has improved, deteriorated, or remained unchanged, and document any change in condition class. Inspect any problems noted during previous evaluation, and note the presence and condition of noxious weeds, erosion, water developments, fencing, and salting. If county-listed noxious weeds are noted, complete Weed Inventory Form (located in Weed Management Guidance) as required by Weed Management RMS #12.

Riparian Areas

Indicate presence or absence of riparian areas on parcel being evaluated by checking the appropriate category on form. For streams, use definitions contained in SMZ Law and Rules to determine if a stream channel is present and indicate the class of the stream channel. If more than one stream channel is present in the parcel, indicate the class of each stream evaluated. When inspecting tracts with multiple streams and/or riparian areas evaluate the most sensitive riparian area on the tract (e.g., streams containing fisheries, class 1 streams).

Indicate presence and describe any other riparian or wetland features occurring on the site that do not meet the SMZ Law and Rules definition of a stream channel. Examples include: spring or seeps with no discernable stream channel, ephemeral draws, ponds, potholes or other bodies of water that are less than 1/10 acre in size.

Fisheries Status

Indicate presence or absence of a fishery for all Class 1 streams and other bodies of water supporting known or suspected fish populations. Indicate species present if known. If status is unknown, indicate it as such.

Extent of Riparian Evaluation

In order to complete these evaluations the observer will need to determine the location and extent of riparian area and length of stream channel to be evaluated. If possible and time permits, the entire length of stream and associated riparian area within the parcel should be evaluated. If the stream is too long, then one or more representative segments (areas judged to be most representative of conditions over the entire parcel) will have to be identified and evaluated. The reach should not be located in an isolated area which is more heavily impacted than the remainder of the parcel. Conversely, the evaluator should not focus their efforts in an area that is relatively undisturbed or in "better condition" than the rest of the parcel.

Using the Green Line (the first perennial vegetation above the stable low water line of a stream or water body), a study reach will be determined by pacing 500 feet adjacent to the stream channel. If both sides of the stream reach are in the same grazing license, the evaluation should include the riparian zone on both sides of the stream. Ocular assessments will be made by walking along the Green Line and observing the bank and vegetation that lie within a 6-foot width, 3 feet extended to either side of the evaluator and the Green Line. The Green Line method will be used to perform riparian evaluations for forage utilization, browse utilization, streambank disturbance, and riparian tree and shrub age classes.

Indicate by sketching the location of streams and riparian areas on the tract and delineate the reach evaluated on the Supplemental Grazing Evaluation Form.

Streambank Disturbance

An assessment of stream bank disturbance is to be completed on each tract to determine the level of compliance with Grazing Resource Management Standard #7C. This standard requires that streambank disturbance induced by livestock trampling be limited to less than 10 percent alteration per 500 feet of streambank. The underlying goal of this standard is to protect the integrity of streambanks by maintaining them in a condition that resists erosion.

The amount of damage to streambanks will be determined by ocular assessment. The evaluator will view the stream banks and determine the amount of damage caused by livestock. The evaluator will proceed along the Green Line viewing the banks within the 3-foot extension to either side of the Green Line. The length of each livestock altered segment encountered will be estimated and recorded to a resolution of 1 foot. After evaluating both streambanks (if necessary), the overall percentage of altered bank will be determined by dividing the total length of altered bank by the total Green Line length calculated and recorded on the Supplemental Grazing Evaluation Form.

DNRC recognizes that this evaluation will require a judgment call on the part of the evaluator. The most obvious indicator of livestock induced bank alteration is direct evidence of trampling or a concentration of hoof prints along an unstable streambank, and exposure of bare mineral soil.

On highly sinuous stream channels, bank erosion occurs mostly on the outside of the meander curves. Streambank alteration will be overestimated if the evaluated segment is mostly composed of an outside curve. Conversely, streambank alteration may be underestimated if the evaluator focuses on the inside of a meander bend. To ensure accurate estimates, use two full meander cycles as the minimum length of representative segments. A complete meander cycle has the same amount of inside and outside curvature.

Riparian Forage Utilization

Utilization is traditionally described as the portion or percent of current-year forage production that is consumed or destroyed by grazing. A problem with this parameter is the difficulty of evaluating or visualizing something that has already been removed (Bauer 1993).

A quick and easy method of estimating riparian forage utilization has been developed using photographic guides for key riparian graminoids (Kinney and Clary 1994). The use of photographic guide is based on the appearance of the residual portion of a grazed plant (see Appendix 2).

The photographic guide provides a visual comparison standard, which should assist in making utilization estimates more consistent and accurate. Estimate riparian forage utilization by comparing the residual stubble of individual plants to the appropriate photo series contained in the guide. If the species being evaluated are not included in the photo guide, use the photo series from the most closely related species or a species with the most similar growth form. Estimates of riparian forage utilization will be based on the growth form of the plant rather than its size. Therefore, variation in height growth due to site characteristic, seasonal precipitation, or other factors will have minimal effect on utilization estimates.

Riparian utilization will be observed along the Green Line in a representative reach. The area evaluated must be large enough to be considered representative of overall tract conditions. Estimate average utilization of riparian forage species at each tract and record this value on the Supplemental Grazing Evaluation Form.

Riparian Browse Utilization

Many riparian woody species are browsed by livestock or wildlife. Heavy utilization can prevent regeneration or establishment of woody species. Excessive use of these species may cause their elimination from the site and replacement by disturbance-induced species or undesirable invaders.

Riparian browse utilization will be evaluated by DNRC using a modified version of the Cole Browse Survey method (BLM 1996 and USFS 1969). This method is well suited for situations where browse data must be obtained from a large area with limited personal and time.

Riparian shrubs will be examined along the Green Line to determine browse form class during both renewal and mid-term evaluations. Sampling should be confined to key species. Key species include willows, dogwood, choke cherry, mountain maple and service berry. Alder and snowberry should only be sampled if other preferred species are not present. Form class assignments are based upon the length and appearance of the previous year's growth (see Table 1 and Appendix 3).

Table 1 - Browse Form Classes

None	0–5% of the available second year and older leaders are browsed.
Light	5–25% of the available second year and older leaders are browsed.
Moderate	25–50% of the available second year and older leaders are browsed.
Heavy	> 50% of the available second year and older leaders are browsed.
Unavailable	Browse species at site provide no browse below 1.5 m height or are unavailable to livestock due to location.

When estimating the extent of utilization, consider browsed second year and older leaders on woody species normally eaten by livestock and/or wildlife. Do not count current year's use since an evaluation in mid-season is not an accurate reflection of actual use. Leader use estimates are confined to the available portions of the plant. Available portions are those that can be easily grazed, i.e., the plant is not overhanging a stream or steep embankment, or crowded up against another plant. For a cow, browse is only available below five feet in height.

More than one degree of hedging within the available portion of the plant is quite common. Therefore, the overall form class of an individual shrub is based on the average condition of the branch ends.

Determine form class by comparing the total number of leaders available (those within animal reach) with the number of leaders browsed. Estimate the percentage of shrubs from the overall shrub community that occur in each browse form class and record this information on the Supplemental Grazing Evaluation Form.

Riparian Tree/ Shrub Age Classes

An evaluation of riparian trees and shrub age class distribution has also been added to the Supplemental Grazing Evaluation Form. The presence of woody plants in all age classes (seedlings, young, and mature) at sites supporting woody species is one of the clearest indicators of riparian health, vigor, and vegetative stability. Regeneration of woody species can be reduced by heavy browsing on young age class woody plants. A high amount of seedling or young age class plants indicates an upward trend in shrub-dominated riparian types.

The age class of woody species occupying the site based on the number of stems on each plant. See Table 2 for a description of identifying characteristics of each age class (Bauer 1993).

Table 2 -Woody Species Age Classes

Age Class	Characteristic
Seedlings	1 Stem
Young/Sapling	2 to 10 Stems
Mature	More than 10 Stems
Decadent	≥ 30% of Canopy Dead
Dead	100% of Canopy Dread

Determine the percentage composition of each age class by visually estimating along the Green Line and recording results on the Supplemental Grazing Evaluation Form. This monitoring parameter is only applicable to those areas with woody species or woody species potential. Indicate an absence of woody species on the tract on the Supplemental Form. For a woody species age class to be considered present, a minimum of ten individuals per age class per acre must be present. The total of all age classes should equal 100 %, unless riparian shrubs or trees are not present on the tract.

Other Comments

This section provides additional space for the evaluator to make general comments regarding overall riparian health or specific observations which have not already been documented in the previous sections. Some examples might be presence of noxious weeds, effects of irrigation diversions, impacts due to channelization from roads, beaver activity, or concentrated use of riparian area by big game.

Recommendations

List recommended actions for those tracts not meeting the prescribed Grazing Management Standards. Recommendations should address measures designed to mitigate or rehabilitate impacts to riparian and water resources. Describe rangeland improvements or changes in the current grazing management necessary to resolve specific problem areas. Rangeland improvements might include riparian management, weed control, off-site water developments, new or alternative grazing systems, fencing, or prescribed burning.

Summary

The prescribed limits of acceptable resource damage are defined by RMS #4, 6, and 7c. Methods for evaluating those criteria have been outlined in this guidance. Failure to meet the prescribed numeric criteria for riparian forage utilization, riparian browse utilization, and streambank disturbance and/or the narrative criteria for maintenance of different age classes of desired riparian-wetland plant communities may require changes in current grazing practices. **Adjustment to grazing license may be necessary to facilitate rehabilitation and ensure compliance with Grazing RMS #4, 6, and 7c.** Changes in grazing management may include, but are not limited to, such measures as: adjustment to initial stocking rates, length of use, grazing seasons, fencing, offsite water developments, implementation of alternative grazing systems or other restrictions. The BLM and the Montana Riparian and Wetland Association have recently published a document titled "Successful Strategies for Grazing Cattle in Riparian Zones." This document (see Appendix 4) will provide an excellent reference for developing techniques and strategies for riparian grazing management.

Coordination

Currently, the Area Land Offices track grazing license renewal inspections and notify individual Units of their requirement to conduct renewal inspections. The Area Land Offices will also track and notify Units of requirements to perform mid-term evaluations. Units will forward results of mid-term and renewal evaluations to the Agriculture & Grazing Bureau, who will in turn forward copies of the Field Evaluation Form and the Supplemental Grazing Evaluation Form to the Forest Management Bureau's forest planner.

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DOCUMENT B-8. DNRC NOXIOUS WEED INVENTORY / MANAGEMENT FORM AND INSTRUCTIONS.

PROJECT________________________ UNIT_______________DATE______

T____, R____, Section_____ Waypoint_______________________

Leased/Licensed Yes No Is this a follow-up review?__________________

____Are there Weed District Coop. Planned for adjacent lands?____________________

Are there any sensitive sites or limitations to treatments that require special mitigation? (Surface water, Adjacent residences, Sensitive plants)____

PROJECT MAP OR ATTACH QUAD MAP 1:24000

SYMBOLS FOR DESIGNATING INFESTED ACRES ON MAP

X = SPOT INFESTATIONS, LESS THAN 0.1 ACRE

= 0.1 TO 1 ACRE

= 1 to 5 acres

=Draw in infestation> 5 acres

= Infestations that follow linear features such as roads and streams should be designated by drawing lines on the map.

If Category 2 or 3 Noxious Weeds are found, Notify Area Office & County Weed District

EED SPECIES	COUNTY PRIORITY	INFEST. SIZE	COVER CLASS	CONTROL OBJECTIVE	TREATMENT SUGGESTED/NOTES

WEEDS IN THE ROAD (F)	WEEDS IN STAND/MAP UNIT OR DENOTED MAP AREA	
er or not weeds are growing in any road bd or R/W (includes cated in the stand polygon or located adjacent to the polygon. rates to or more stands, record the presence of weeds for the ost of the road is adjacent to. You do not have to record the veeds for both stands when they are on each side of the road.	Record whether or not weeds are growing in the stand or map unit polygon	
DESCRIPTION	**CODE**	**DESCRIPTION**
None; no weeds were observed growing in the road(s) djacent to or within the polygon.	**0**	None; no weeds were observed growing in the stand polygon or area.
Spotty; noxious weeds are growing in the road(s) in a few mall spots (less than an area 20'x 20').	**1**	**Spot Spotty or occasional plants; noxious weeds are** growing in the stand in a few small spots (less than an area 20'x 20').
Established patches; noxious weeds are growing in patches in he road(s). Some of the weeds are growing in patches greater han an area 20'x20' in size (400 sq. ft.)	**2**	Mod. Established patches; noxious weeds are growing in patches in the stand. Some of the weeds are growing in patches greater than an area 20'x 20' in size.
Abundant; noxious weeds are growing throughout most of the oad(s) bed and/ or R/W (> 50% of the road area).	**3**	High Abundant; noxious weeds are growing throughout most of the stand (> 50% of the stand area).

INSTRUCTIONS FOR COMPLETING THE NOXIOUS WEED INVENTORY FORM

NOXIOUS WEED INVENTORY/MAPPING

The following are map symbols and cover classes used to outline and describe noxious weed infestations for project specific weed mapping which meet the requirements of the Statewide weed mapping standards required by County Weed Districts (Mapping Noxious Weeds in Montana Ext. PUB. EB 148 & Montguide MT 9613).

STEP 1

Fill out the Weed Inventory / management form header with all available information (Legal description, date etc). Outline the survey area on the quad map. Areas inside the survey boundary without size and location designations will be considered weed free.

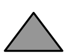
STEP 2

Designate the noxious weed species and use correct symbol on map (refer to current Montana State listed Category weeds and County Weed District listed weeds, attached).

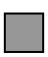
Map the infested areas using the following symbols to designate the size and locations of the infestations (symbols should be centered over the infestation sites).

SYMBOLS FOR DESIGNATING INFESTED ACRES ON MAP

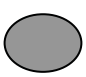
X = Point infestations, less than 0.1 acre



= 0.1 to 1 acre



= 1 to 5 acres



= Area infestations larger than 5 acres should be outlined directly on map

= Infestations that follow linear features such as roads and streams should be designated by drawing lines on the map

WEEDS ON THE ROAD OR LINEAR FEATURES (Powerlines, fences)

On forest sites, noxious weeds more typically occur along portions of roads and should be with a separate road code to help when deciding management options. Record whether or not weeds are growing in any **road bed or R/W** (includes cut and fill) located in the **stand map unit/polygon** or located adjacent to the polygon. If a road separates two or more stands, record the presence of weeds for the stand that most of the road is adjacent to.

ROAD CODE **DESCRIPTION**

R 1 **Spotty**; noxious weeds are growing in the road(s) in a few small spots (less than an area 20' x 20').

R 2 **Established patches**; noxious weeds are growing in patches in the road(s). Some of the weeds are growing in patches greater than an area 20' x 20' in size (400 ft^2).

R 3 **Abundant**; noxious weeds are growing throughout most of the road(s) bed and/ or R/W (> 50% of the road area).

In addition to drawing the line on the map, the following information is useful to record.

1. **Width of line**. Record the width of the weed infestation in yards next to the line drawn on the base map.

2. **Direction of weeds from line or road**. Next to the line, write an **L, R**, or **C** depending on where the weeds are located (i.e., are the weed infestations to the left, right, or in the center of the line you have drawn on the base map?)

STEP 3

Record site information and recommended treatments on back of weed form.

SITE #

Note site number referenced on map, this may be a segment of road, stand unit or delineated weed infestation.

WEED SPECIES

Note noxious weed species present on site. Where more than one weed species occurs in a mappable area/site, you may chose to note each weed species as a separate line to denote the ground cover class and recommended treatment. Such as when you have widespread knapweed, with some isolated toadflax plants, you may eradicate the toadflax, but tolerate the knapweed based on the site.

COUNTY PRIORITY

List the county noxious weed priority available from the CINWA agreement signed for the area of operation. The county priority should be considered in treatment objective.

INFESTATION SIZE (CODE) Refer to description at base of weed form. Designate area of weed infestation or length and width of road / linear feature (powerline, fence, etc.) to provide details for areas outlined on reference map.

INDICATE PERCENT COVER BY SPECIES

Weed ground cover has been determined to be the most important standard data to be collected for the statewide system and is essential to determining treatment methods. Estimate ground covered by a particular weed species and categorize by cover classes of Trace, Low, Moderate or High as described below. Cover class should be indicated directly on the map next to the infested acres symbol. Use the following symbols to indicate infestation cover class.

NATIVE VEGETATION

Record dominant vegetation habitat type or general description

This will help to determine long range objectives.

DETERMINE TREATMENT OBJECTIVES

Weed Management Control Objectives (ARM 36.11.445)

ERADICATE	Attempt to eliminate a noxious weed species from site, recognizing that this may not be achieved during the analysis period. However, eradication efforts would continue as long as detectable weeds were present.
SUPPRESS	Prevent seed production through the target patch and reduce the area coverage of the weed. Prevent the weed species from dominating the vegetation of the area, but accept low levels of the weed.
CONTAIN	Prevent the spread of the weed beyond the perimeter of patches or infestation area established at time of survey. Tolerate weeds within established infestations, but Suppress or Eradicate outside those areas.
TOLERATE	Accept the continued presence of established infestations and the probable spread to ecological limits for certain species. Try to exclude new invaders through preventative measures.

TREATMENT RECOMMENDED

Based on weed inventory and management objectives, recommend treatment measures considering integrated weed management tools outlined in Weed RMS # 3A.

IMPLEMENTATION (ABBREVIATED - IMP YES/NO)

Note date treatment measures implemented, or planned date to implement. Leave blank if no treatment applied to allow for future update without additional form.

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DOCUMENT B-9. CWE COARSE FILTER ANALYSIS FORM

CWE COARSE FILTER ANALYSIS FORM

DNRC – Forest Management Bureau

Version: 2004.2

Analyst:

Date:

A. PROJECT INFORMATION

Project name:

Extent and intensity of proposed actions:

Area Office / Unit Office:

Legal(s):

B. MAP INFORMATION

GIS project file name and location:

GIS layers used:

USGS quad:

Other mapping resources:

C. GENERAL WATERSHED INFORMATION

6th Code HUC numerical ID:

Major drainage name:

Tributaries:

Basin area:

Precipitation (weighted mean):

Runoff:

Ownership:

Other water resources:

Landtype associations or soil types prone to mass wasting:

Potential risk of surface erosion:

Additional geographic information:

If applicable

7th Code HUC or equivalent ID:

Major drainage name:

Tributaries:

Basin area:

Precipitation (weighted mean):

Runoff:

Ownership:

Other water resources:

Landtype associations or soil types prone to mass wasting:

Potential risk of surface erosion:

Additional geographic information:

D. STATUS OF AFFECTED WATER BODIES

Water-use classification (Water Quality Standards):

Downstream beneficial uses:

Water rights:

1996 303(d) listing name (if applicable):

1996 303(d) listing cause(s):

1996 303(d) listing sources(s):

200 303(d) listing name (if applicable):

200 303(d) listing cause(s):

200 303(d) listing sources(s):

TMDL status:

E. FISHERIES PRESENCE INFORMATION

Internal fisheries habitat survey data: ☐ Yes ☐ No

☐ Internal fisheries habitat survey data attached

MFISH data: ☐ Yes ☐ No

☐ MFISH data attached

FWP contact and relevant information:

USFS contact and relevant information:

Other contact and relevant information:

Native species present:

Status of native species present:

Non-native species present:

F. EXISTING WATERSHED CONDITIONS AND OTHER RESOURCE DATA

Sediment (☐ attached):

Stream temperature (☐ attached):

Large woody debris (☐ attached):

Channel morphology (☐ attached):

Stream stability (☐ attached):

Flow regime (☐ attached):

Fisheries connectivity (☐ attached):

Road condition inventory (☐ attached):

Mass wasting (☐ attached):

Other monitoring data (☐ attached):

G. OTHER EXISTING AND PROPOSED WATERSHED ANALYSES

Past/proposed DNRC analyses: ☐ Yes Date(s): ☐ No

☐ Attached

Past/proposed other agency(s) analyses: ☐ Yes Date(s): ☐ No

☐ Attached

Past/proposed other organization(s) analyses: ☐ Yes Date(s): ☐ No

☐ Attached

Comments:

H. EXISTING ACTIVITIES

Aerial photo date:

Criteria used to define ‘forested’:

Estimate of percent of existing harvest within watershed:

Estimate of percent of ‘forested’ area within watershed:

Estimate of percent of road densities within watershed:

Estimate of percent of road crossing densities within watershed:

Grazing License(s): ☐ Yes ☐ No

☐ Mid-Term and/or Renewal Grazing Assessments attached

I. COARSE FILTER ANALYSIS

Describe the variables considered to determine the potential risk of cumulative watershed effects within the project area:

Clearly describe the collective set of existing conditions that determine the baseline for assessing the risk of adverse cumulative watershed effects:

Clearly describe the rationale used to determine level of risk of cumulative watershed effects as a result of the proposed action(s):

If there is anything other than a ‘low’ risk of cumulative watershed effects as a result of the proposed action(s), clearly describe the method(s) and scope of additional analysis that is needed:

DOCUMENT B-10. EXAMPLE GRIZZLY BEAR DEED RESTRICTIONS

DNRC will develop specific deed restrictions using measures similar to those listed below for properties being disposed of or leased with high established use by grizzly bears and areas of notable importance to grizzly bears, such as habitat linkage, as long as the value of the land is not reduced.

1. Barbecue pits. Permanent barbecue pits are prohibited.

2. Gardens. Gardens shall be fenced with at least one foot of fencing material below ground level and at least eight feet in height. The top rail shall be made of something other than wire to prevent wildlife from entanglement.

3. Birdfeeders. All bird feeders shall be suspended on a cable or other device so that they are at least 12 feet above the ground and at least 4 feet from any tree, post or other structure that bears could climb.

4. Fruit trees. The planting of any type of fruit tree is prohibited unless surrounded by a properly constructed and maintained electric fence. Any produce shall be harvested promptly and thoroughly to prevent the accumulation of rotting organic matter.

5. Solid waste. No part of the property shall be used as a dumping ground. All solid waste shall be stored inside the home or garage and shall be contained in metal, plastic, or other suitable containers which have sufficiently tight-fitting covers to prevent entrance or destruction by bears or other wild animals, unless it is in a commercially produced bear-resistant container. Solid waste may be stored out of doors if it is in a commercially produced bear-resistant container. Solid waste shall not be accumulated for longer than seven days and must be removed every seven days. Solid waste must be covered when it is being transported. Burying or burning solid waste is prohibited.

6. Feeding wildlife. Intentional feeding of wildlife is prohibited (with the exception of birds, as set forth in Section 3 above). Salt blocks, mineral blocks and feeding platforms for deer or other wildlife are prohibited. Horse or livestock feed, such as hay, pellets and grain indoors, shall be stored in a secured area or in commercially produced wildlife resistant containers. Pet food shall be stored indoors or in commercially produced wildlife resistant containers.

7. Domestic animals. All domestic animals shall be controlled to prevent them from chasing, stalking, killing, harming, or harassing wildlife and livestock and to prevent them from becoming prey for wildlife.

8. Rabbits, chickens, turkey, pigs, sheep and goats. The keeping of rabbits, chickens, turkeys, pigs, sheep and goats is prohibited.

9. Apiaries. Apiaries shall be surrounded by electric fencing.

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DOCUMENT B-11. EXAMPLE BULL TROUT DEED RESTRICTIONS

DNRC will develop specific deed restrictions using measures similar to those listed below for properties being disposed of or leased adjacent to bull trout core areas (MBTRT 2000) as long as the value of the land is not reduced.

The deed restrictions would apply within a conservation zone 100 feet wide, slope distance on each side of the stream measured from the ordinary high water mark. The conservation zone will be extended to include wetlands located adjacent to the stream.

1. No residential buildings, buildings housing livestock, or livestock holding facilities shall be constructed within a conservation zone.

2. No new road construction shall be allowed except where necessary to obtain access or to cross a stream or wetland.

3. Any new roads will be constructed and existing roads will be maintained within the conservation zone utilizing Montana Forestry BMPs to minimize the delivery of sediment to streams.

4. No gravel pits will be developed within the conservation zone.

5. The amount of impervious surface area (such as paving) shall not exceed 10 percent of the total land area within the conservation zone.

6. Timber harvest shall maintain a 50-foot-wide no-harvest buffer. This buffer will start at the edge of the ordinary high water mark and extend across the conservation zone to a slope distance of 50 feet when measured perpendicular to the stream. Harvest in the remaining 50 feet of the conservation zone will retain a minimum of 50 percent of the trees greater than or equal to 8 inches dbh. Shrubs and sub-merchantable trees must be protected and retained in the entire conservation zone to the extent practical during timber harvest.

7. Areas cultivated for lawns, gardens, and pastures shall not exceed 25 percent of the area within the conservation zone.

8. Broadcast burning is prohibited within the conservation zone.

9. The handling, storage, application, or disposal of hazardous or toxic materials in the conservation zone in a manner that pollutes streams, lakes, or wetlands or that may cause damage or injury to humans, land, animals, or plants is prohibited.

10. The application of herbicides and pesticides, must be done in a manner that follows existing regulations and label instructions.

11. No development of private ponds for fish stocking is allowed.

Rationale:

Because real estate and recreational development occurs in a wide variety of geographical and social situations, regulating those activities is inconsistent and difficult. In the HCP project area, the rigor of land use controls for landowner activities other than forestry is less protective of streams in forested areas than the restrictions that govern forestry. In the Bull Trout Final Rule (USFWS 1998), the USFWS views rural residential development as a major threat to bull trout restoration and endorses the use of deed restrictions to minimize these threats.

While the sale of lands does not impact riparian function, the increased uncertainty that those lands might end up in a less restricted land use is a concern of the USFWS. The commitment to require conservation zone restrictions in certain areas and the incentive to voluntarily apply them in others minimizes the uncertainty associated with land sales. Dispositions of land adjacent to bull trout core areas as defined in MBTRT 2000 have been determined to be of higher priority concern than other dispositions.

References:

MBTRT (Montana Bull Trout Restoration Team). 2000. Restoration plan for bull trout in the Clark Fork River Basin and Kootenai River Basin, Montana. Montana Fish, Wildlife, and Parks Commission, Helena, Montana.

USFWS. 1998. Endangered and threatened wildlife and plants; determination of threatened status for the Klamath River and Columbia River distinct population segments of bull trout. U.S. Department of the Interior, Fish and Wildlife Service. Federal Register, Volume 63, No. 111. June 10, 1998.

DOCUMENT B-12. MONITORING METHODS TO ASSESS ACCURACY OF DNRC STAND LEVEL INVENTORY DATA AND HCP HABITAT MAPPING PROTOCOLS FOR DESCRIBING LYNX HABITAT

R. Baty/B. Long/M. O'Herron

~~7/22/08~~4/30/10

The purpose of this document is to identify and preliminarily evaluate the types and degrees of error associated with SLI data fields that address habitat parameters for lynx, and characterize structural den site attributes and their relative abundance in second growth stands on DNRC HCP lands. This must be done to provide assurances for both parties (USFWS and DNRC) that lynx habitat parameters are being managed and retained at levels agreed to in the DNRC HCP conservation strategies. The following discussion and methods are intended to provide a basis to work from to fully develop a final approach following analysis and discussion by both parties of the first set of data collected. A portion of the field work necessary to accomplish this effort would be scheduled by the TSS section during the ~~2008~~2010 field season and would continue into the ~~2009~~2011 field season as needed.

There are ~~two~~three main questions we need to answer:

1) Accuracy of the SLI and GIS -- For particular stands, how accurate are the stand conditions indicated by the SLI and the geographic conditions indicated by GIS?

2) Horizontal cover -- How well do the SLI stands that our habitat filter selects as Winter Foraging Habitat provide horizontal cover, given our understanding of the levels preferred by lynx (as indicated by J. Squires, pers. comm., April 3, 2008)?

3) **Den site attributes** – How prevalent are large downed logs, concentrations of small logs, and root wads in lynx habitat stands that have been previously harvested under less stringent forest management policies than the HCP, and what are their physical characteristics (i.e., photographs)?

Relevant SLI Parameters to Sample:

Pfister (et al. 1977) habitat type
One of three species present: SAF, GF, ES (unless secondary habitat type)
Crown closure (overstory, understory, and total stand)
Stand size class
Average stand height
Sapling stem density (for trees 1-4 inches dbh)
Coarse Woody Debris (large logs > 20 in. diameter; piles of smaller logs (6-20 in dbh) creating sheltered spaces; and root wads)
Canopy layers
Recent management/disturbance history (if present – e.g. recent thinning, harvest, burn, etc.)
Indication if non-habitat if applicable – i.e., permanent non-forest areas, rock, water, etc.

GIS Parameters

~~Not big game winter range~~
Within 2.4 miles of lynx habitat

Den Site Parameters

The number and type of den site structures encountered during sample routes

Horizontal Cover Parameters

Mean stand horizontal cover -- cover board estimates (J. Squires, pers. comm., April 3, 2008).

<u>Evaluation of Error Types</u>

Given the types of errors possible, errors must be evaluated in a manner that allows us to assess their importance. For example, one minor deviation in the "type" call of a habitat type given the "series" is correctly noted as subalpine fir would be inconsequential. Whereas, a habitat type series entry for a stand that is not either a primary or secondary preferred lynx habitat type would be an important error that would require adjustment of the habitat map and acreages. As a suggested example, error types should be categorized by their importance in a manner such as:

> **a) Most important** -- instances where the data records in error indicate lynx habitat is present when it is not, or one or more structural categories are off to a degree that would render a stand "temporary non habitat" rather than the condition indicated;
>
> **b) Moderately important** -- errors would be those where 1 or more fields in error might cause a minor shift from one habitat condition to another (e.g. winter foraging to suitable) given that the stand was miss-classed, but clearly continues to meet suitable lynx habitat condition;
>
> **c) Minor errors** -- would include those habitat type call errors that occur within preferred type 1 and type 2 lynx habitat or other minor errors in structural classes that would not be sufficient in themselves to kick a stand out of lynx habitat or the indicated structural habitat condition.

Other important considerations are:

> 1) What types are most likely to have errors and what types of errors are they? What are probable sources of the error (e.g. human/observational, temporal/succession, updating, etc.)?
>
> 2) Do common errors in one lynx habitat condition effectively offset errors in another (i.e., an example situation may exist where 20% of winter foraging stands are really better classed simply as "suitable" habitat, however, 25% of the acres classed as suitable have overgrown since their inventory and would meet the winter foraging class definition. This situation would provide confidence that reported winter foraging acres are very likely to be present and actual acres may be underestimated by SLI summaries).

3) Are errors more common in one lynx habitat condition than others? What are the sources of those errors and what is the relative importance of those errors?

4) Are SLI errors more common in one geographic area than others?

5) Through horizontal cover board sampling, do modeled lynx types generally reflect the habitat conditions for the purposes intended (e.g. winter foraging or suitable habitat as indicated by the SLI model)?

Suggested Initial Sampling Intensity and Locations

Total # of randomly-selected stands to sampled:

15 stands in winter foraging *in LMAs* (5 STW, 5 Swan, *5 Garnet/Seeley)
15 stands in ~~young~~summer foraging *in LMAs* (5 STW, 5 Swan, *5 Garnet/Seeley)
15 stands in suitable habitat (5 STW, 5 Swan, *5 Garnet/Seeley)
15 stands in temp-non-suitable (5 STW, 5 Swan, *5 Garnet/Seeley)
15 stands in non-lynx habitat (5 STW, 5 Swan, *5 Garnet/Seeley)

** Two stands of each type will be sampled in the Garnet LMA and three stands of each type will be sampled in the Seeley LMA.*

DNRC estimates that 3 days will be spent checking the stands within each LMA (STW for example) counting travel time. Thus, approximately 15 days would be spent in the field checking 75 stands.

Except for those 15 non-habitat stands sampled, the remaining 60 stands sampled should all be selected from the potential lynx habitat pool.

Sampling and Analysis

A complete list of all parameters applicable to the lynx habitat mapping protocol would be re-sampled by a TSS technician using SLI protocols who would re-evaluate each stand without knowledge of existing SLI stand codes. The analysis will re-evaluate, given the re-sampled parameters, the current lynx type conditions using the SLI HCP modeling protocol. Current lynx type results from the new sample will be compared with the types indicated in the existing inventory. Once completed, the error types as described above will be evaluated.

Estimates of horizontal cover will be obtained for each stand within the “winter foraging” and “suitable” habitat classes. Estimates will be derived from 5 randomly located plots per stand following standard cover board methods provided by Bertram (USFS draft methods, June 5, 2008) and Squires (pers. comm., April 3, 2008). Field examiners will take 4 representative photos from different locations in each stand and identify them in a manner to allow their association with recorded field data. Following analysis, the horizontal cover threshold for estimates obtained in the summer will be 48%.

Estimates of potential den site densities will be obtained by tallying the presence of large downed logs > 20 inches dbh, piles of smaller logs (6 to 20 inches dbh) that create sheltered spaces, and large root wads within view along each survey route. An approximate acreage will be assigned to each route to estimate density of these potential den site features. Photographs will be taken of representative potential den sites located along the survey routes and labeled according to the stand and survey route.

Frequency

This monitoring exercise would be conducted once prior to implementation of the HCP~~, and again at year 4 following HCP implementation~~. Results would be reported ~~in the 5-year monitoring report~~to the USFWS within 1 year of completing the field work. The necessity of additional evaluation of SLI accuracy, sampling intensity, parameter selection, and geographic areas etc. will be re-evaluated every 5 years thereafter, considering results from sampling during the previous period(s).

Accuracy

Accuracy will be assessed by both parties following data collection and analysis. The assessment will consider the frequency of "type a" and "type b" errors as described above. The analysis will also consider the instances of "offsetting stands" with "Type b" errors, which may compensate for each other if they more reflect another required category required within an LMA. The analysis will also include an assessment of the **"other important considerations"** described above. Any procedure or protocol revisions deemed necessary by both parties will be addressed with USFWS cooperation prior to their incorporation and adoption. Once in place, at least one additional monitoring run using these monitoring methods will be conducted within one year to ensure that accuracy has improved.

Table 1. Habitat parameters and associated lynx structural habitat types.

Habitat Parameter	Associated Lynx Habitat Types
Habitat Type (Pfister et. al 1977)	Lynx Habitat – All Structural Types
SAF, GF, ES Tree Species Present	Winter Foraging Habitat
Crown Closure	Lynx Habitat – All Structural Types
Stand Size Class	Lynx Habitat – All Structural Types
Sapling Stem Density (for trees 1-4 in. dbh)	Winter Foraging Habitat ~~Young~~Summer Foraging Habitat
Coarse Woody Debris	Indication of Denning Structure
Canopy Layers	Indication of Winter Foraging Structure
Recent Disturbance History	Explanatory Variable for Temp-Non Habitat
Presence of Big Game Winter Range	Indicator of Non-Habitat
DNRC Types Within 2.4 Miles of Federal Lynx Habitat	Lynx Habitat – All Structural Types
Mean Stand Horizontal Cover	Winter Foraging Habitat Other Suitable Habitat

References

Pfister, R.D, B.L. Kovalchik, S.F. Arno, and R.C. Presby. 1977. Forest habitat types of Montana. U.S. Forest Service, Intermountain Forest and Range Experimental Station, General Technical Report, GTR-INT-34, Ogden, Utah.

Squires, J.R. 2008. Wildlife Research Ecologist with the USFS Research Branch, Forest Science Lab, Missoula, Montana. February 11, 2008 – Power Point Presentation slides containing preliminary research findings and methods -- provided to Ross Baty, DNRC biologist, April 3, 2008.

USFS. 2008. Horizontal cover – interim guidance for assessing multi-storied stands within lynx habitat. *Prepared by* Tim Bertram and Jim Claar, Wildlife biologists, U.S. Forest Service, Region 1. Missoula, Montana. Unpublished document. June 5, 2008.

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DOCUMENT B-13. USFWS CHECKLIST FOR CHANGED CIRCUMSTANCES

This checklist is to be used to document coordination between USFWS and DNRC in the event of a changed circumstance as outlined in Chapter 6 of the DNRC Forested Trust Lands HCP.

Part I. Background Information

Notification of a Changed Circumstance

(This section should document the date of notification, the party providing notice of a changed circumstance, and the format of the notification [i.e., attached letter, phone conversation, etc.]).

(As soon as practicable after a changed circumstance has been identified, preliminary notification can be done by phone, email, fax, etc. However, formal notification of a changed circumstance should be provided in writing under signature either hard copy or electronically.).

Nature of the Changed Circumstance

(This section should describe the type of changed circumstance that has occurred and when if known. If it is a natural disturbance, describe the approximate location, number of acres or stream length affected, potential species affected, etc.)

Part II. Documentation for a Natural Disturbance Changed Circumstance

Complete this section if the changed circumstance is due to a natural disturbance.

Preliminary Plans to Address the Natural Disturbance Changed Circumstance

(This section should identify DNRC's preliminary plans for field evaluations, what is known to date about on-the-ground issues/effects, and USFWS expectations relative to follow-up by DNRC after field evaluations in the event the USFWS is unable to participate).

Field Evaluation

(This section should document the outcome of the field evaluation or reference notes from the field evaluation by DNRC or the USFWS).

Recommendations for the Contingency Plan

(This section should identify the following: 1) DNRC's site-specific measures in the proposed contingency plan; 2) the effects the proposed contingency plan may have on HCP species and how to mitigate for those effects; 3) concerns of the USFWS (and other interested parties) relative to the proposed contingency plan; and 4) other measures proposed by the USFWS (and other interested parties) for inclusion in the contingency plan, as appropriate.)

Review of the Contingency Plan

(This section should reference the proposed final contingency plan and identify USFWS comments on the plan or concurrence with the plan. This section should also note any discussion or negotiation of the plan with DNRC and how things were concluded and identify follow-up actions that may be needed to ensure successful implementation of the contingency plan.)

Part III. Documentation for an Administrative Changed Circumstance

Complete this section if the changed circumstance is due to an administrative change.

Plans to Address the Administrative Changed Circumstance

(This section should identify the course of action developed cooperatively by the USFWS and DNRC to address the issues raised by the changed circumstance.)

DOCUMENT B-14. ACRES OF ~~MATURE~~WINTER FORAGING HABITAT AVAILABLE FOR HARVEST UNDER CHANGED CIRCUMSTANCES AND AN EXAMPLE OF THE PROCESS

A. ESTIMATING ACRES OF CANADA LYNX ~~MATURE~~WINTER FORAGING HABITAT THAT COULD BE AUTHORIZED FOR TAKE BY THE USFWS THROUGH A CHANGED CIRCUMSTANCE

Prepared by R. Baty, FMB Wildlife Biologist, and K. Randzio, FMB Intern, on April 9, 2009.

The following recent timber sales were selected to estimate a typical amount of ~~mature/~~winter foraging habitat that is likely to be considered for harvest in an "average" timber sale on the Swan River State Forest and Stillwater Block (Table 1). The acreage estimates identify minimized levels of incidental "take" that would be permitted by the USFWS through the Changed Circumstances process. Should a large natural disturbance reduce the winter foraging habitat below the minimum required 20%, DNRC could negotiate with the USFWS to establish a non-replaceable harvest amount of additional live, winter foraging habitat to provide assurances that harvest volumes could be met, while minimizing further impacts to lynx. The original intent of these additional acres is to use them as "get by" acres for one harvest entry under extreme circumstances until recovery of dense seedling and sapling stands regenerate and recover on affected lands. The total acreage could only be used after all other means of mitigation and minimization were explored during each Changed Circumstance, and they are not intended to be replaceable (that is, the total acres is all that is allowable for the 50 year term of the ITP). For the purposes of these calculations, DNRC is not including additional acreages from the Seeley and Garnet LMAs in the total. This is a logical and reasonable approach given the scattered nature of the much smaller areas involved in those LMAs and the high importance of this habitat condition for lynx. The total acres could be used in the Garnet and Seeley LMAs under a Changed Circumstance with approval from the USFWS. However, those lands were not considered when developing the total acres needed.

Table 1. Summary of Winter Foraging Habitat Harvested during Recent Sales in the Swan River State Forest and Stillwater Block.

Timber Sale Location and Title	Data Source (Page number in the EA or EIS)	Winter Foraging Habitat Affected
Swan River State Forest Timber Sales		
White Porcupine	p. III-218	556 acres
Three Creeks	p. F-31	288 acres
Goat Squeezer	p. III-22	31 acres
	Subtotal Swan	**875 acres (average of 292 acres per sale)**
Stillwater Block Timber Sales		
Olney Urban Interface	p. 52	244 acres
Chicken/Antice	p. III-47	33 acres
Duck-to-Dog	p. III-55	474 acres

Timber Sale Location and Title	Data Source (Page number in the EA or EIS)	Winter Foraging Habitat Affected
Shorts Meadow/Evers Creek	p. III-36	405 acres (denning, ~~mature~~winter foraging and other habitat)
	Subtotal Stillwater Block	**1,156 acres (average 289 acres per sale)**

For the purposes of this estimate, DNRC has determined that it is reasonable to expect that two large-scale disturbances could impact each LMA during the 50-year term. Thus, DNRC is requesting that 2,320 acres of winter foraging habitat be available for harvest through changed circumstance negotiations with the USFWS (Table 2).

Table 2. Estimated Acres of Winter Horaging Habitat Needed for Harvest under Changed Circumstances and an Example of the Process.

LMA Name	Acres Allowed per Disturbance	Acres Requested Considering 2 Disturbances over 50 years
Stillwater East	290	580
Stillwater West	290	580
Coal	290	580
Swan	290	580
Total Acres Requested	**NA**	**2,320**

B. Example Scenario of How DNRC Would Proceed Under Changed Circumstances when an LMA No Longer Provides 20 Percent Foraging Habitat.

Each LMA requires:

- 65% of the total lynx habitat as suitable habitat
- 20% of the total lynx habitat as winter foraging habitat ~~(young or mature)~~.
- Convert no more than 15% of the total lynx habitat to nonsuitable per decade.

Take Allowance

Take was issued for DNRC to reduce foraging habitat to 20% in each LMA.

Additionally, take was issued for changed circumstances on 2,320 acres of foraging habitat.

Example Situation

Swan LMA is comprised of 25,333 acres total lynx habitat.

Therefore, 16,466 acres are required to be suitable habitat and 5,066 acres as foraging.

Currently, 21,063 acres are suitable (83%) and 16,762 acres are foraging (66%).

In 2010, the ITP is issued. DNRC proceeds according to the HCP and ITP until a large fire (10,000 acres) burns through the Swan LMA in 2025. The LMA now has 10,133 acres of suitable (40%) and 3,034 acres (12%) of foraging habitat.

At the time the fire occurred (Year 2025), DNRC was preparing a MEPA analysis for the Doe Creek Timber Sale in the Swan. This sale was a multi-year sale on 2,000 acres of the SRSF. This project would harvest timber from 2,000 acres, include treatment of 450 acres of ~~mature~~ lynx winter foraging habitat. The MEPA EA for the sale was out to the public and schedule to go to the land board in early 2026.

The project is shelved for several years, but in 2030, DNRC determines the sale is needed to address some insect infestation occurring adjacent to the burned acres and to harvest some green stands that were planned for treatment through the original Doe Creek Timber Sale.

Here is how DNRC would proceed.

Notify FWS of a changed circumstance.

Review the Doe Creek Timber Sale.

- Because the area was unaffected by the fire, DNRC revisits the original timber sale size at 2,000 acres.
- Because the LMA now only contains 40% suitable habitat, DNRC re-examines the sale to determine if it can limit further reduction of suitable habitat. Through this process, DNRC is able to reduce the sale size so a total of 1,500 acres would be treated.
    - 1,500 acres of tph (25,333) is 6%
    - LMA now has 36% suitable habitat
- Because the LMA now only contains 12% foraging habitat, DNRC re-examines the stands of ~~mature~~winter foraging habitat. Through this process, DNRC is able to shift some harvest around so that only 200 acres of ~~mature~~winter foraging habitat would be treated.
    - 200 acres of tph (25,333) is 0.8%
    - LMA now has 11% foraging habitat
- DNRC subtracts 200 acres from the pool of 2,320 acres of allowable take under changed circumstances.
- DNRC develops a mitigation plan with the following commitments:
    - DNCR has conducted PCT on 2,000 acres of the original burn area. DNRC agrees to defer PCT on the remaining 8,000 acres burned in 2025 for an additional 5 years (for a total of 10 years after the natural disturbance event).
    - DNRC agrees to retain a higher percentage of winter foraging habitat in the Stillwater East LMAs such that the LMA now has a minimum of 30% foraging habitat (20% required for the LMA plus 10% to compensate for the Swan) until such time that the Swan LMA attains 65% suitable habitat and 20% winter foraging habitat ~~(young or mature)~~.
    - DNRC negotiates a new allowable lynx habitat percentage for the LMA – This would be 33% (because a few acres are growing out of suitable and DNRC is harvesting 1,500 acres) for an additional 7 years, at which time the burned areas would be growing into suitable habitat and the LMA would again achieve 65% suitable.
    - DNRC agrees to conduct additional rehabilitation (including expeditious planting) on 1,000 acres of the burned area where regeneration is suffering.

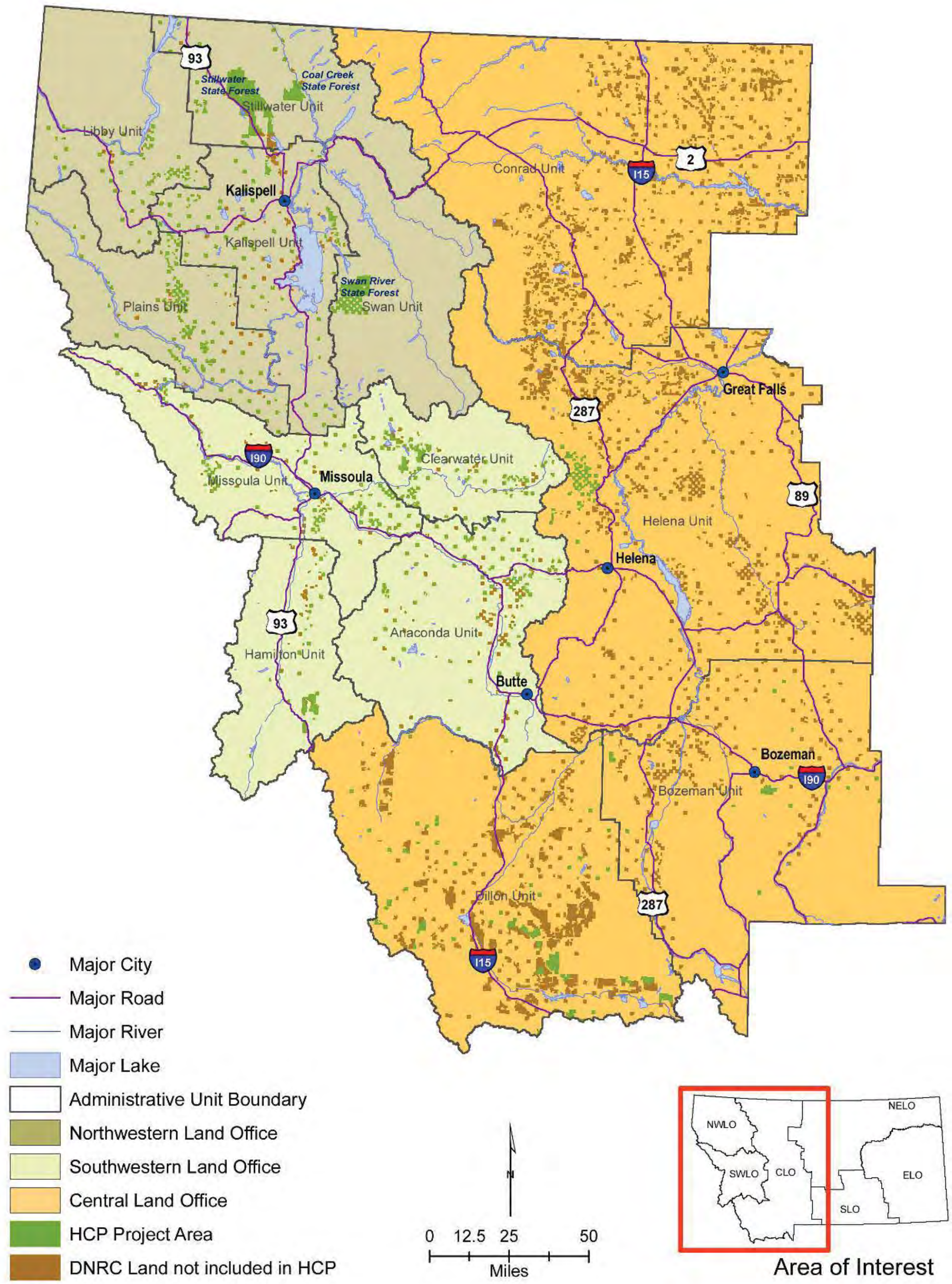
Appendix

HCP Figures

LIST OF FIGURES

LIST OF FIGURES (CONTINUED)

FIGURE C-1. LOCATION MAP OF THE HCP PROJECT AREA IN WESTERN MONTANA



File: B-1.mxd

FIGURE C-2. LOCATION OF GRIZZLY BEAR RECOVERY ZONE AND NON-RECOVERY OCCUPIED HABITAT IN THE HCP PROJECT AREA

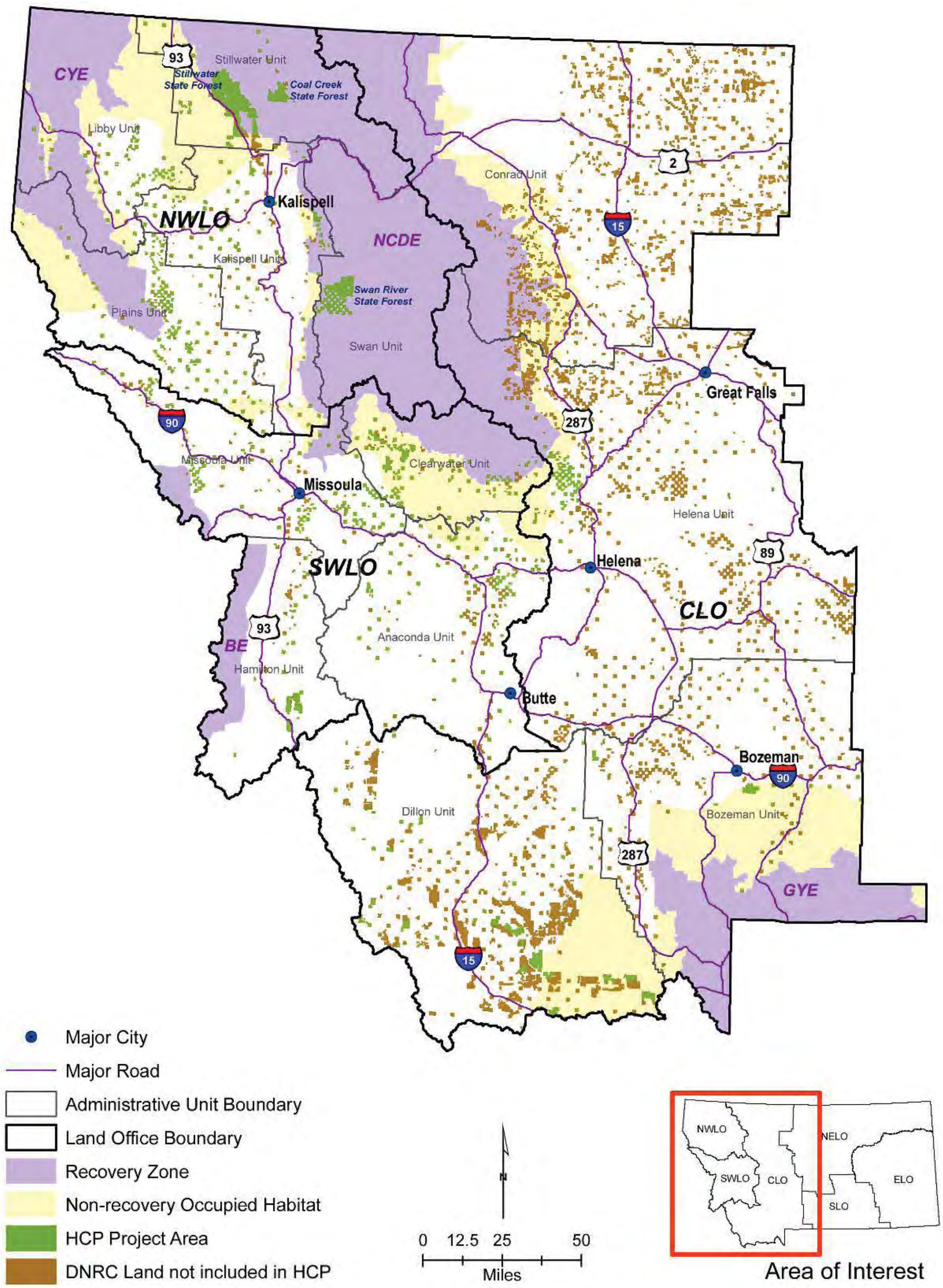


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FIGURE C-3. LOCATION OF GRIZZLY BEAR HABITAT IN THE STILLWATER UNIT

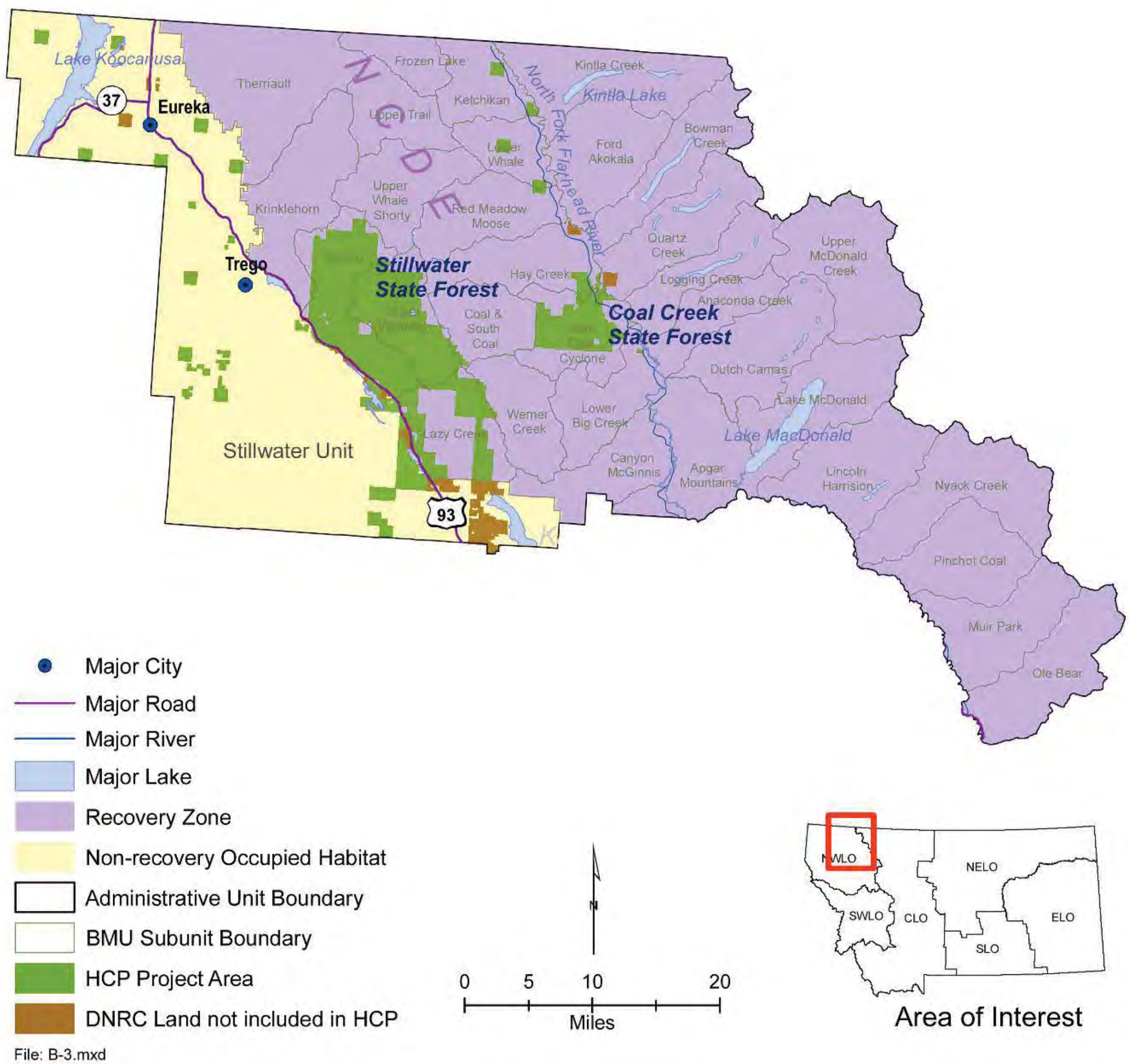
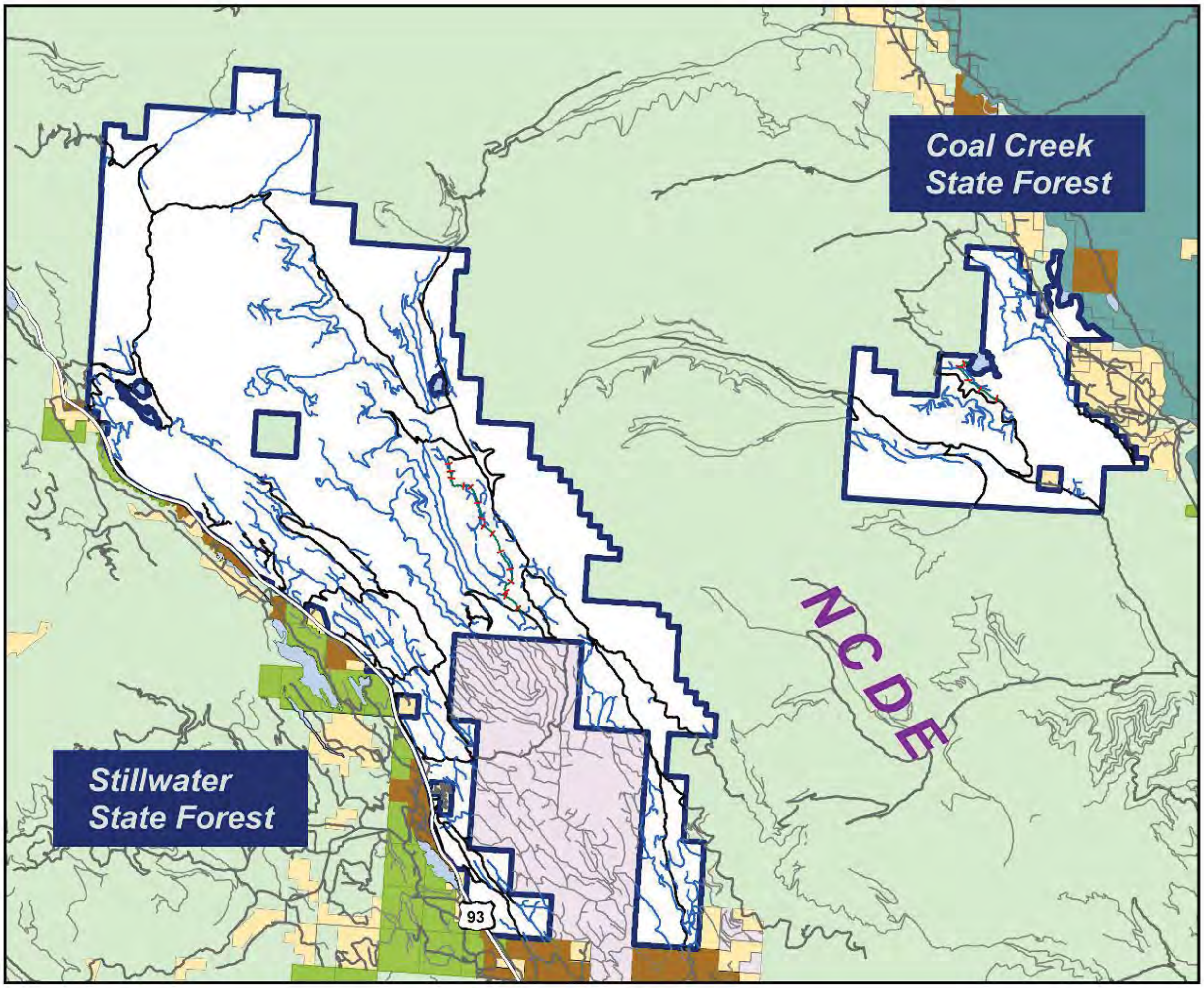


FIGURE C-4A. STILLWATER BLOCK TRANSPORTATION PLAN UNDER THE CURRENT MANAGEMENT STRATEGY: EXISTING ROADS BY ROAD CLASS, ACTIVITY CATEGORY, AND RESTRICTION TYPE



- Restricted Roads (Non-Stillwater Block)
- Open Roads (Non-Stillwater Block)
- Major Lake
- Stillwater Block
- HCP Project Area (Non-Stillwater Block)
- DNRC Land not included in HCP
- Private Land
- Plum Creek Timber Company
- US Forest Service
- National Park Service

STILLWATER BLOCK DNRC EXISTING ROADS		ACTIVITY CATEGORY		
		Motorized Public Access	Commercial Forest Management Activity	DNRC Low Intensity Forest Management Activity
Symbol	Road Class – No.	Restriction Type	Restriction Type	Restriction Type
	Open – 170 (Hwy./County)	Open Year-Round	Open Year-Round	Open Year-Round
	Open – 190 (Forest Road)	Open Year-Round	Open Year-Round	Open Year-Round
	Restricted – 130	Restricted Seasonally	Restricted Seasonally	Open Year-Round
	Restricted – 120, 121	Closed Year-Round	Open Year-Round	Open Year-Round
SEASONAL RESTRICTIONS				
Symbol	Seasonal Restrictions (Pertaining to "Restricted Seasonally" Restriction Type)			
	Spring Restrictions (April 1-June 30)			

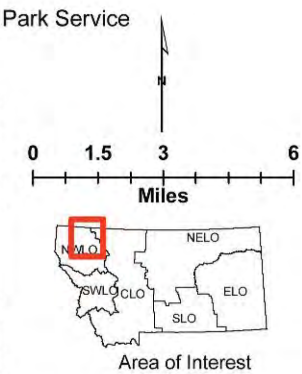


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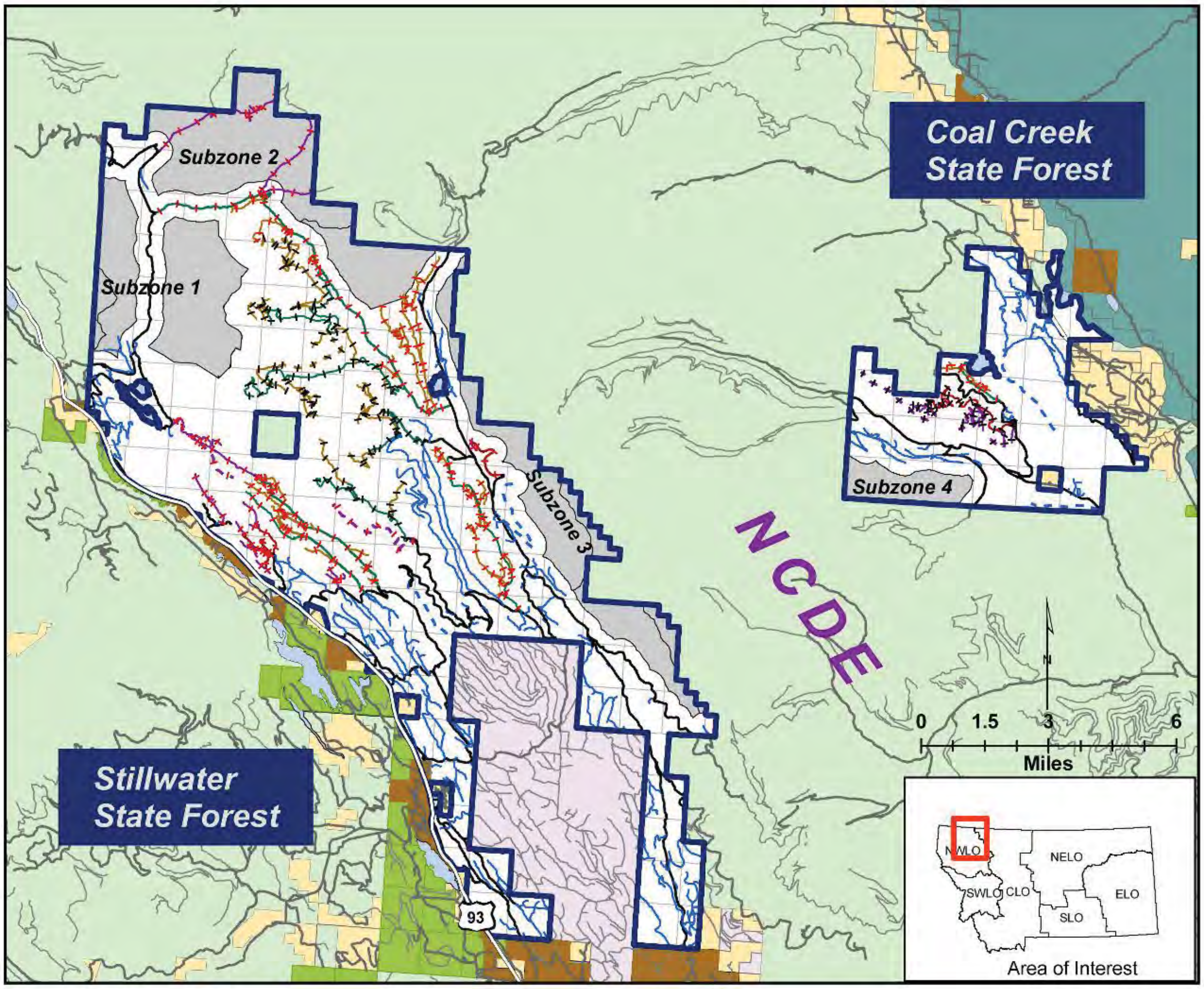
FIGURE C-4B. STILLWATER BLOCK TRANSPORTATION PLAN UNDER THE PROPOSED HCP: EXISTING AND PROPOSED ROADS BY ROAD CLASS, ACTIVITY CATEGORY, AND RESTRICTION TYPE



- Restricted Roads (Non-Stillwater Block)
- Open Roads (Non-Stillwater Block)
- Major Lake
- Stillwater Block
- Class A Lands
- Class B Lands
- HCP Project Area (Non-Stillwater Block)
- DNRC Land not included in HCP
- Private Land
- Plum Creek Timber Company
- US Forest Service
- National Park Service

STILLWATER BLOCK DNRC EXISTING ROADS		ACTIVITY CATEGORY		
		Motorized Public Access	Commercial Forest Management Activity	DNRC Low Intensity Forest Management Activity
Symbol	Road Class – No.	Restriction Type	Restriction Type	Restriction Type
	Open – 170 (Hwy./County)	Open Year-Round	Open Year-Round	Open Year-Round
	Open – 190 (Forest Road)	Open Year-Round	Open Year-Round	Open Year-Round
	Restricted – 130	Restricted Seasonally	Restricted Seasonally	Open Year-Round
	Restricted – 131	Restricted Seasonally	Restricted Seasonally	Restricted Seasonally
	Restricted – 120, 121	Closed Year-Round	Open Year-Round	Open Year-Round
	Restricted – 127, 128	Closed Year-Round	Restricted Seasonally	Open Year-Round
	Restricted – 125,126	Closed Year-Round	Restricted Seasonally	Restricted Seasonally
STILLWATER BLOCK DNRC PROPOSED ROADS		ACTIVITY CATEGORY		
		Motorized Public Access	Commercial Forest Management Activity	DNRC Low Intensity Forest Management Activity
Symbol	Road Class – No.	Restriction Type	Restriction Type	Restriction Type
- - - -	Proposed – 021	Closed Year-Round	Open Year-Round	Open Year-Round
- - - -	Proposed – 027	Closed Year-Round	Restricted Seasonally	Open Year-Round
- - - -	Proposed – 025	Closed Year-Round	Restricted Seasonally	Restricted Seasonally
SEASONAL RESTRICTIONS				
Symbol	Seasonal Restrictions (Pertaining to "Restricted Seasonally" Restriction Type)			
ı ı ı	Spring Restrictions (April 1-June 30)			
ı ı ı ı	Spring and Fall Restrictions (April 1- June 30 AND September 16-November 30)			

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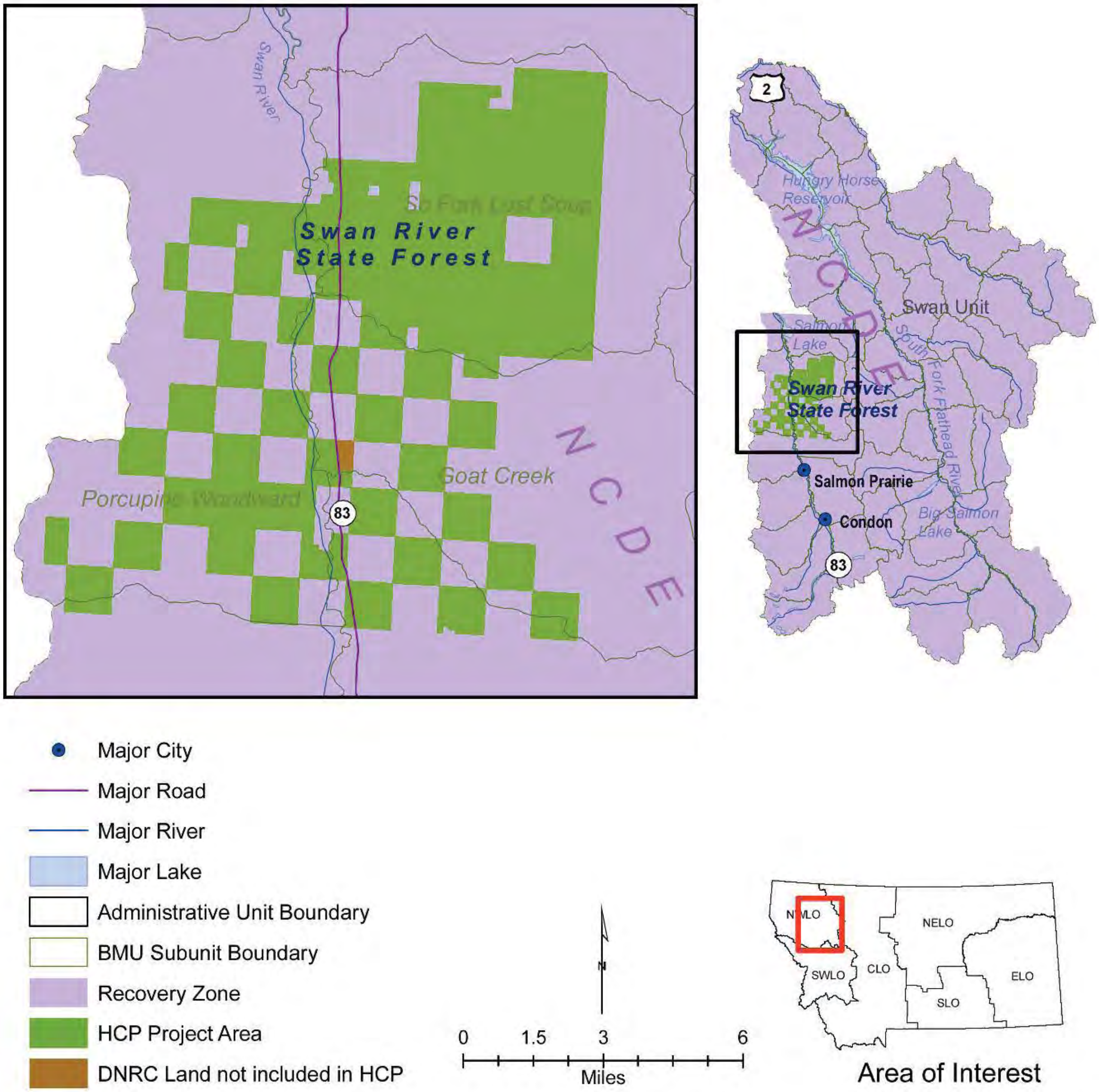
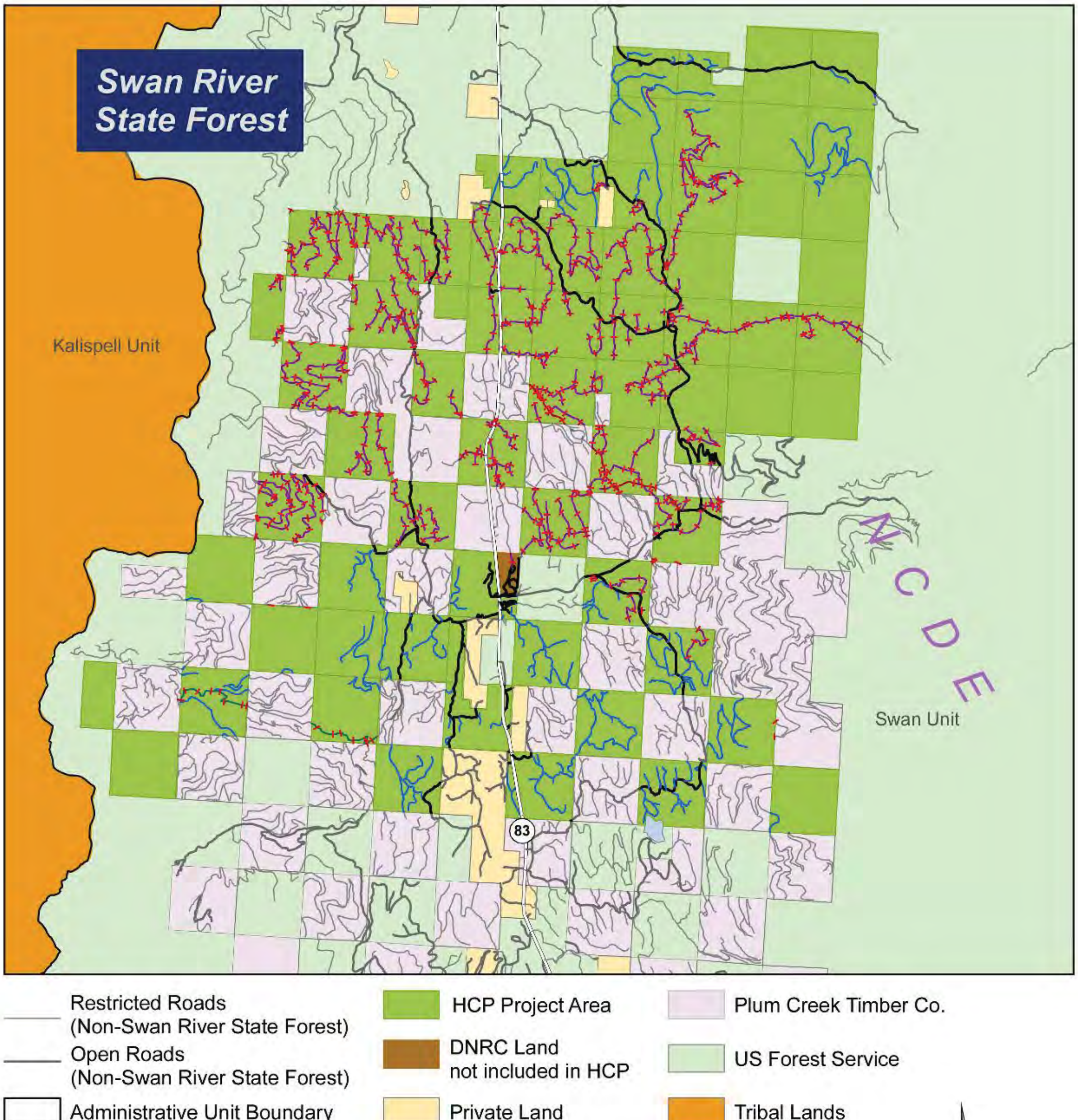
FIGURE C-5. LOCATION OF GRIZZLY BEAR HABITAT IN THE SWAN UNIT



File: B-5.mxd

FIGURE C-6A. SWAN RIVER STATE FOREST TRANSPORTATION PLAN UNDER THE CURRENT SWAN AGREEMENT: EXISTING ROADS BY ROAD CLASS, ACTIVITY CATEGORY, AND RESTRICTION TYPE



SWAN RIVER STATE FOREST DNRC EXISTING ROADS		ACTIVITY CATEGORY		
		Motorized Public Access	Commercial Forest Management Activity	DNRC Low Intensity Forest Management Activity
Symbol	Road Class – No.	Restriction Type	Restriction Type	Restriction Type
	Open – 170 (Hwy./County)	Open Year-Round	Open Year-Round	Open Year-Round
	Open – 190 (Forest Road)	Open Year-Round	Open Year-Round	Open Year-Round
	Restricted – 130	Restricted Seasonally	Restricted Seasonally	Open Year-Round
	Restricted – 131	Restricted Seasonally	Restricted Seasonally	Restricted Seasonally
	Restricted – 120, 121	Closed Year-Round	Open Year-Round	Open Year-Round
	Restricted – 125,126	Closed Year-Round	Restricted Seasonally	Restricted Seasonally

SEASONAL RESTRICTIONS	
Symbol	Seasonal Restrictions (Pertaining to "Restricted Seasonally" Restriction Type)
ı ı ı	Spring Restrictions (April 1-June 15)

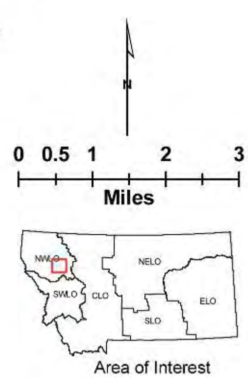


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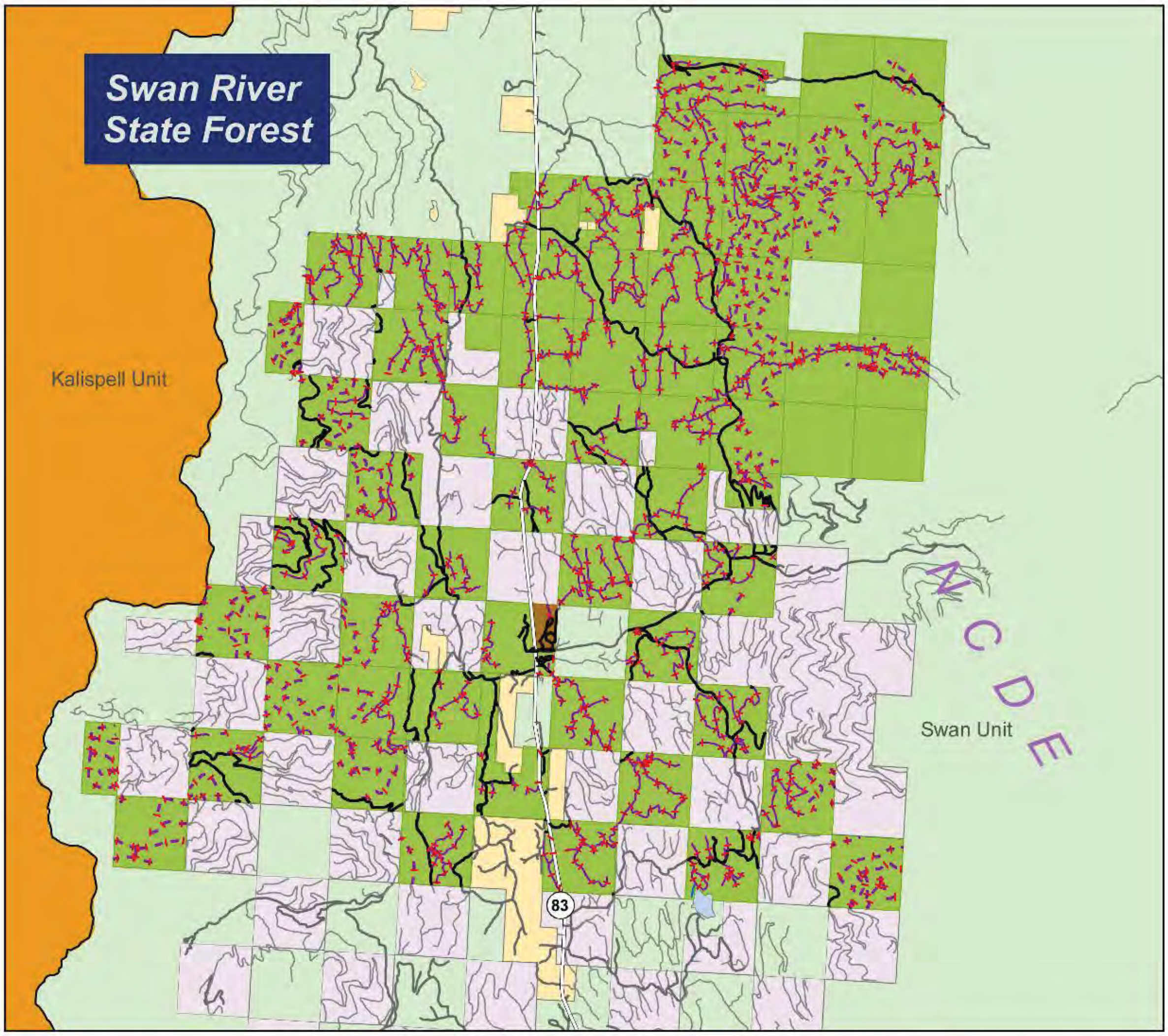
FIGURE C-6B. SWAN RIVER STATE FOREST TRANSPORTATION PLAN UNDER THE PROPOSED HCP: EXISTING AND PROPOSED ROADS BY ROAD CLASS, ACTIVITY CATEGORY, AND RESTRICTION TYPE



Restricted Roads (Non-Swan River State Forest)
Open Roads (Non-Swan River State Forest)
Administrative Unit Boundary
HCP Project Area
DNRC Land not included in HCP
Private Land
Plum Creek Timber Co.
US Forest Service
Tribal Lands

SWAN RIVER STATE FOREST DNRC EXISTING ROADS		ACTIVITY CATEGORY		
		Motorized Public Access	Commercial Forest Management Activity	DNRC Low Intensity Forest Management Activity
Symbol	Road Class – No.	Restriction Type	Restriction Type	Restriction Type
	Open – 170 (Hwy./County)	Open Year-Round	Open Year-Round	Open Year-Round
	Open – 190 (Forest Road)	Open Year-Round	Open Year-Round	Open Year-Round
	Restricted – 120, 121	Closed Year-Round	Open Year-Round	Open Year-Round
	Restricted – 125,126	Closed Year-Round	Restricted Seasonally	Restricted Seasonally

SWAN RIVER STATE FOREST DNRC PROPOSED ROADS		ACTIVITY CATEGORY		
		Motorized Public Access	Commercial Forest Management Activity	DNRC Low Intensity Forest Management Activity
Symbol	Road Class – No.	Restriction Type	Restriction Type	Restriction Type
	Proposed – 025	Closed Year-Round	Restricted Seasonally	Restricted Seasonally

SEASONAL RESTRICTIONS	
Symbol	Seasonal Restrictions (Pertaining to "Restricted Seasonally" Restriction Type)
	Spring Restrictions (April 1-June 15)

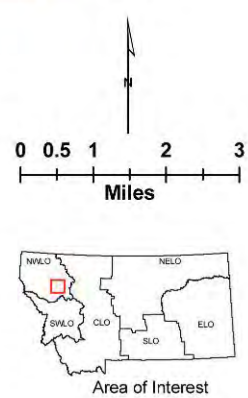


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FIGURE C-7. ACTIVE MANAGEMENT/REST SUBZONES FOR THE SWAN RIVER STATE FOREST GRIZZLY BEAR CONSERVATION STRATEGY

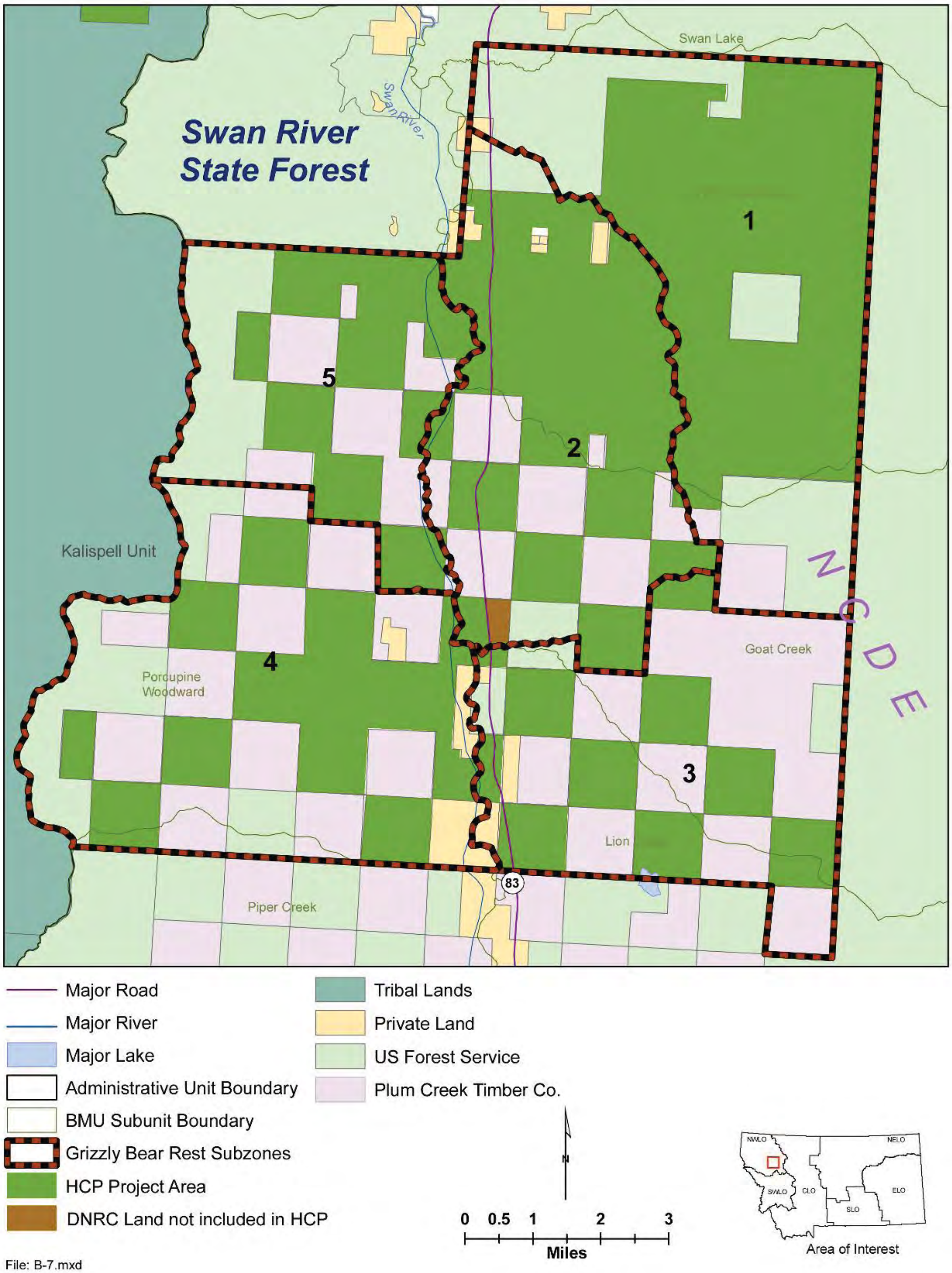

FIGURE C-8. LOCATION OF GRIZZLY BEAR HABITAT IN THE ANACONDA UNIT

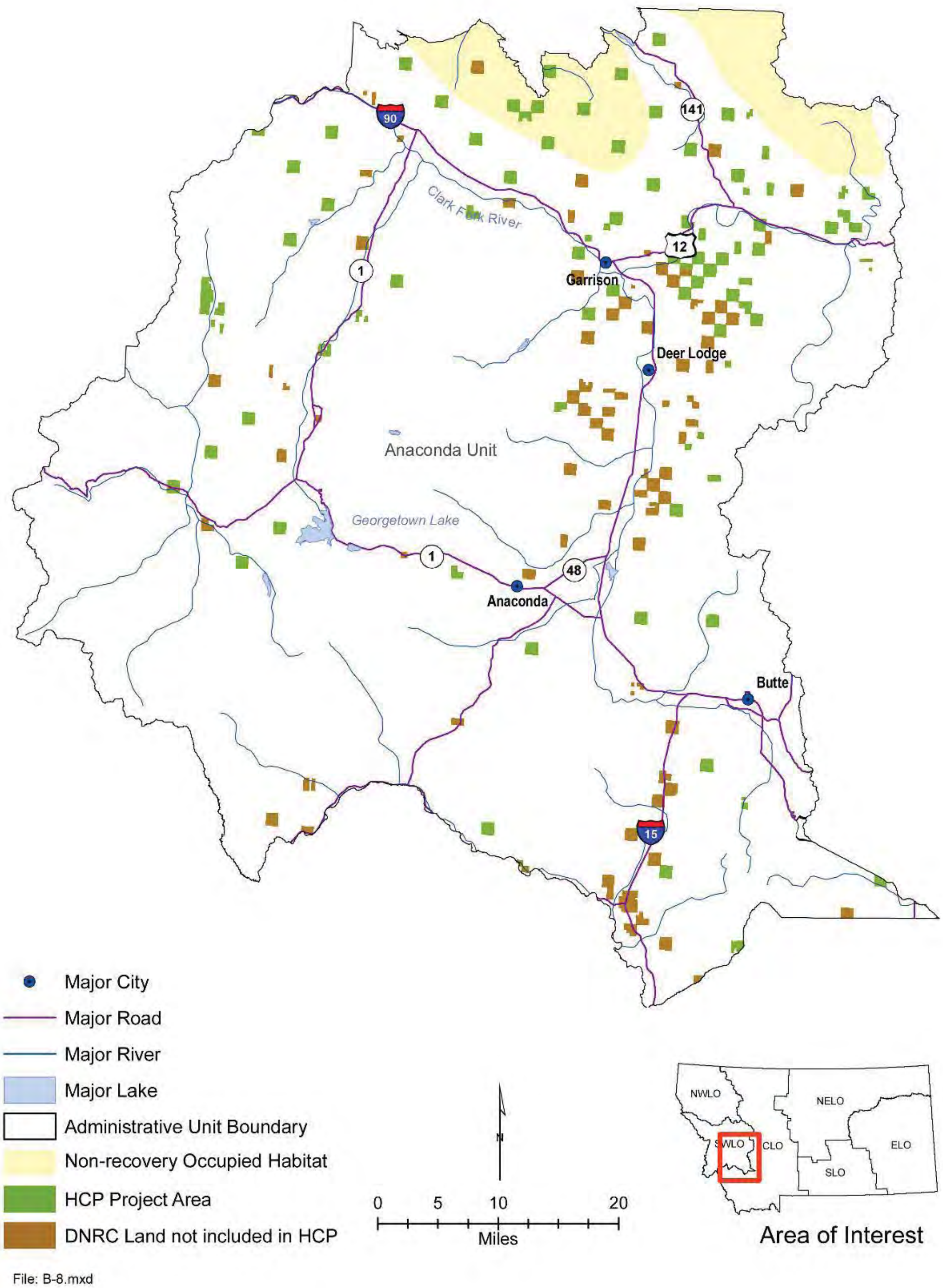

FIGURE C-9. LOCATION OF GRIZZLY BEAR HABITAT IN THE BOZEMAN UNIT

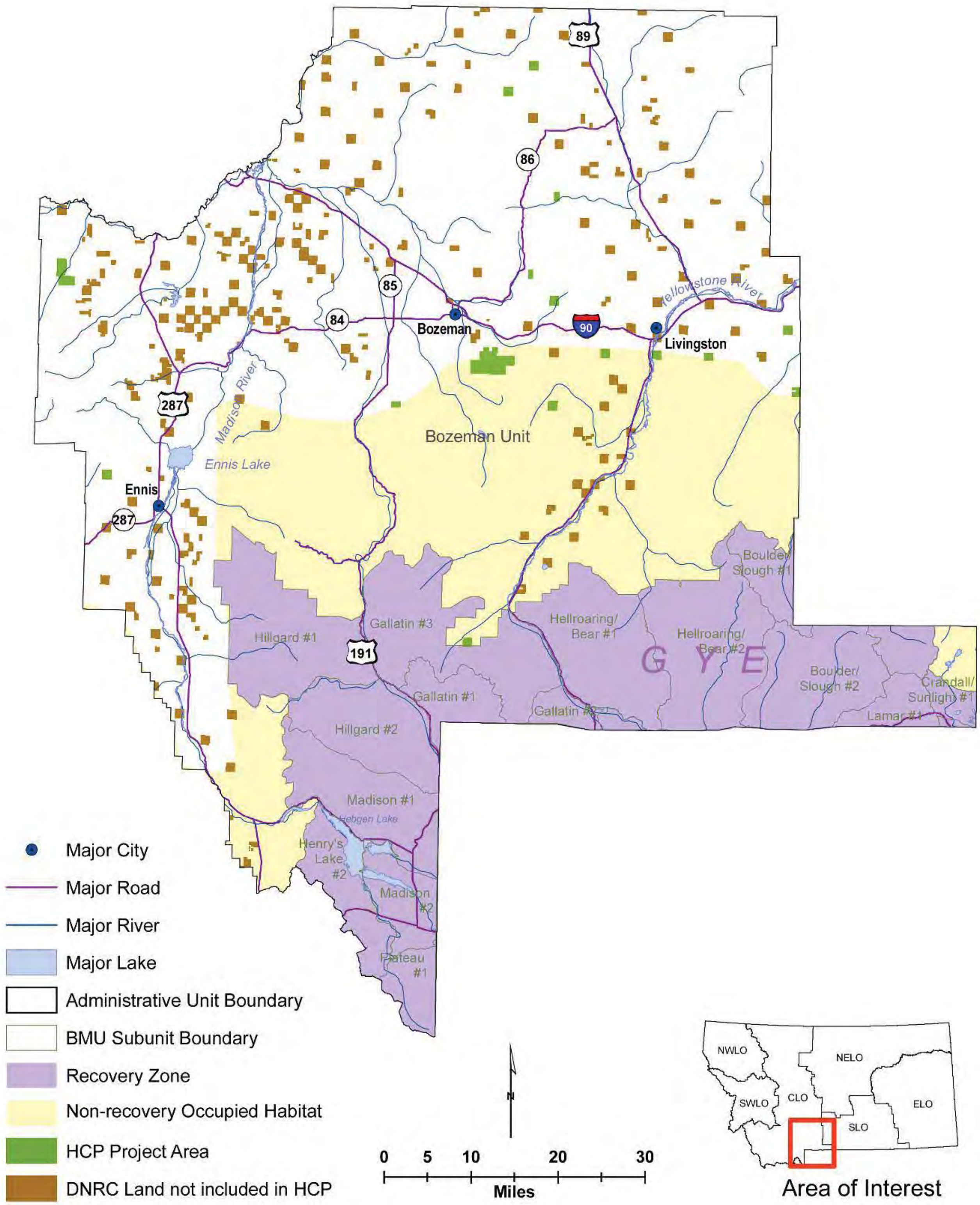

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FIGURE C-10. LOCATION OF GRIZZLY BEAR HABITAT IN THE CLEARWATER UNIT

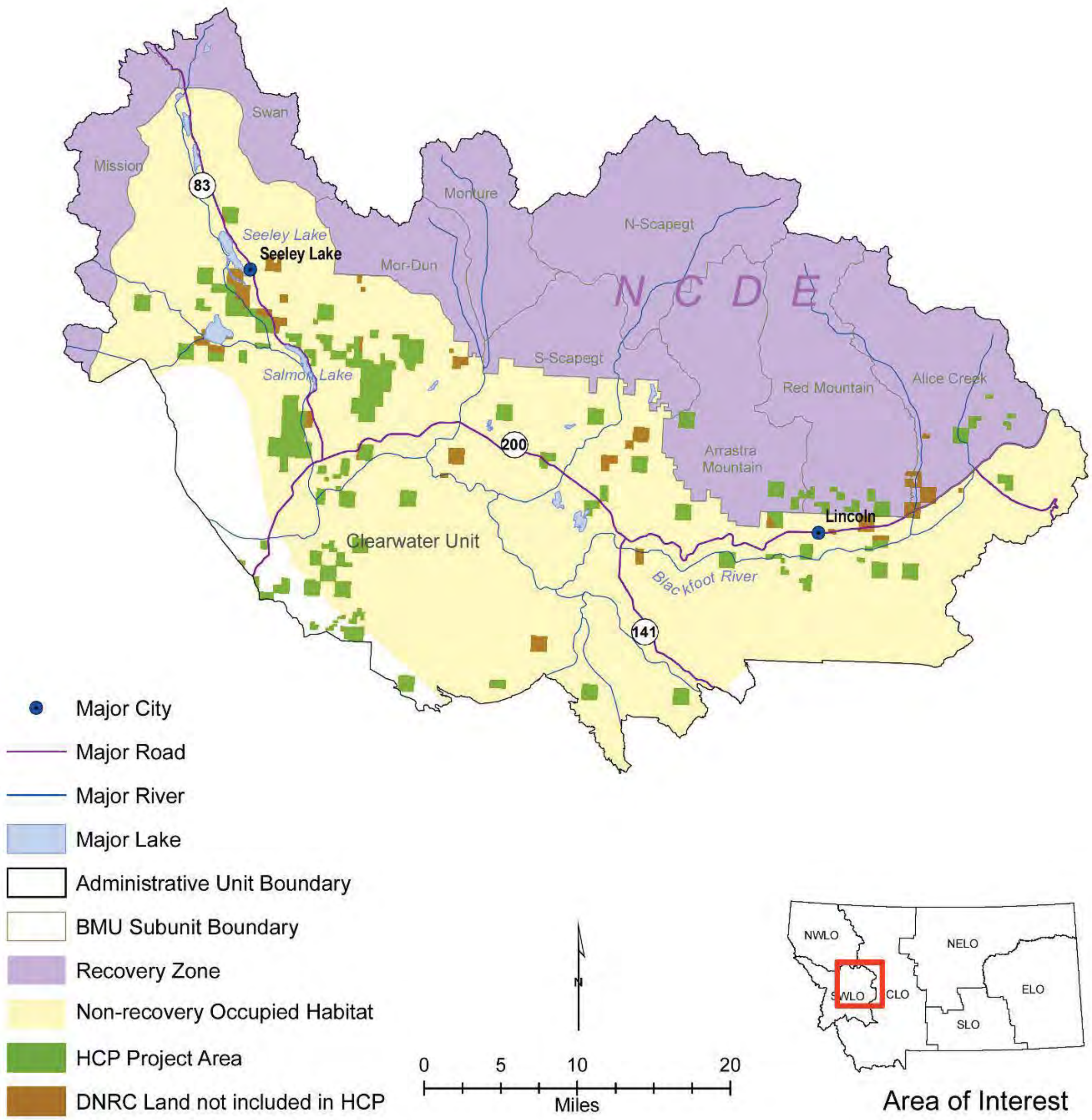

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FIGURE C-11. LOCATION OF GRIZZLY BEAR HABITAT IN THE DILLON UNIT

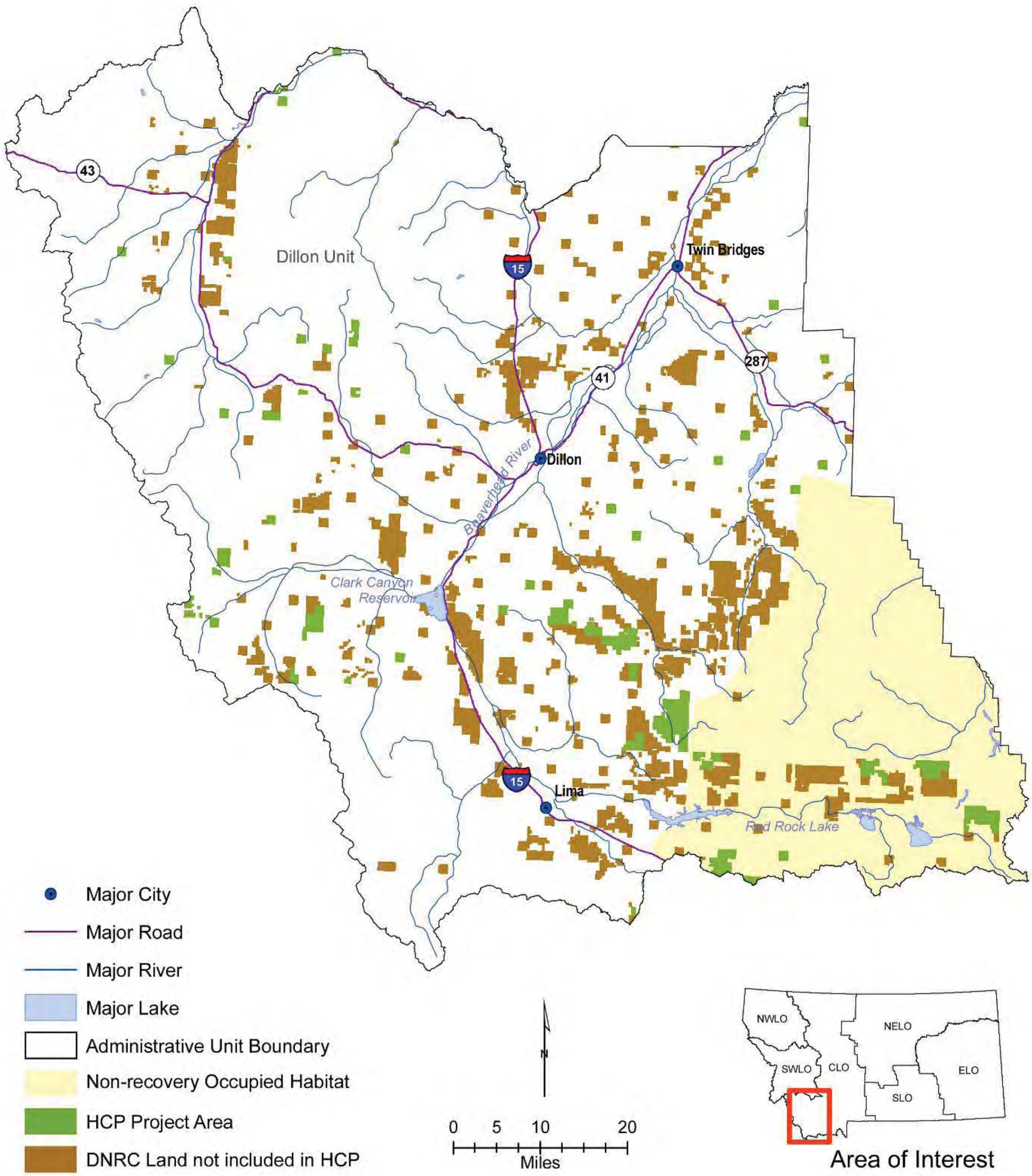

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FIGURE C-12.   LOCATION OF GRIZZLY BEAR HABITAT IN THE HELENA UNIT

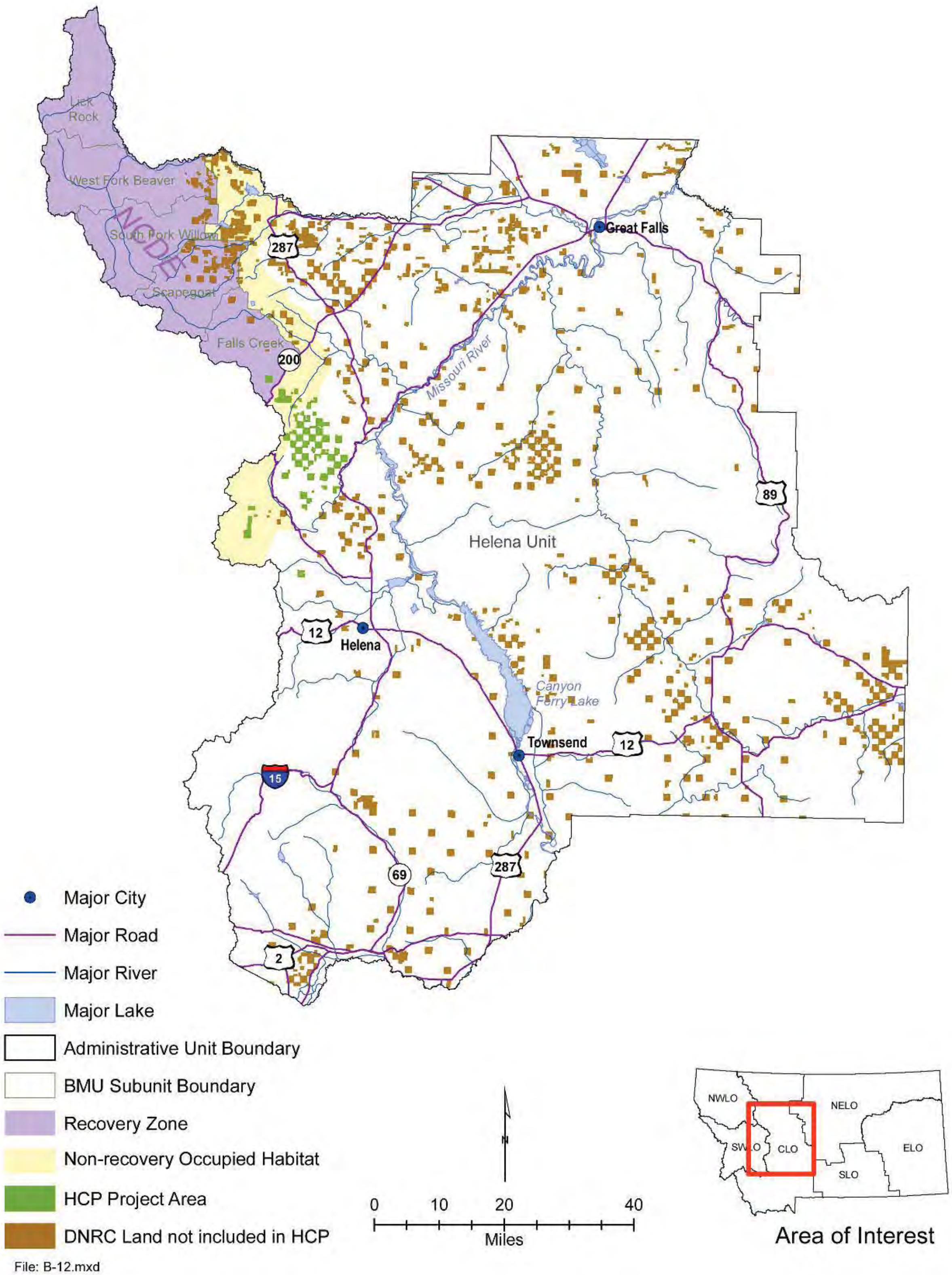

FIGURE C-13. LOCATION OF GRIZZLY BEAR HABITAT IN THE KALISPELL UNIT

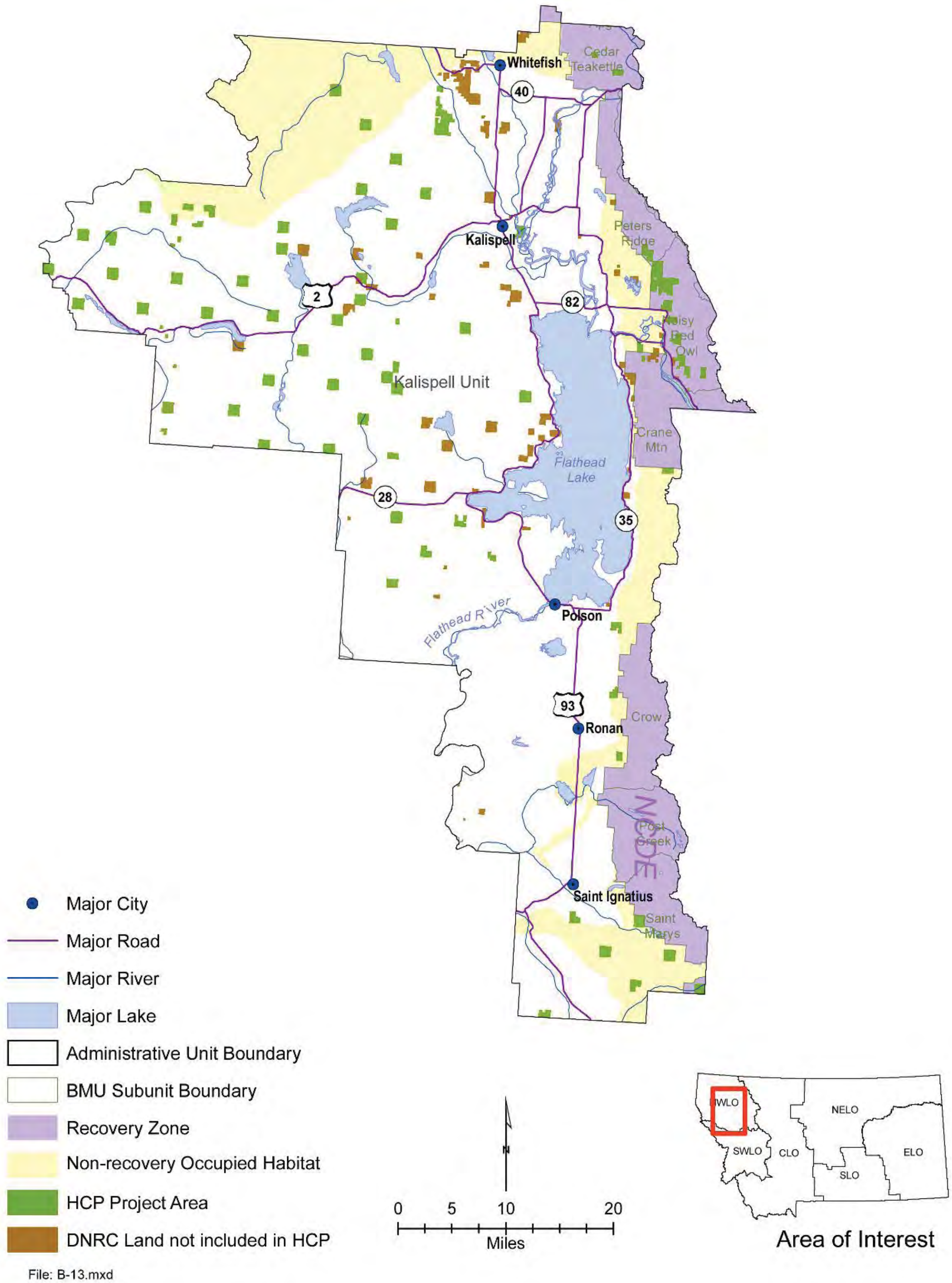

FIGURE C-14. LOCATION OF GRIZZLY BEAR HABITAT IN THE MISSOULA UNIT

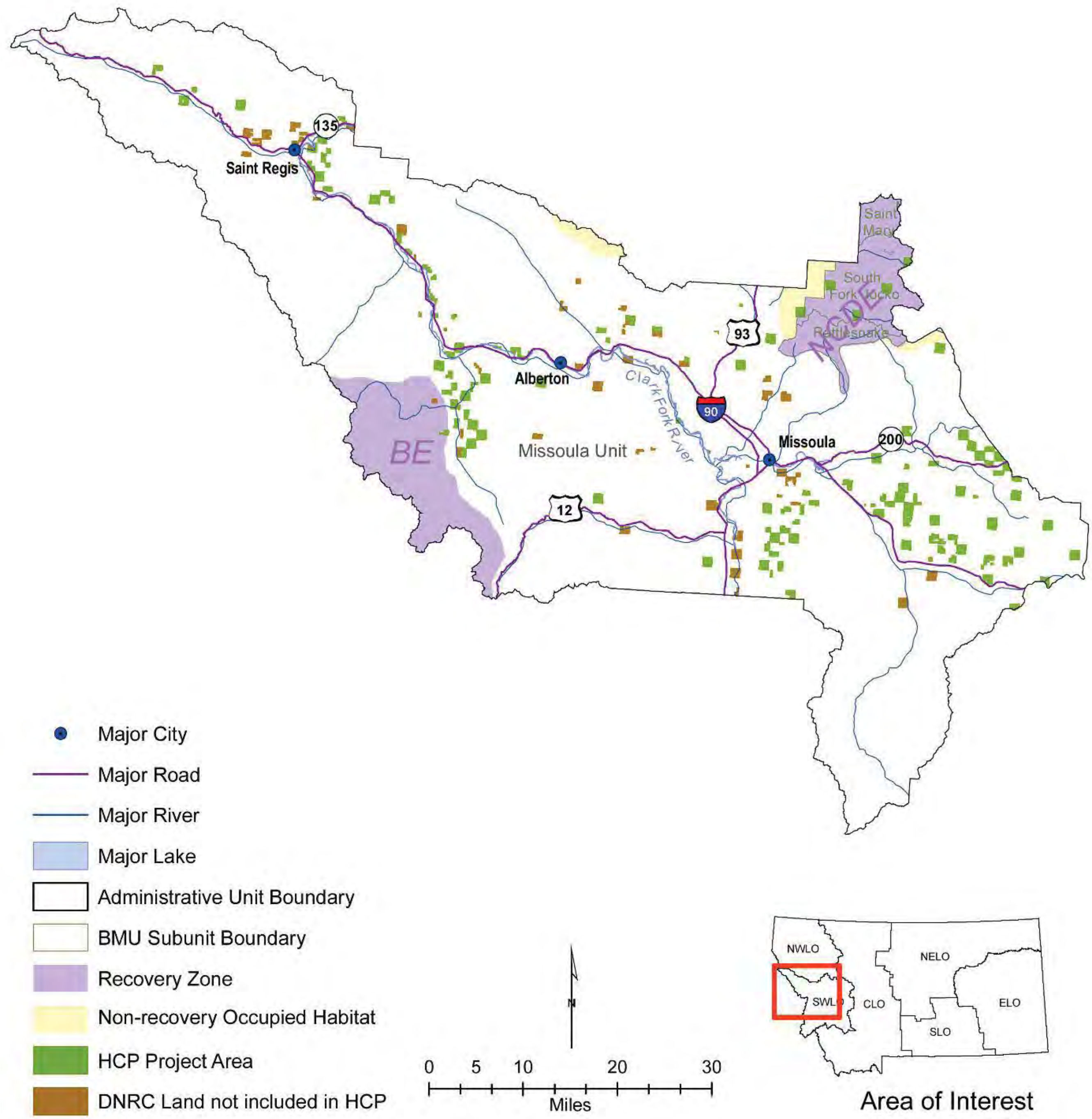

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FIGURE C-15. LOCATION OF GRIZZLY BEAR HABITAT IN THE LIBBY UNIT

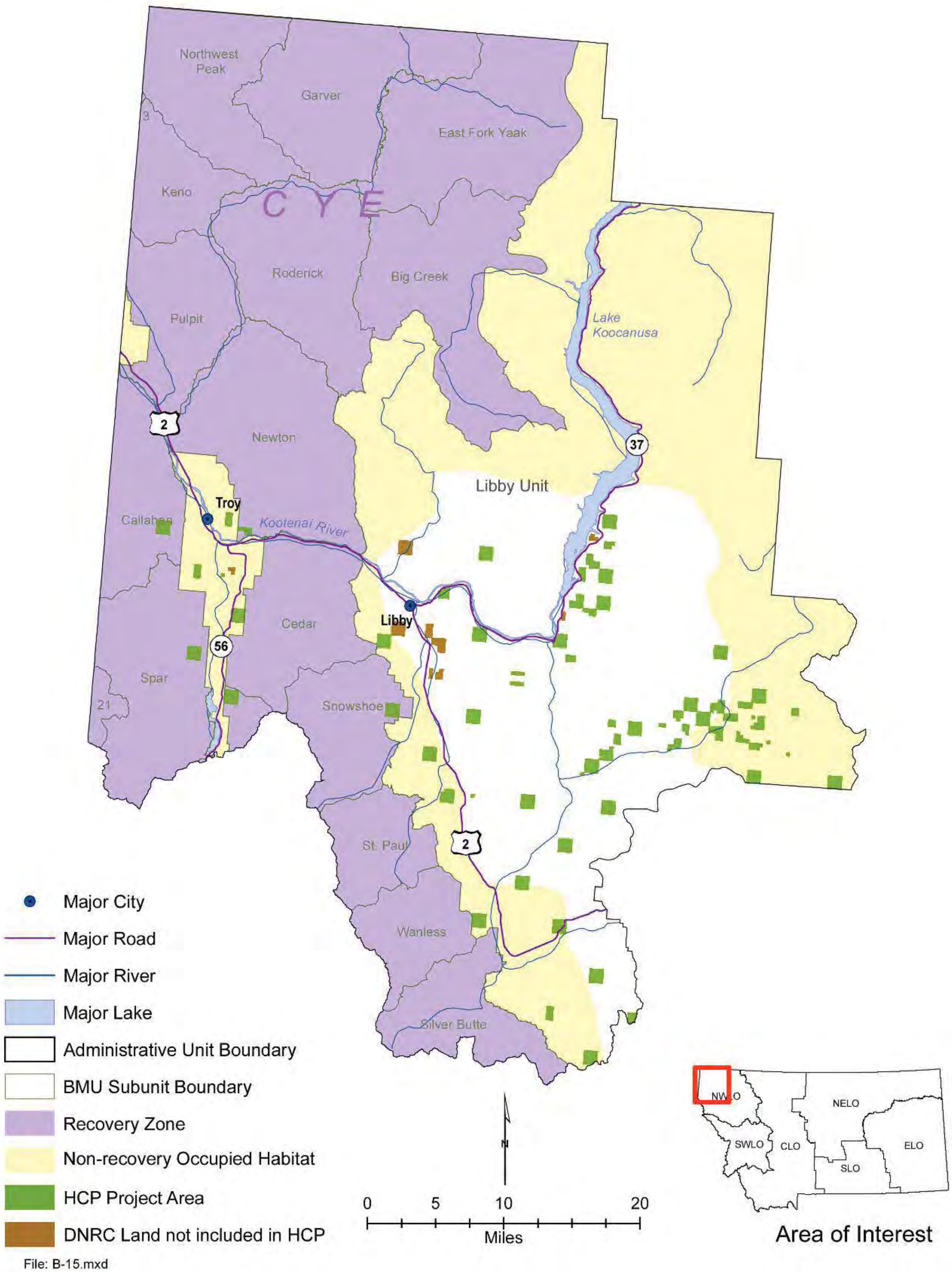


FIGURE C-16. LOCATION OF GRIZZLY BEAR HABITAT IN THE PLAINS UNIT

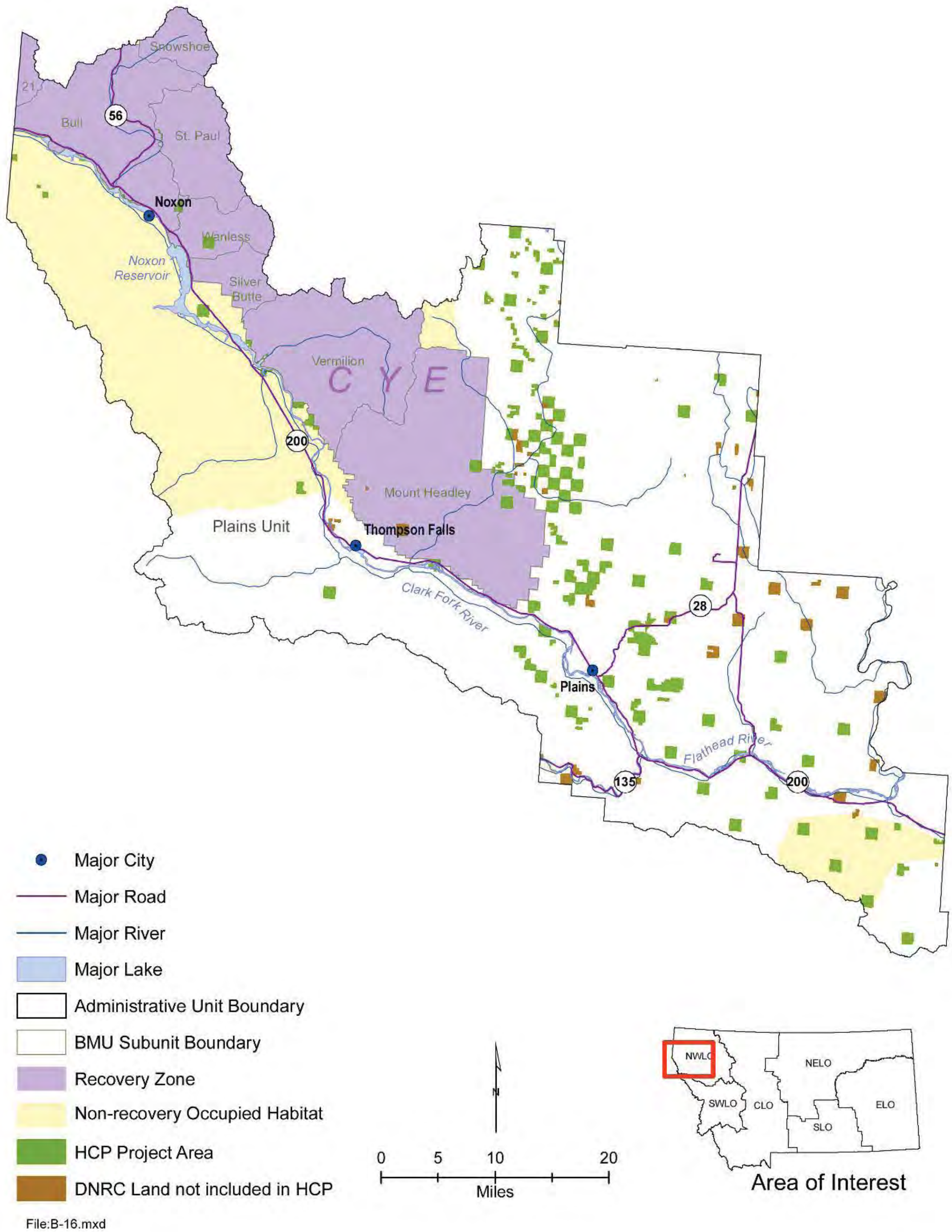


FIGURE C-17. LYNX DISTRIBUTION (USFWS 2003) AND LYNX MANAGEMENT AREAS (LMAS) IN THE HCP PROJECT AREA

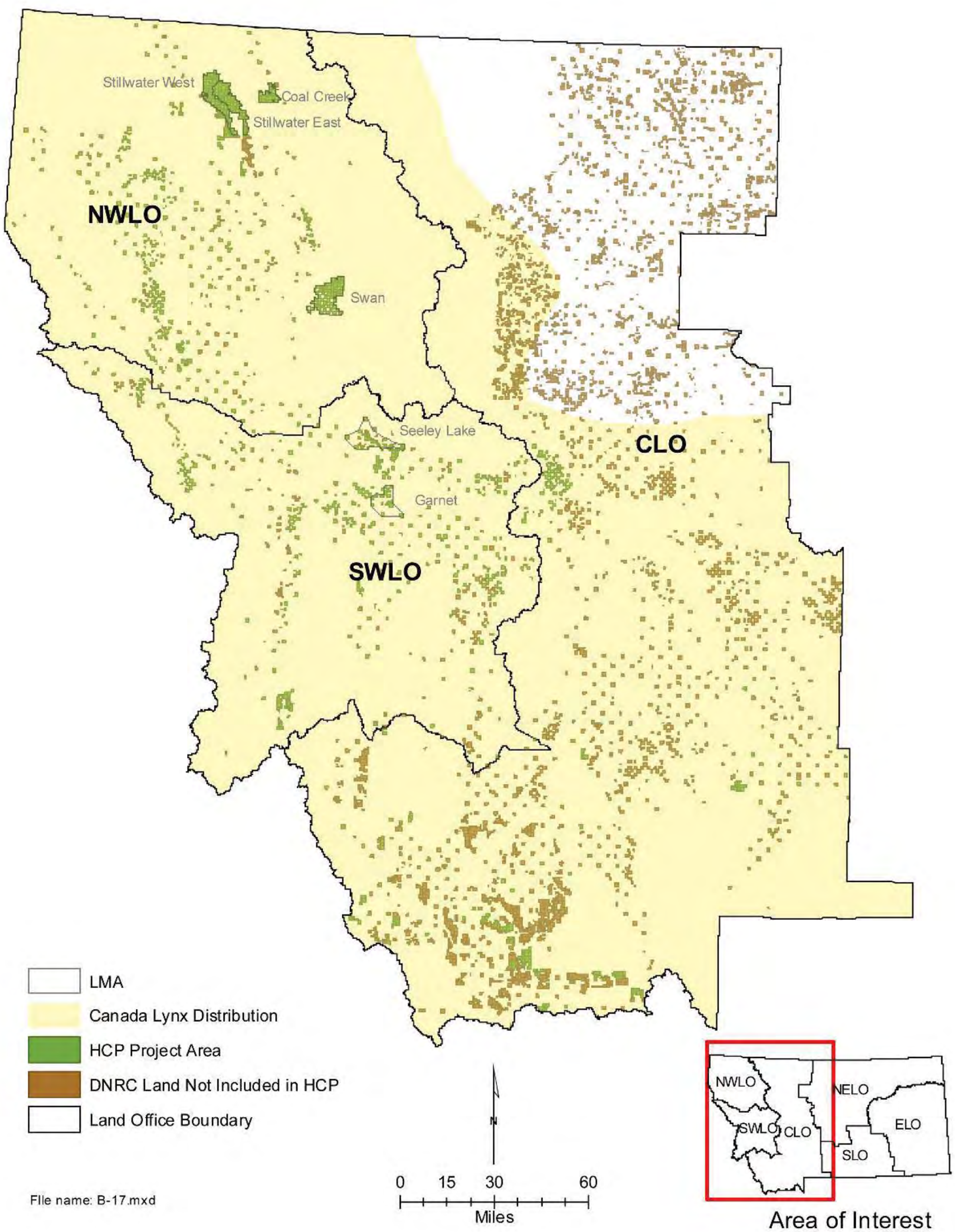


FIGURE C-18. DNRC LYNX HABITAT INDEX MAP

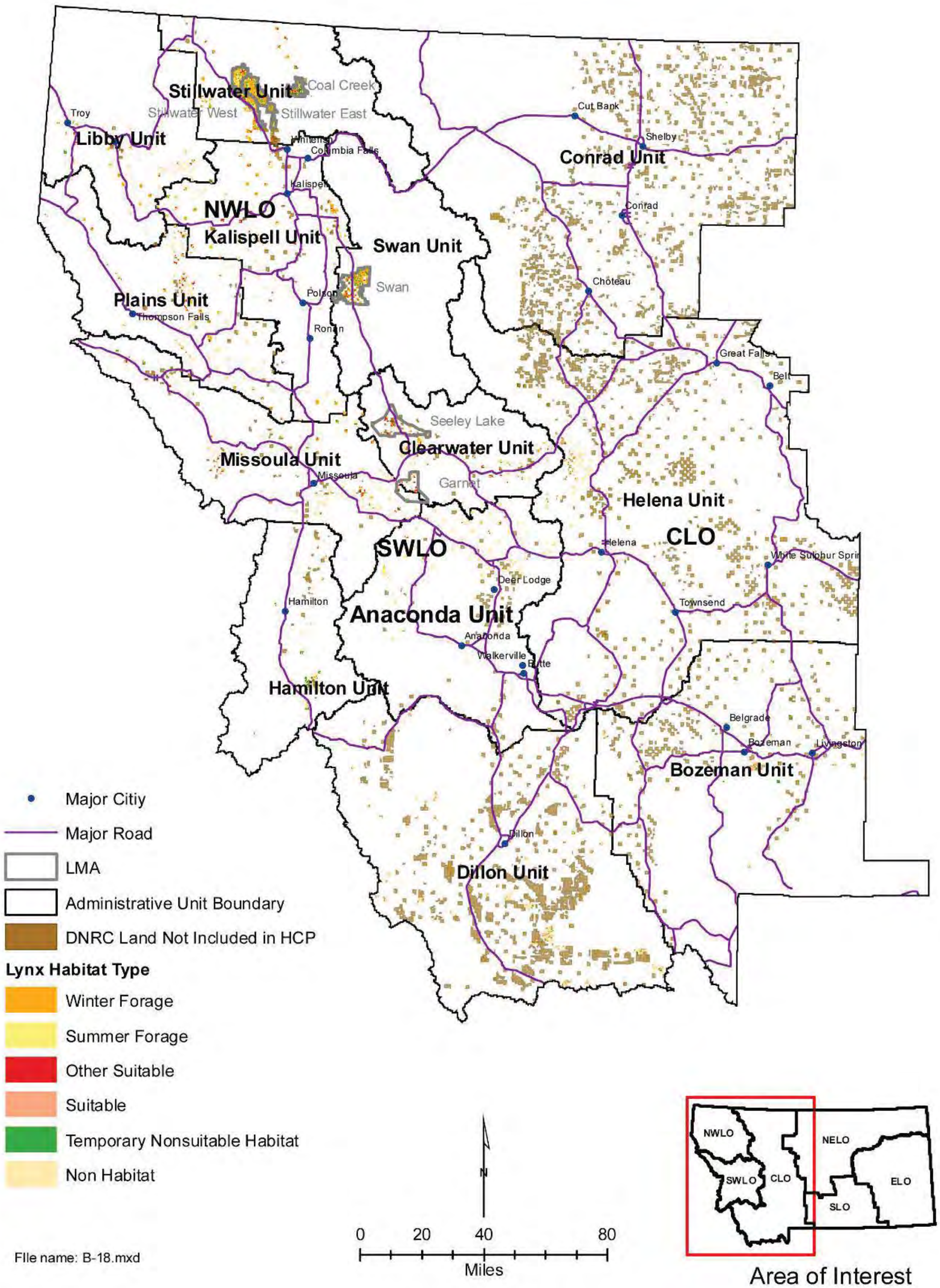


FIGURE C-19. LYNX HABITAT IN THE HCP PROJECT AREA IN THE ANACONDA UNIT

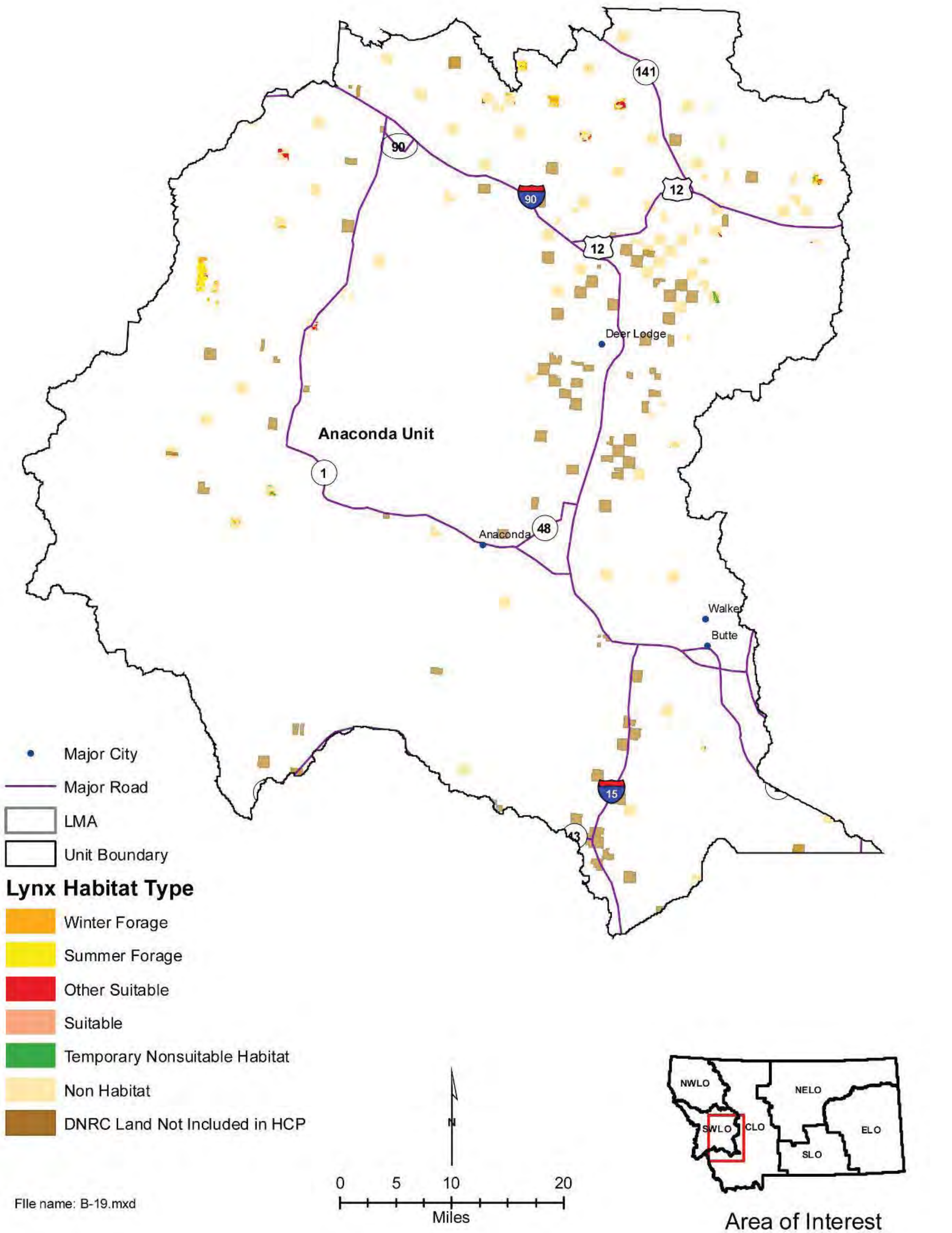


FIGURE C-20. LYNX HABITAT IN THE HCP PROJECT AREA IN THE BOZEMAN UNIT

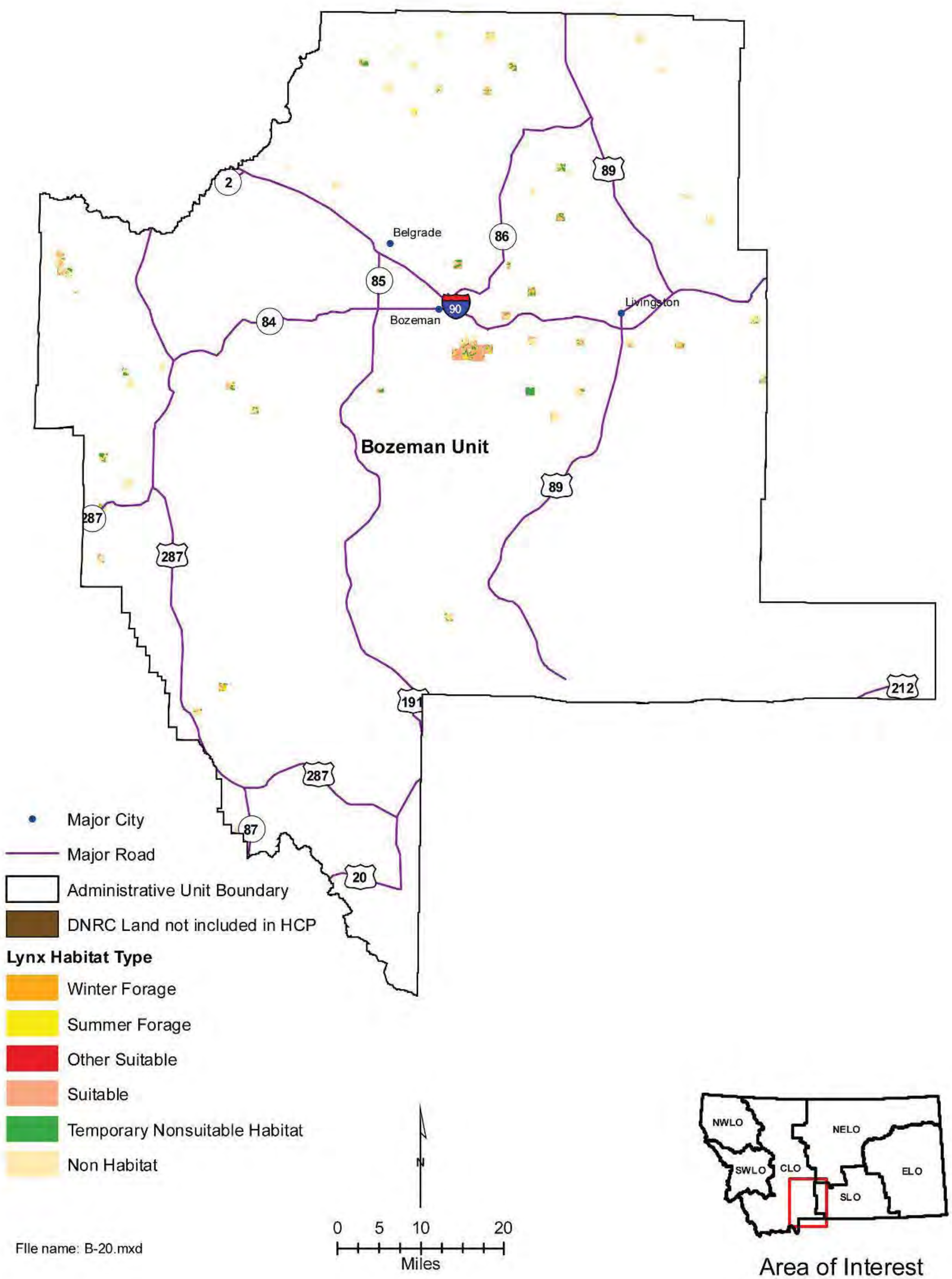


FIGURE C-21. LYNX HABITAT IN THE HCP PROJECT AREA IN THE CLEARWATER UNIT

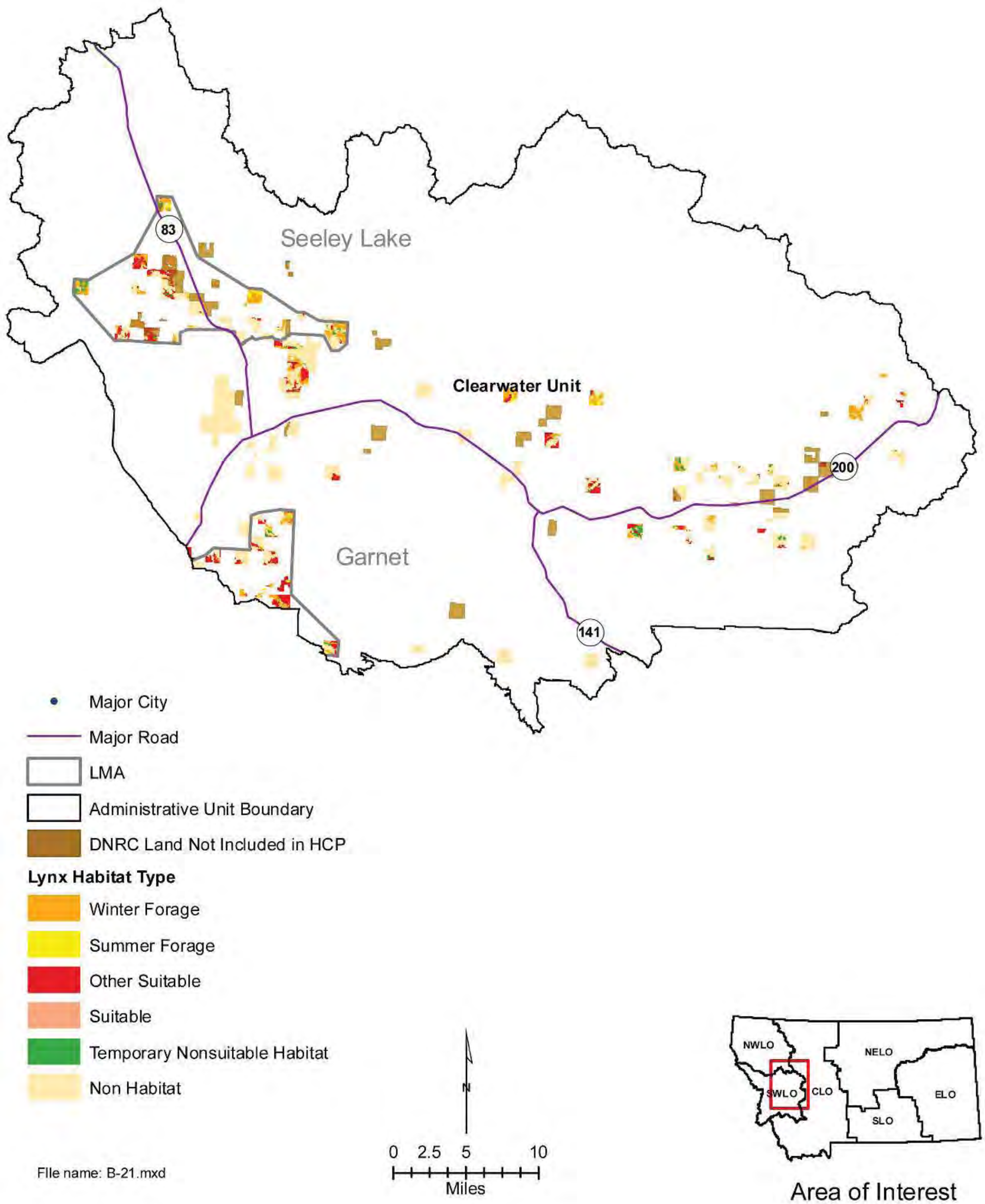


FIGURE C-22. LYNX HABITAT IN THE HCP PROJECT AREA IN THE DILLON UNIT

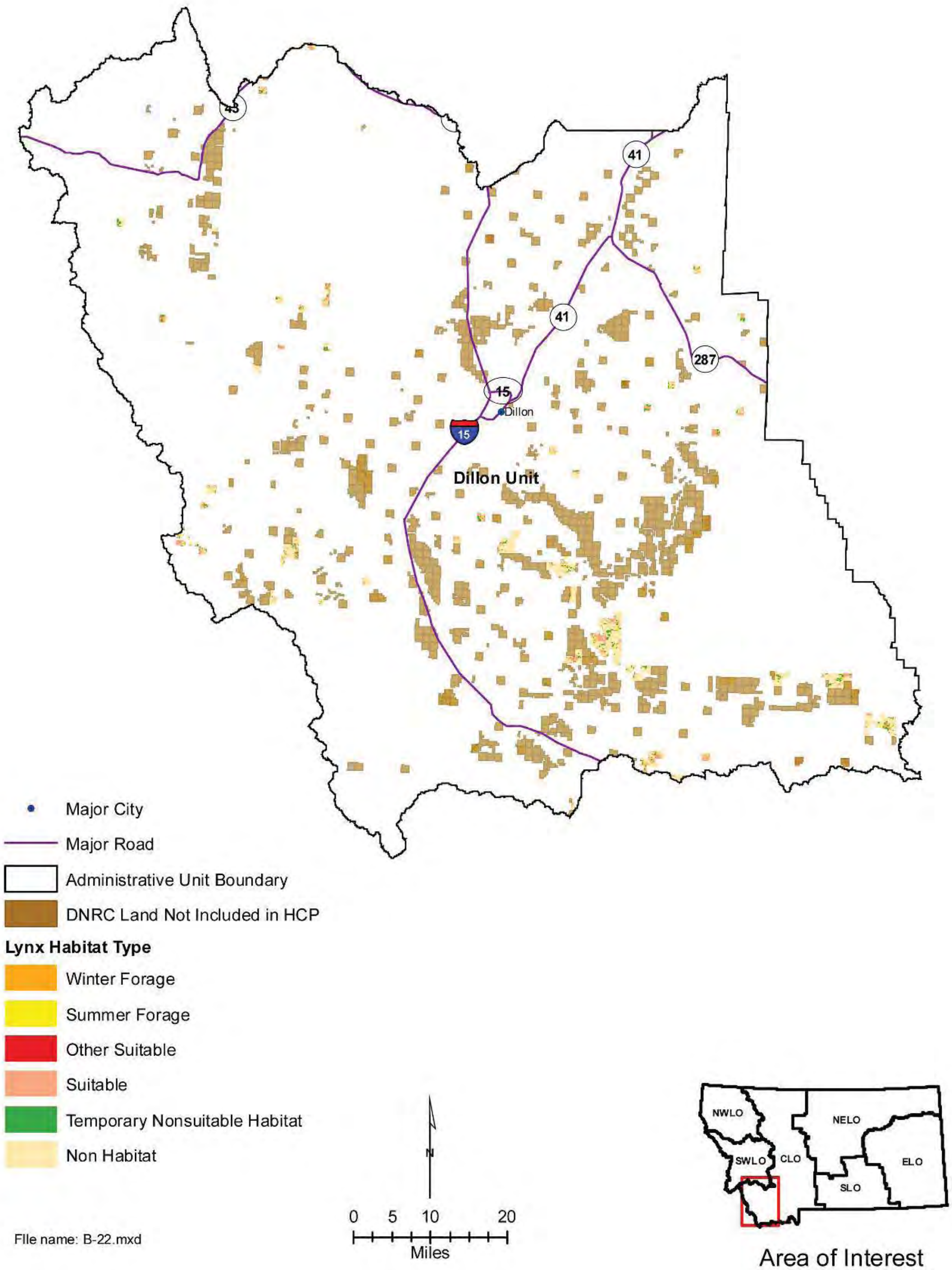


FIGURE C-23. LYNX HABITAT IN THE HCP PROJECT AREA IN THE HAMILTON UNIT

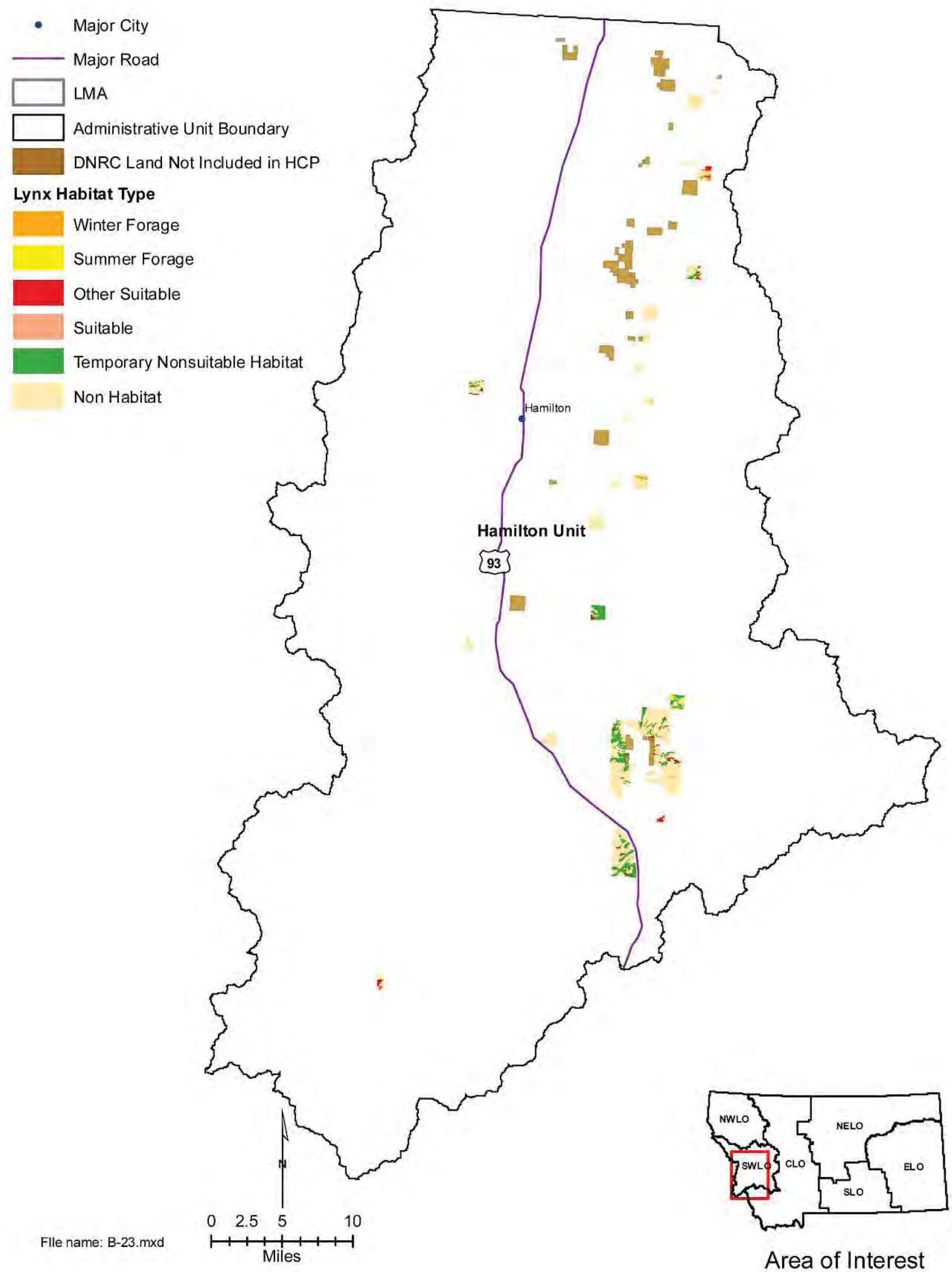


FIGURE C-24. LYNX HABITAT IN THE HCP PROJECT AREA IN THE HELENA UNIT

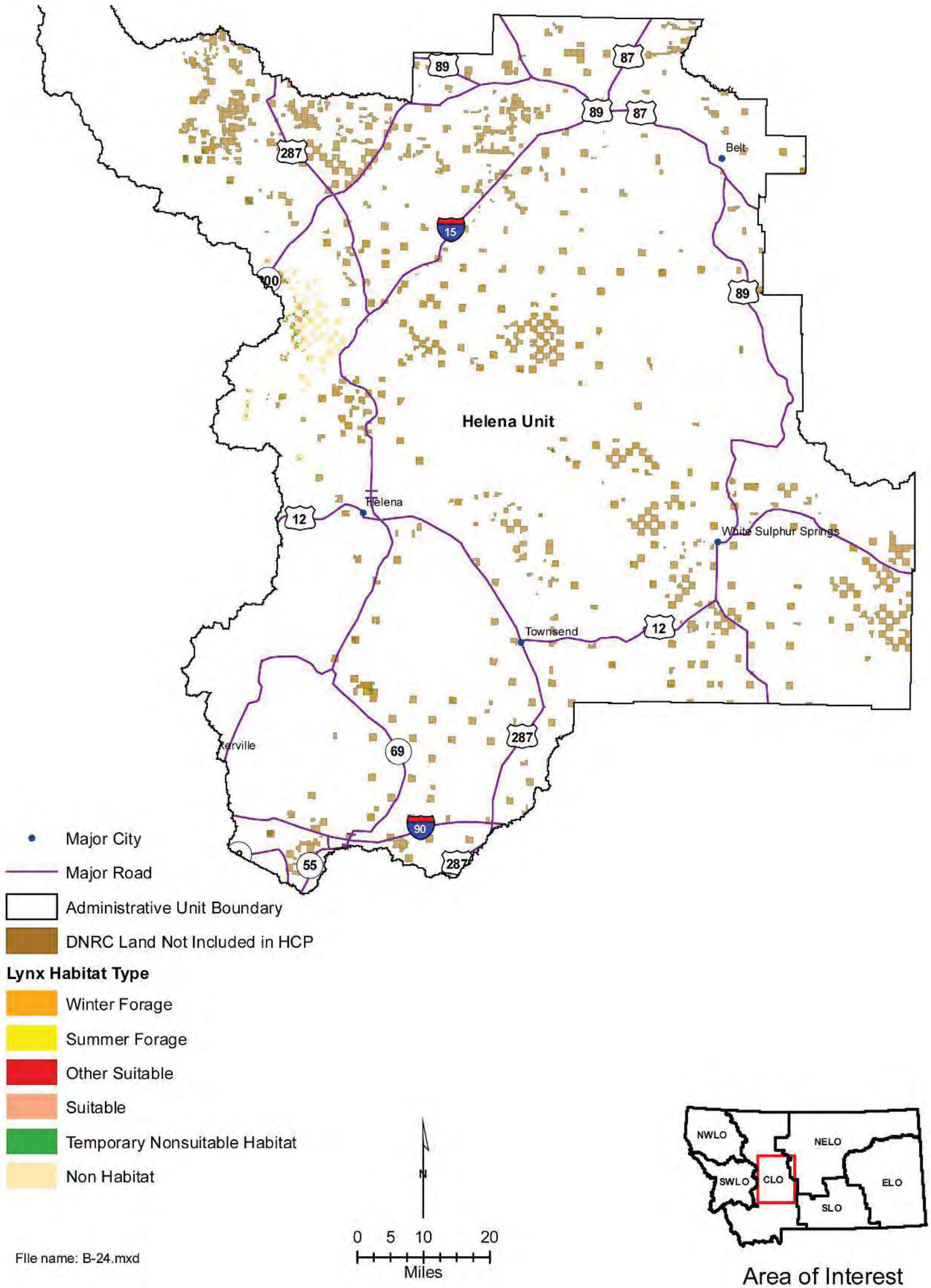


FIGURE C-25. LYNX HABITAT IN THE HCP PROJECT AREA IN THE KALISPELL UNIT

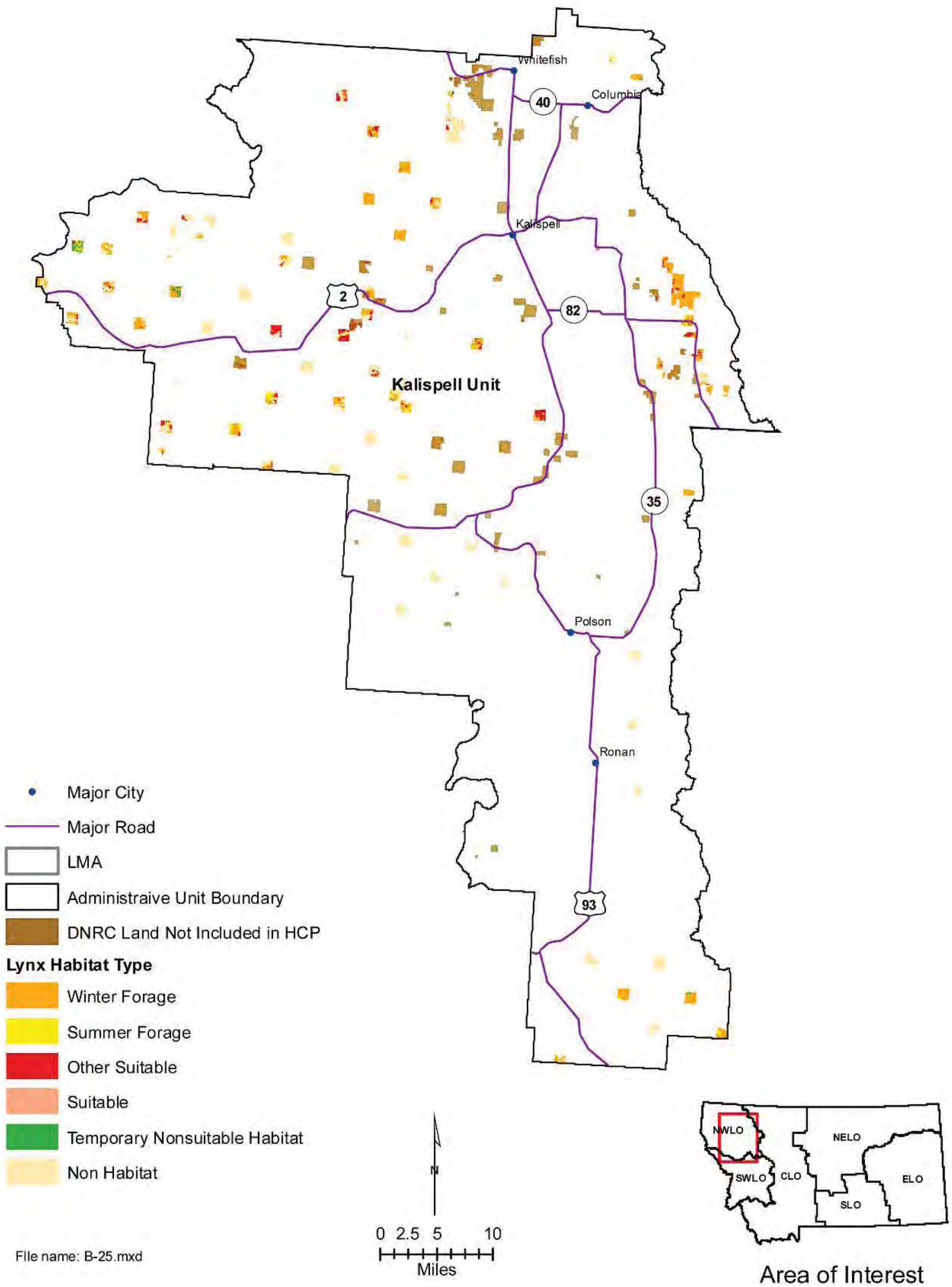


FIGURE C-26. LYNX HABITAT IN THE HCP PROJECT AREA IN THE LIBBY UNIT

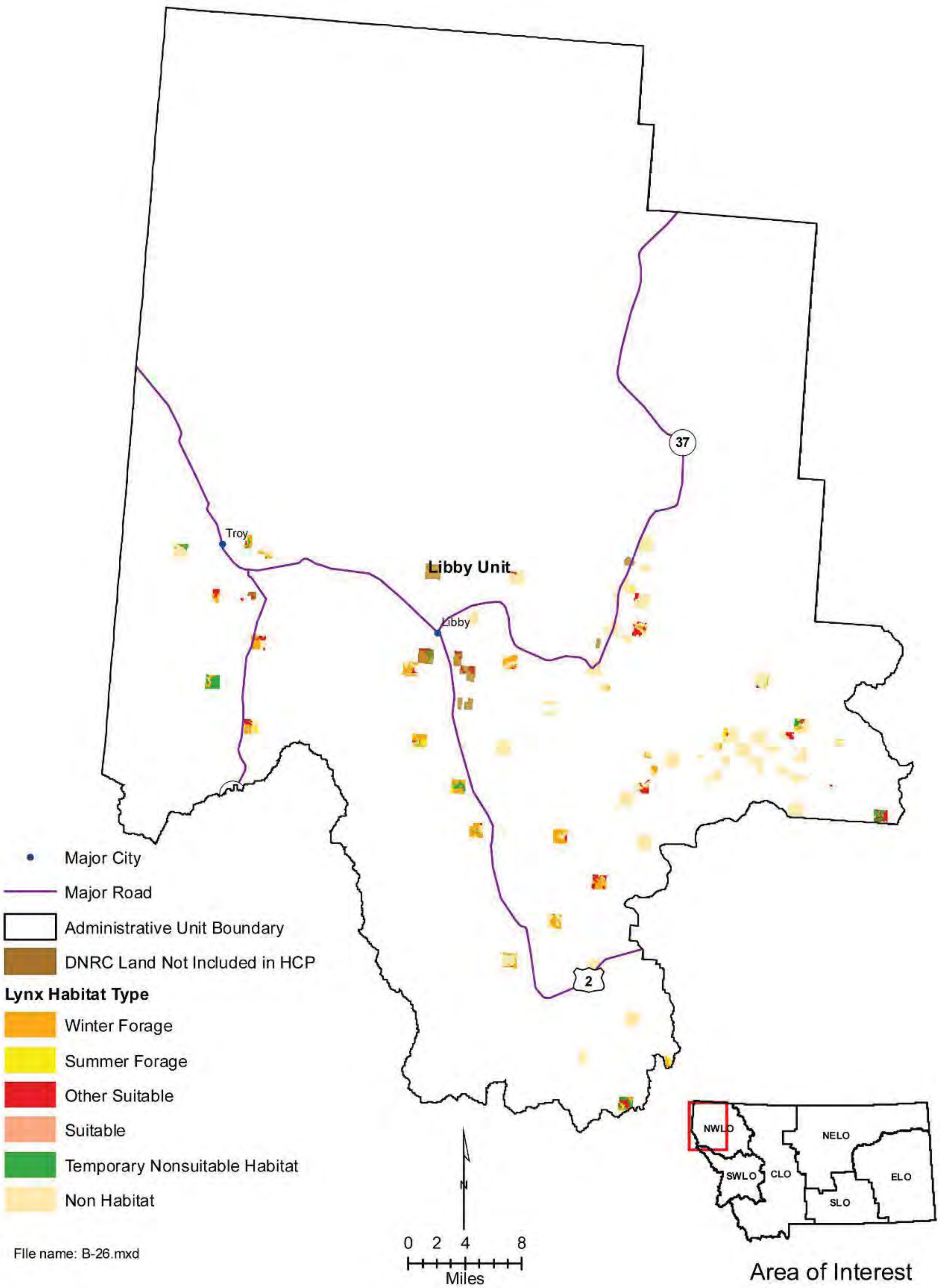


FIGURE C-27. LYNX HABITAT IN THE HCP PROJECT AREA IN THE MISSOULA UNIT

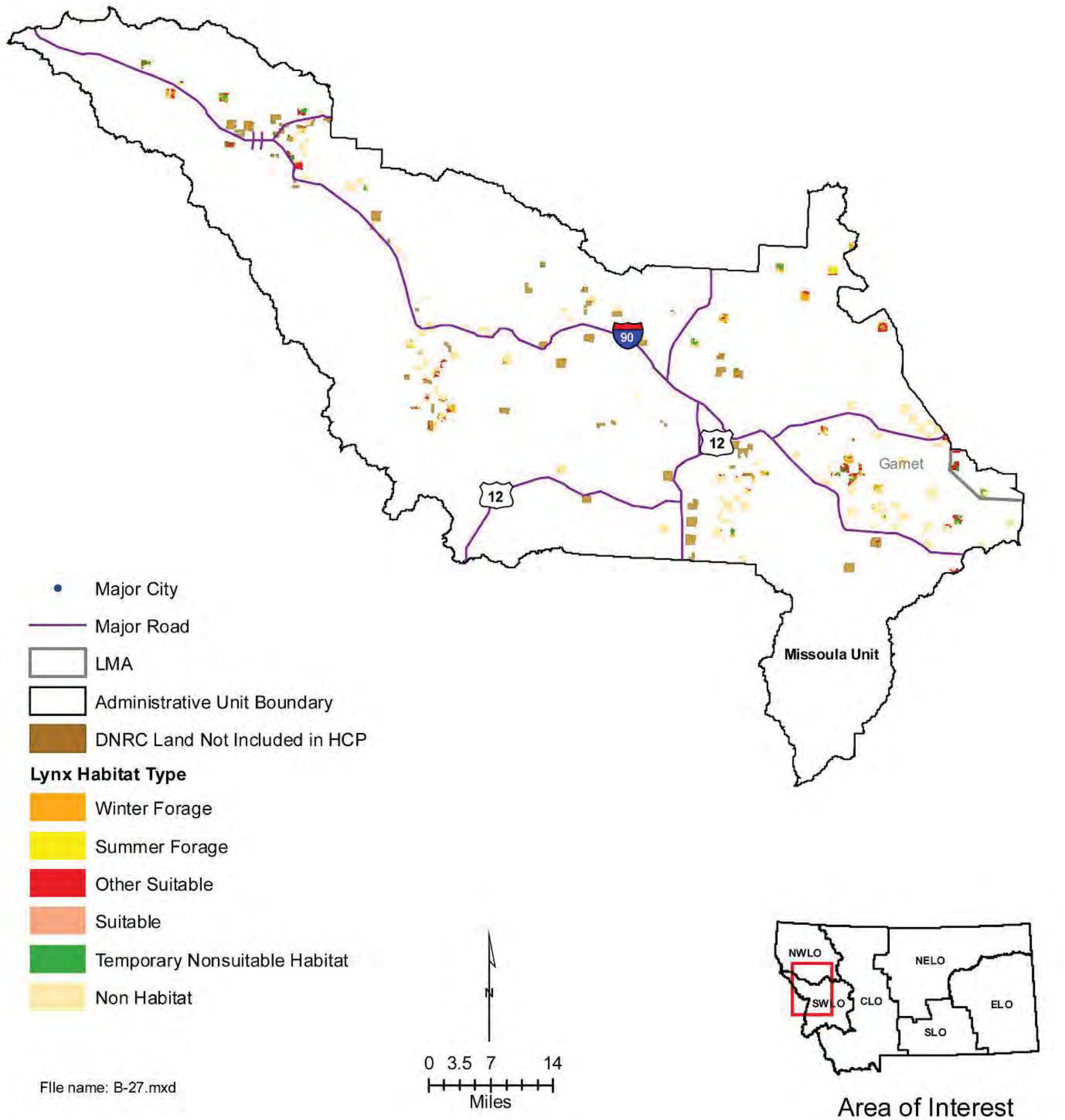


FIGURE C-28. LYNX HABITAT IN THE HCP PROJECT AREA IN THE PLAINS UNIT

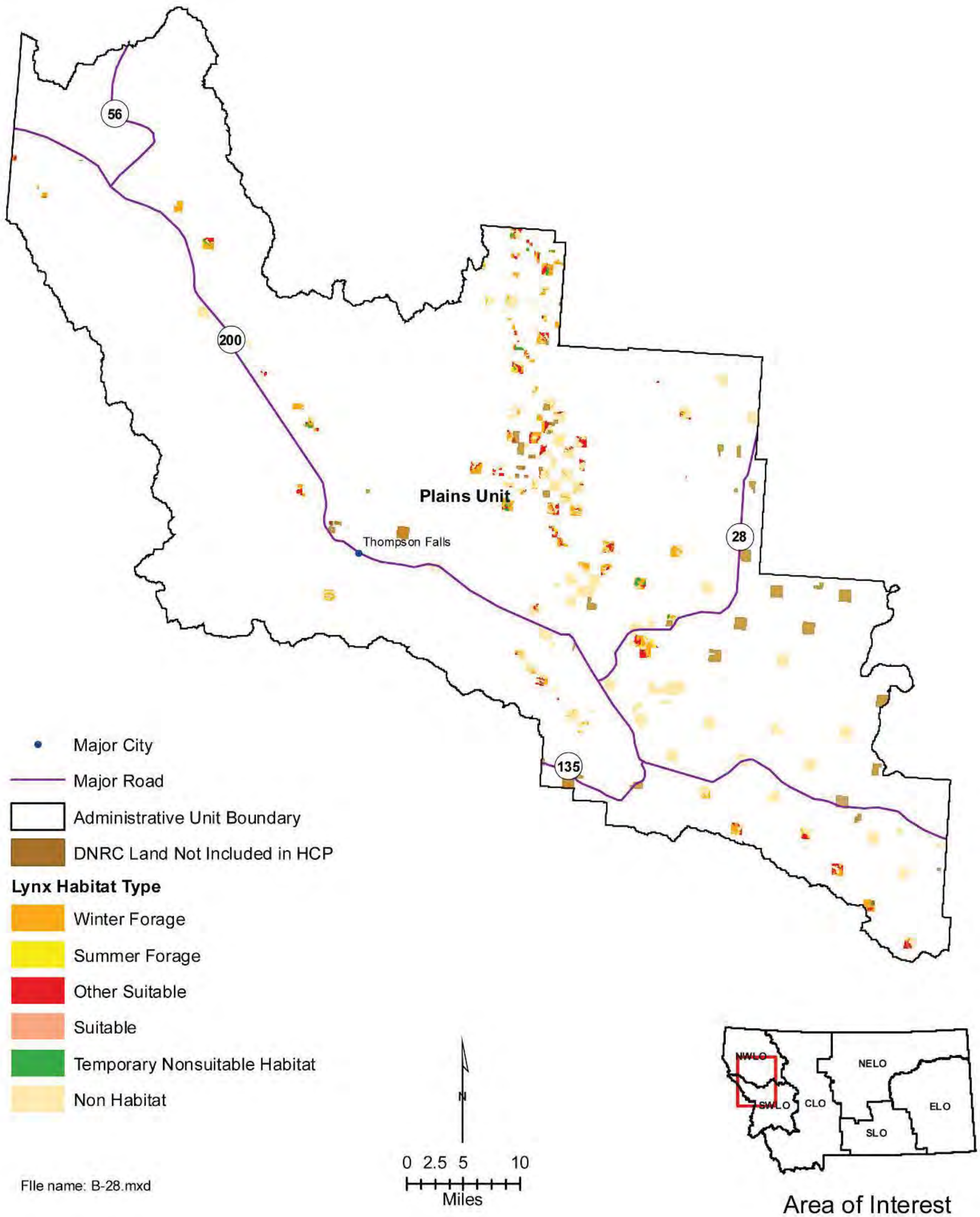


FIGURE C-29. LYNX HABITAT AND LMAS IN THE HCP PROJECT AREA IN THE STILLWATER UNIT

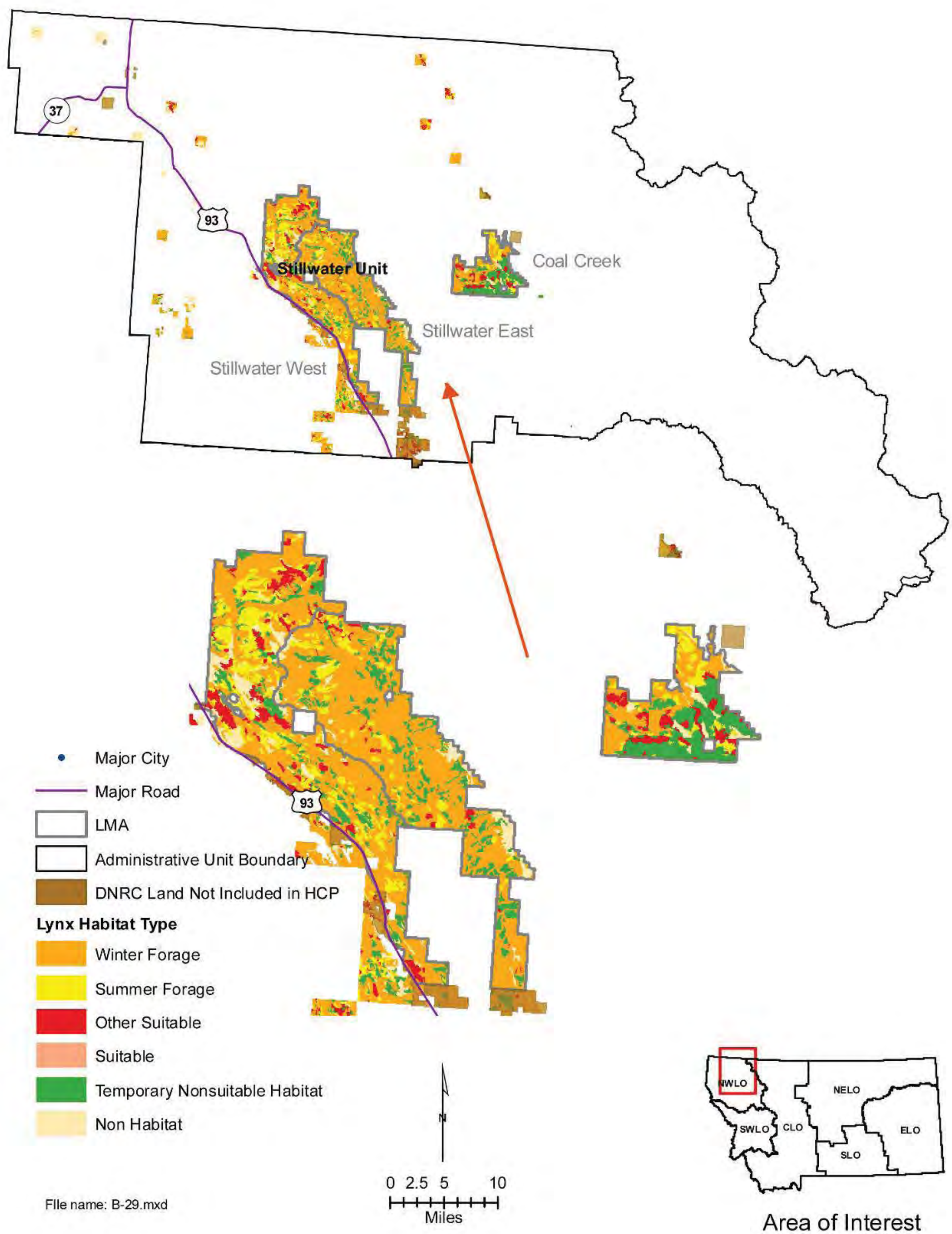


FIGURE C-30. LYNX HABITAT AND LMAS IN THE HCP PROJECT AREA IN THE SWAN UNIT

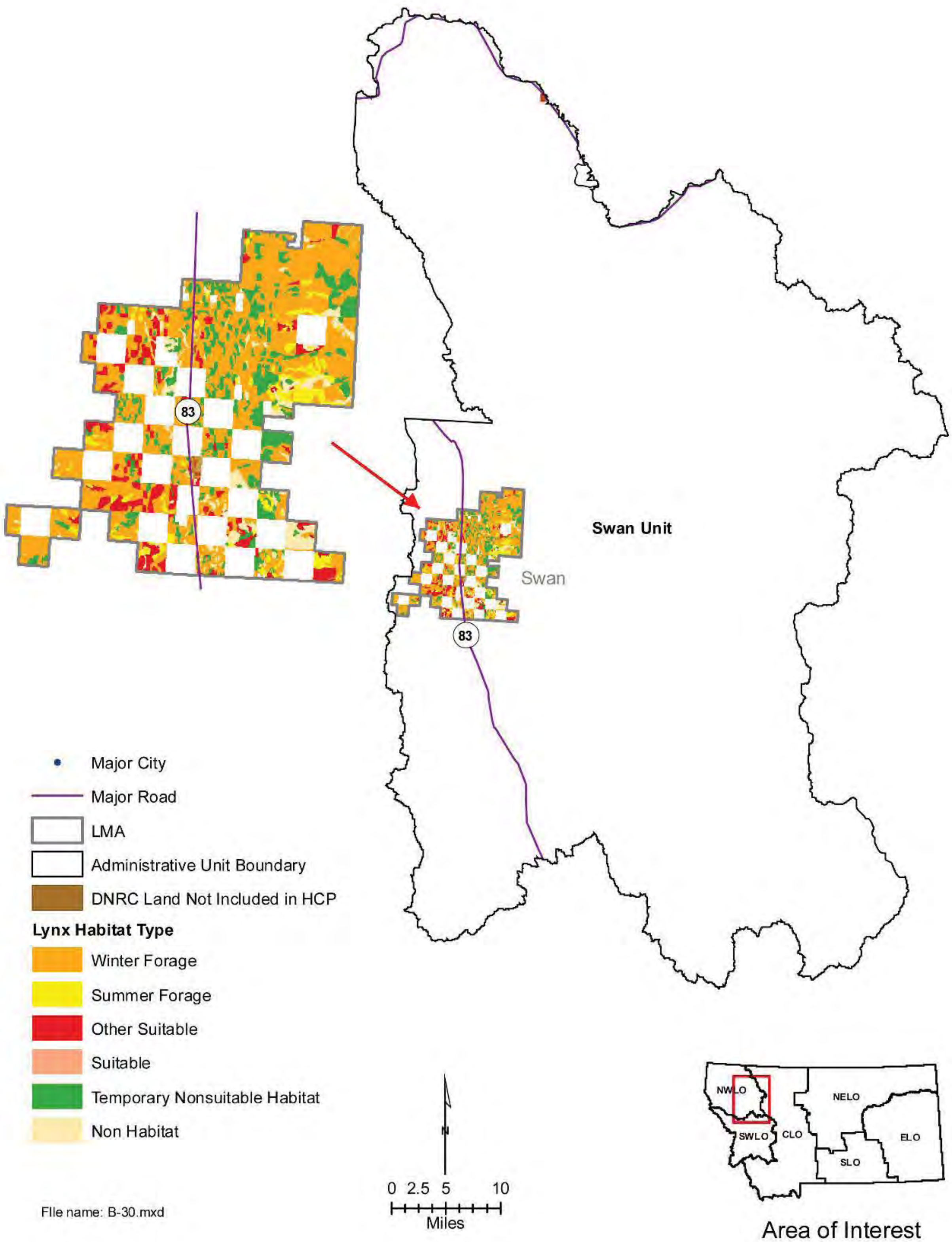


FIGURE C-31. LYNX HABITAT IN THE SEELEY LAKE AND GARNET LMAS

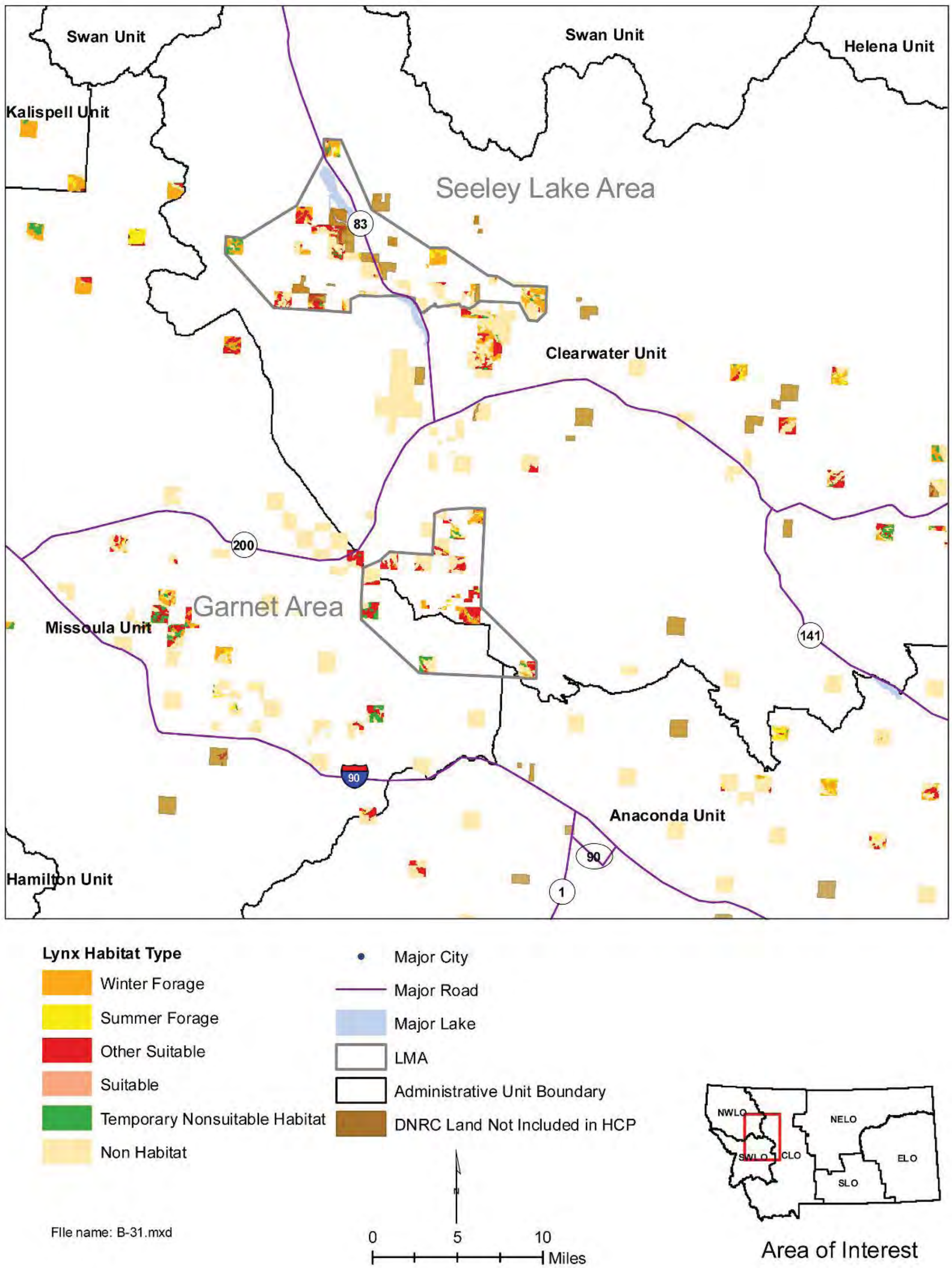


FIGURE C-32. DISTRIBUTION OF HCP FISH SPECIES WITHIN THE NWLO, SWLO, AND CLO

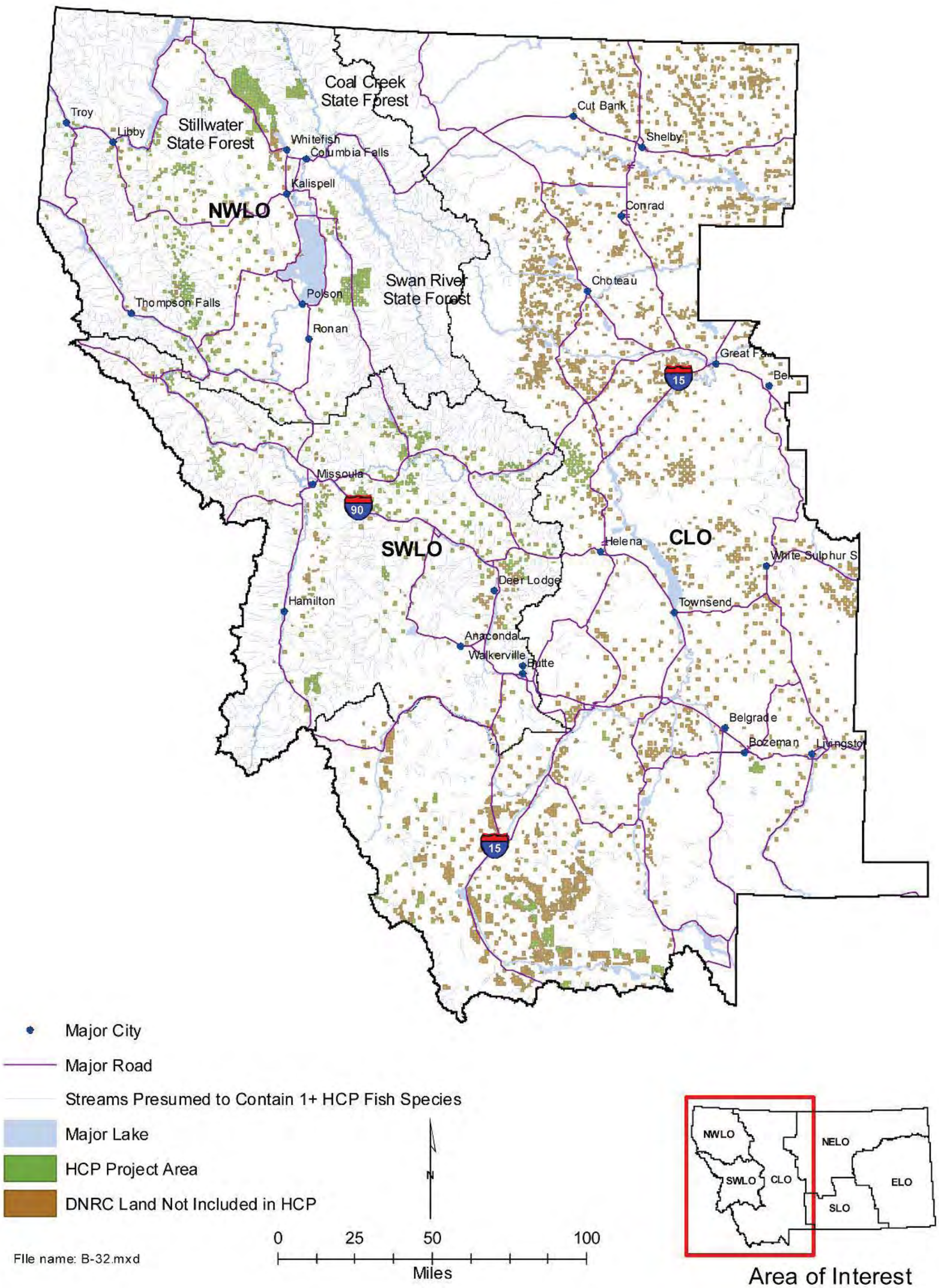


FIGURE C-33. LOCATIONS OF THE AQUATIC ANALYSIS UNITS IN THE HCP PROJECT AREA

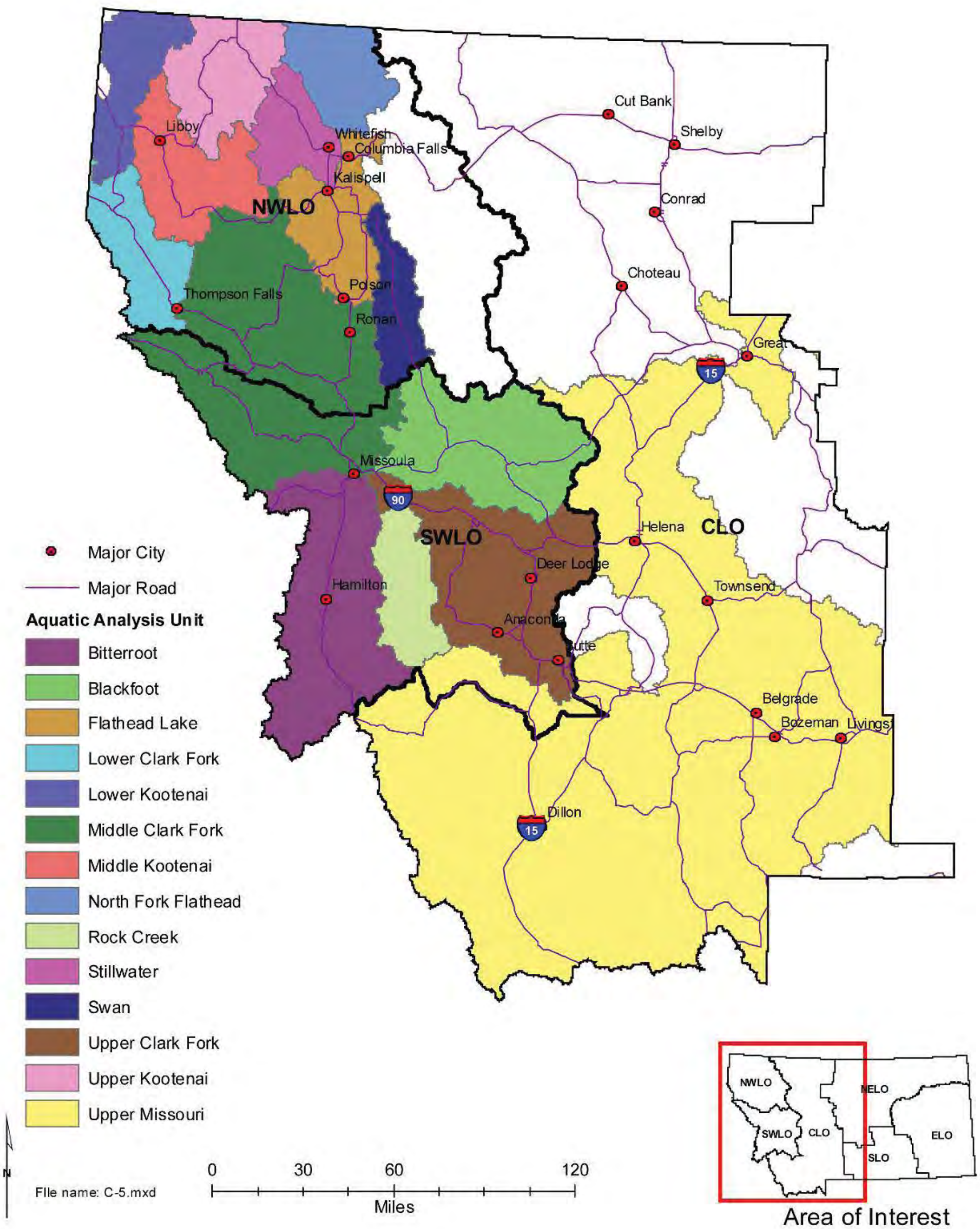
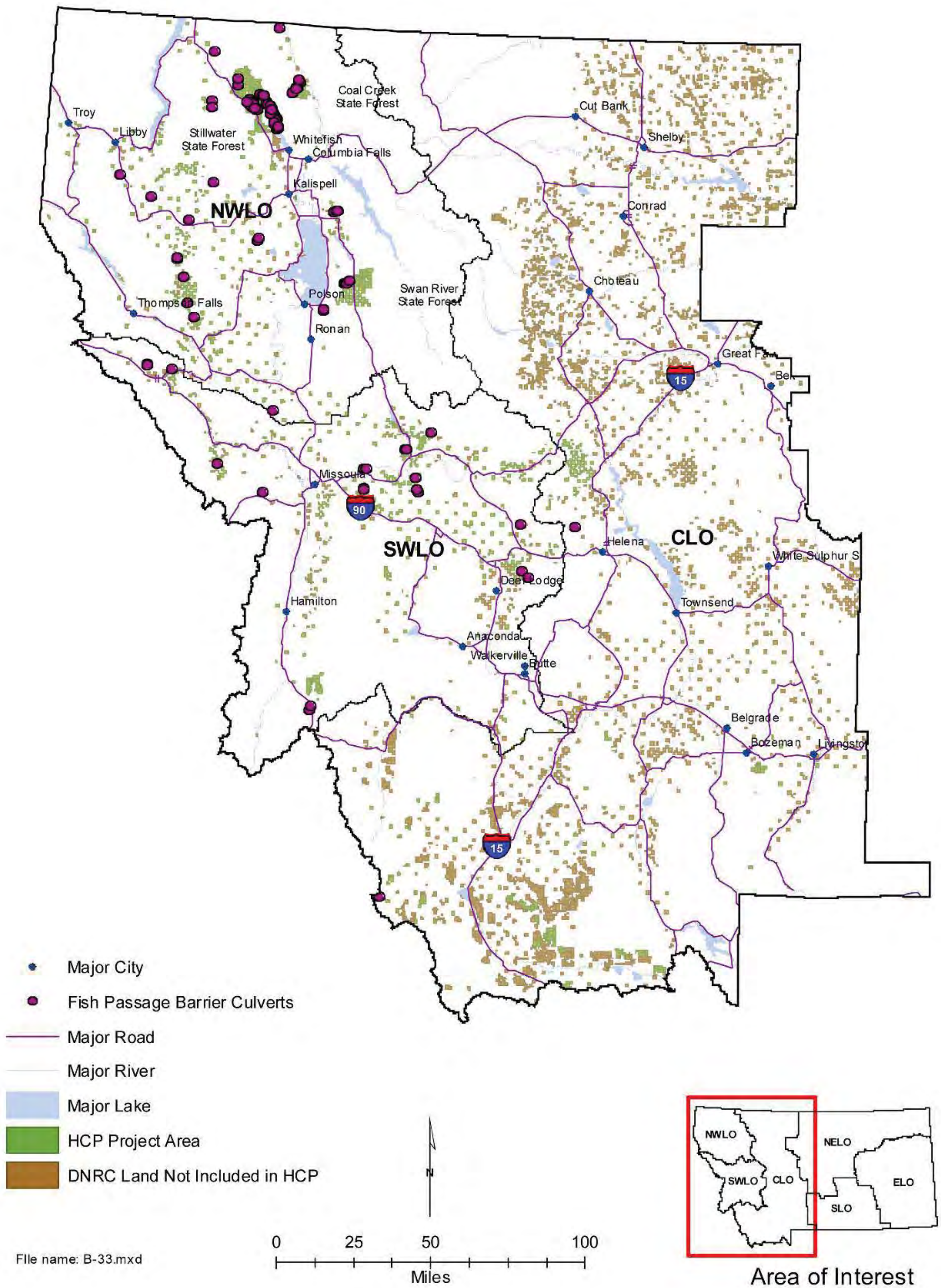


FIGURE C-34. LOCATION OF PRIORITY FISH PASSAGE BARRIER CULVERTS WITHIN THE HCP PROJECT AREA



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